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# United States Coast Pilot 5
# Atlantic Coast Gulf of Mexico, Puerto Rico, and Virgin Islands

EIGHTH EDITION—JULY 1975

Corrected through:

Local Notices to Mariners issued by Coast Guard District Commanders, April 8, 1975.

Weekly Notice to Mariners published by Defense Mapping Agency Hydrographic Center, No. 24, June 14, 1975.

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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
Robert M. White, Administrator

NATIONAL OCEAN SURVEY
Allen L. Powell, Director

Washington, D.C.: 1975
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# National Oceanic and Atmospheric Administration

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# LIMITS OF UNITED STATES COAST PILOTS

**Atlantic Coast**

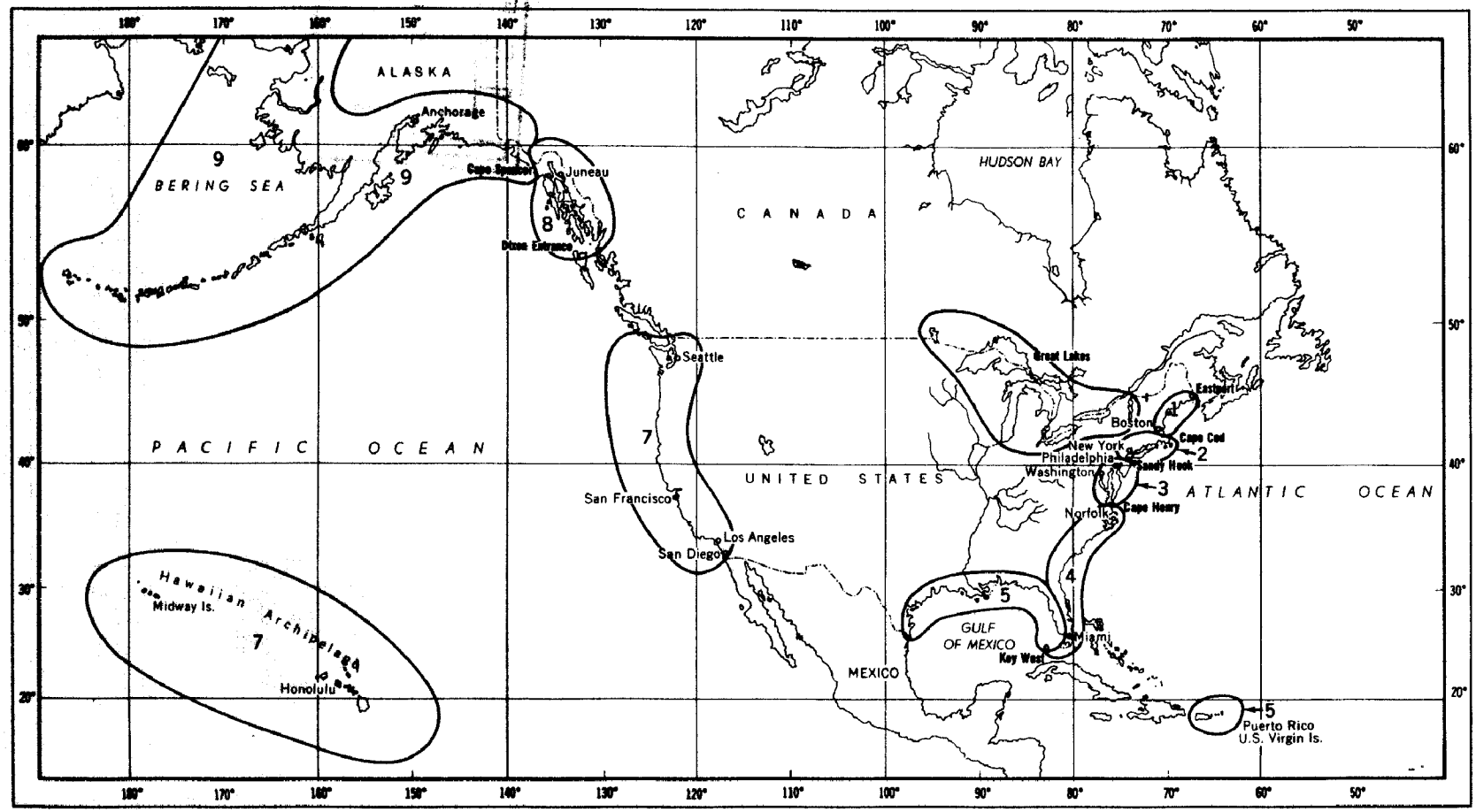
1 Eastport to Cape Cod
2 Cape Cod to Sandy Hook
3 Sandy Hook to Cape Henry
4 Cape Henry to Key West
5 Gulf of Mexico, Puerto Rico, and Virgin Islands

**Pacific Coast**

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

**Great Lakes Pilot**

The Lakes and their Connecting Waterways



# Preface

United States Coast Pilots are published by the National Ocean Survey pursuant to the Act of 6 August 1947 (33 USC 883a and b), and to the Act of 2 July 1958 (PL 85–480; 72 Stat. 279). The functions of the former Coast and Geodetic Survey are now carried out by the National Ocean Survey in accordance with Reorganization Plan No. 4 of 1970.

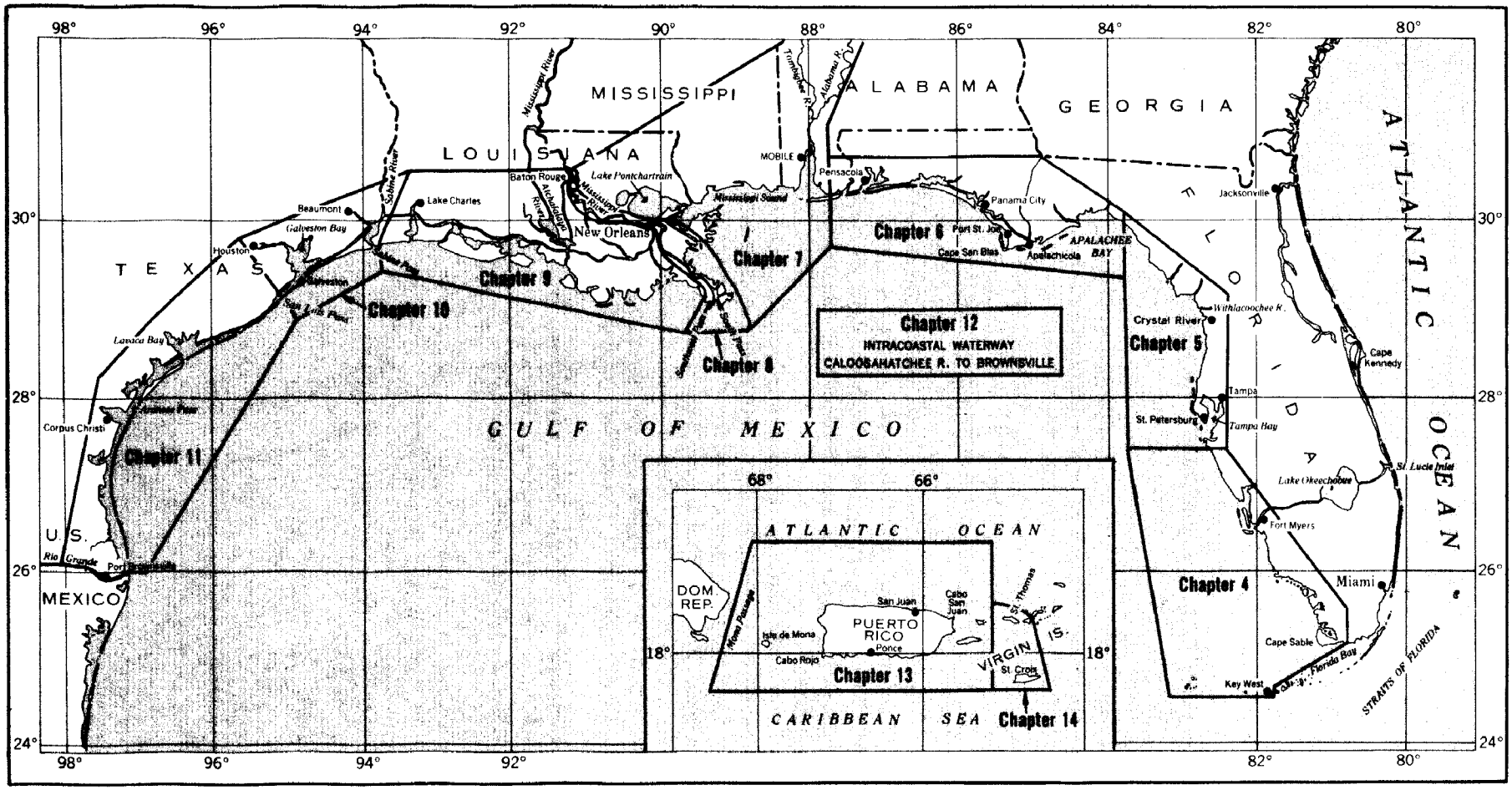
Coast Pilots supplement the navigational information shown on the nautical charts and are based upon field inspections conducted by the National Ocean Survey, information published in Notices to Mariners, and reports from NOAA survey vessels, other Government agencies, State and local governments, maritime and pilotage associations, port authorities, mariners, and others. The tables which follow the appendix are usually revised about every 5 years.

This volume of Coast Pilot 5, Atlantic Coast, Gulf of Mexico, Puerto Rico and Virgin Islands, cancels the Seventh (April 1974) Edition.

**Caution: The Coast Pilot is corrected through the dates of Notices to Mariners shown on the title page, and should not be used without reference to Notices to Mariners issued subsequent to those dates.**

Mariners and others are urged to report promptly to the National Ocean Survey 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 Weekly Notice to Mariners for your convenience. These reports and/or suggestions for increasing the usefulness of the Coast Pilot should be sent to Director, National Ocean Survey, Attention C324, Rockville, Maryland 20852.

The information published in this book has been computerized and printed by an automatic photocomposition process. The magnetic tape will be revised each year, and a new edition of Coast Pilot 5 will be published annually.

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# 1. GENERAL INFORMATION

**UNITED STATES COAST PILOTS.**-The National Ocean Survey Coast Pilots are a series of eight nautical books that cover a wide variety of information important to navigators of United States coastal and intracoastal waters. Most of this book information cannot be shown graphically on the standard nautical charts and is not readily available elsewhere. Coast Pilot subjects include navigation regulations, outstanding landmarks, channel and anchorage peculiarities, dangers, weather, ice, freshets, routes, pilotage, and port facilities.

**When new editions of Coast Pilots are published, they will be printed annually by an automatic photocomposition process, thus eliminating the yearly supplements. Coast Pilots 1, 2, 3, 4, 5, and 7 have been computerized and are now published on an annual basis.**

**Cumulative supplements** containing changes reported since dates of editions, will continue to be published early each year for the other Coast Pilots until they are due for new editions. Eventually all Coast Pilots will be computerized and new editions will be printed on an annual basis.

**Caution.-The Coast Pilot is corrected through the dates of Notices to Mariners shown on the title page, and should not be used without reference to the Notices to Mariners issued subsequent to those dates.**

The **Great Lakes Pilot** is published annually by the National Ocean Survey and contains similar information for the Great Lakes.

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

**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 Pilots 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 Pilots between as-built and authorized clearances. (See charts for horizontal clearances of bridges, as these are given in the Coast Pilots only when they are less than 50 feet.) Submarine cables are rarely mentioned.

**Courses.**-These are true and are expressed in the same manner as bearings. The directives "steer" or "make good" a course mean, without exception, to proceed from a point of origin along a track having the identical meridional angle as the designated course. Vessels following the directives must allow for every influence tending to cause deviation from such track, and navigate so that the designated course is continuously being 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.**-Depths are in feet or fathoms below the low-water tidal datum of the charts unless otherwise stated. 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 Pilots give 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.

**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 7 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 one 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 Center Radio Navigational Aids publications.)

**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 Coast Pilots; 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 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, except the Great Lakes. 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. The weekly notices may be obtained by operators of oceangoing vessels, without cost, by making application to Defense Mapping Agency Hydrographic Center, Washington, D.C. 20390.

**Notice to Mariners,** relating to the **Great Lakes** and tributary waters west of Montreal, is published weekly by the U.S. Coast Guard. These notices contain selected items from the Local Notices to Mariners and other reported marine information, and are intended primarily for use in correcting Great Lakes charts and related publications. Application for these free notices should be made to Commander, 9th Coast Guard District, Federal Building, Cleveland, Ohio, 44199.

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

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

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 Center.

Notices to Mariners may be consulted at Coast Guard district offices, NOS field offices, Defense Mapping Agency Hydrographic 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 United States 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 and does, upon 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, Great Britain, Greece, Honduras, Jamaica, Liberia, and the Netherlands. 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 Survey** (NOS), National Oceanic and Atmospheric Administration (NOAA), Department of Commerce.-The National Ocean Survey, established by joining the former Coast and Geodetic Survey with elements of the U.S. Lake Survey, 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 marine facilities of NOS are located in the Washington, D.C. area

(headquarters); in Norfolk, Va. (Atlantic Marine Center); in Detroit, Mich. (Lake Survey 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.)

The distribution center for NOS charts and publications is at 6501 Lafayette Avenue, Riverdale, Md. 20840. Orders mailed to headquarters should be accompanied by a check or money order made payable to National Ocean Survey, Department of Commerce.

**Sales agents** for Charts, Coast Pilots, Tide Tables, Tidal Current Tables, Tidal Current Diagrams, and Tidal Current Charts of the National Ocean Survey 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 Survey, Distribution Division (C44), 6501 Lafayette Avenue, Riverdale, Md. 20840.

**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, reference should be made 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 water 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 icebreaking facilities.

The Coast Guard 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 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.

Information concerning the predicted location and SAR characteristics of each vessel known to be within an area of interest, called a Surface Picture (SURPIC), is made available upon request to recognized SAR agencies or vessels needing assistance regardless of nationality for use during emergencies.

Instructions guiding participation in the AMVER System are available in the following 13 languages: Danish, Dutch, English, French, German, Greek, Italian, Japanese, Norwegian, Portuguese, Russian, Spanish, and Swedish. They are available from: Commander, Eastern Area, U.S. Coast Guard, Governors Island, N.Y. 10004; Commander, Western Area, U.S. Coast Guard, 630 Sansome Street, San Francisco, Calif. 94126; and at U.S. Coast Guard District Offices, Marine Inspection Offices, and Captain of the Port Offices in major U.S. ports.

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 Superintendent of Documents, Government Printing Office, Washington, D.C. 20402, 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 or Marine Inspection Office. Coast Guard District Offices, Coast Guard Stations, Captain of the Port Offices, and Marine Inspection Offices are listed 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.)

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

**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. 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 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 after April 23, 1973, by the "Marine Protection, Research, and Sanctuaries Act of 1972, Public Law 92-532."

Ocean dumping permits for dredged spoil will be issued by the Corps of Engineers, and all other ocean dumping permits will be issued by the Environmental Protection Agency.

The regulations to implement this law were published in the Federal Register on April 5, 1973.

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 and in all possessions except the Panama Canal Zone. 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 non-resident 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 Center (DMAHC),** Department of Defense.-The Defense Mapping Agency Hydrographic Center provides accurate charts and related information for foreign waters. Publications include Sailing Directions (pilots), Light Lists, Table of Distances, Radio Navigational Aids, International Code of Signals, American Practical Navigator (Bowditch), and the Notice to Mariners published weekly.

**Public Health Service,** Department of Health, Education, and Welfare.-The Public Health Service administers hospitalization and outpatient treatment to legal beneficiaries of the government, administers foreign quarantine procedures at U.S. ports of entry, and conducts medical examinations of aliens.

All vessels arriving in the United States are subject to public health inspection. Only the following vessels are subject to **routine boarding** for quarantine inspection upon arrival: (a) vessels which have been in a smallpox-infected country in the 15 days prior to arrival; (b) vessels which have been in a plague-infected country within 60 days prior to arrival; (c) vessels which have had on board during the 15 days preceeding arrival any of the following signs of **illness:**

1. Temperature of 100°F (38°C) or greater which was accompanied or followed by any one or all of the following: rash, jaundice, glandular swelling; or
2. Diarrhea severe enough to interfere with work or normal activity.
3. Death, regardless of the foregoing criteria.

Masters of vessels having illness aboard compatible with the above criteria must provide radio notification of the illness through their agent to the quarantine station at the intended U.S. port of arrival.

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, Quarantine Branch, Bureau of Epidemiology, Center for Disease Control, Atlanta, Ga. 30333.

U.S. merchant seamen are entitled to **medical relief** obtainable through the Public Health Service. A U.S. seaman is one engaged on board in care, preservation, or navigation of any registered, enrolled, or licensed vessel of the United States, or in the service, on board, of those so engaged. Hospitals, outpatient clinics, and contract physician's offices of the Public Health Service are located at the addresses given in the appendix. Free **medical advice** is furnished to seamen by radio through the cooperation of Governmental and commercial radio stations whose operators receive and relay messages from ships at sea to

Public Health Service stations and then radio the medical advice back to the ships. (See appendix for list of radio stations that provide this service.)

**National Weather Service** (NWS), National Oceanic and Atmospheric Administration (NOAA), Department of Commerce.-The National Weather Service, formerly the Weather Bureau, makes forecasts and gives warnings of approaching storms over land and ocean areas to navigation, commerce, agriculture, and the general public. Other warnings cover cold waves, frost, forest-fire hazard, tornadoes, and floods. Meteorological information is collected and transmitted at 1-hour, 3-hour, and 6-hour intervals from land stations, ships at sea, and aircraft. These reports form a basis for the forecasting service, and for research basic to improvement of the NWS.

National Weather Service offices are in many ports and other places in the United States and possessions. Stations in the area of concern to this Coast Pilot, where the public may compare barometers against NWS barometers and discuss weather information with service officials, are listed in the appendix.

The collection of **marine meteorological observations** from ships at sea is conducted on a purely voluntary and cooperative basis. NWS supplies shipmasters with blank forms, printed instructions, and such other materials that are essential to the making and recording of observations. In the course of an average peacetime year, more than 400,000 observations are received from vessels representing every maritime nation and reaching every quarter of the globe.

The **hurricane and storm warning service** was established primarily to aid marine interests. Warnings are issued whenever winds, weather, sea conditions, storm surge, or other conditions are expected that will be a hazard to marine operations. These warnings are given wide distribution by commercial radio and television, Coast Guard radio, daily newspapers, and by visual warning displays. Storm information is also broadcast over National Bureau of Standards Time and Frequency Radio Stations WWV, Ft. Collins, Colo., and WWVH, Kauai, Hawaii. (See Time Signals this chapter.) During the hurricane season, June through November, ships are asked to be especially watchful for signs of hurricanes and report by radio immediately. Satellite weather pictures are also used to locate hurricanes; these pictures are especially useful in areas of the ocean infrequently crossed by ships. Special reports are obtained from weather reconnaissance planes dispatched to keep track of hurricanes. Coastal radar reports are extremely valuable in defining the size and intensity of hurricanes when they are within about 200 miles of the station.

A **hurricane watch** is an announcement by the NWS to the public and all other interests via press, radio, and television whenever a tropical storm or hurricane becomes a threat to a coastal area. The "hurricane watch" announcement is not a warning; it indicates that the hurricane is near enough that everyone in the "watch" area should listen for subsequent advisories and be ready to take precautionary action in case hurricane warnings are issued.

The NWS, along with the Coast Guard, state and local governments, and private interests, cooperate in operating a **coastal warning display system** to warn pleasure boatmen, and other marine interests lacking radio-receiving equipment, of impending hazardous weather and sea conditions on coastal and inland waters. There are about 500 of these flag or light display stations. The storm warning display stations are listed on NOS charts and included on the Marine Weather Services Charts published periodically by NWS.

**Environmental Data Service (EDS),** National Oceanic and Atmospheric Administration (NOAA), Department of Commerce. - Among its functions, EDS archives, processes, and disseminates the non-realtime meteorological and oceanographic data collected by government agencies and private institutions. Marine weather observations are collected from ships at sea on a voluntary basis. More than one-half million observations are received annually at EDS'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 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.

**Radio distress procedures.**-Distress calls are made on 500 kHz (SOS) for radiotelegraphy and on 2182 kHz or channel 16 (156.80 MHz) VHF-FM (MAYDAY) for radiotelephony. For less serious situations than warrant the distress procedure, the urgency signal (PAN for radiotelephony) or the safety signal (SECURITY 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 H.O. Pubs. 117A, 117B, or Part 83, Title 47, Code of Federal Regulations. **(See appendix for a list of Coast Guard Stations which guard 2182 kHz and 156.80 MHz.)** 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, masts, 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. 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, 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 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 121.5 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 International Regulations for Preventing Collisions at Sea.

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 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, 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 envolope 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.

(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.

(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.

**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.

## RADIO WARNINGS AND WEATHER

Marine radio warnings and weather forecasts are available from many sources and through several types of transmissions. Only voice radiotelephone broadcasts are described in the Coast Pilots. 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 H.O. Pubs. 117A, 117B, and the Department of Commerce publication, 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 Pilots 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 warnings, storm warnings, navigation information, and other advisories on **2670 kHz**, following a preliminary call on **2182 kHz.** (See the appendix for a list of the stations and their broadcast 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. **Both the urgent signal and message are**

**transmitted on 2182 kHz. Safety** broadcasts are preceded by the safety signal SECURITY. **The safety signal is given on 2182 kHz, and the message is given on 2670 kHz.** At the discretion of the originator, urgent and safety broadcasts may also be made on VHF-FM channel 16 (156.80 MHz).

The National Weather Service operates **VHF-FM radio stations,** usually on frequencies **162.40 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 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 the 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 storm, 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 U.S. system of broadcasting time signals begins at 55 minutes 0 second of some hour and continues for 5 minutes. Signals are transmitted on every second of this period except the 29th of each minute, the 51st of the first minute, the 52d of the second minute, the 53d of the third minute, the 54th of the fourth minute, the last 4 seconds of the first 4 minutes, and the last 9 seconds of the last minute. The hour signal is a 1.3-second dash, which is much longer than the others.

In all cases the beginning of the dashes indicates the beginnings of the seconds, and the ends of the dashes are without significance. The number of dashes sounded in the group at the end of any minute indicates the number of minutes of the signal yet to be sent. In case of signal failure or error, the signal is repeated 1 hour later.

Time corrections (DUT1=UT1-UTC) will be transmitted in standard Morse Code (15 wpm) during each minute between seconds 56 and 59. The code will give the letter "A" for add and one digit to designate a positive DUT1 and the letter "S" with a digit to designate a negative correction.

The **U.S. Naval Observatory,** Washington, D.C., makes time signal broadcasts for the Atlantic area from Navy Radio Station **NSS,** Annapolis, Md., as follows: frequencies-88, 5870, 8090, 12135, 16180, 20225, and 25590 kHz; hours of transmission-0455-0500, 1055-1100, 1655-1700, and 2255-2300 Greenwich Mean Time, except that on Tuesday the frequency 185 kHz replaces 88 kHz from 1655-1700 and frequencies 20225 and 25590 kHz are used only from 1655-1700 and 2255-2300.

**WWV-WWVH BROADCASTS.**-The **National Bureau of Standards** broadcasts time signals continuously, day and night, from its radio stations **WWV,** near Fort Collins, Colo. (40°40′49″N., 105°02′27″W.), and **WWVH,** Kauai, Hawaii (21°59′26″N., 159°46′00″W.), on radio frequencies of 2.5, 5, 10, 15, and 20 MHz, and also 25 MHz from Fort Collins only. Services include standard time signals and time intervals, time corrections, standard radio frequencies, standard audio frequencies, standard musical pitch, a slow time code, propagation forecasts, geophysical alerts, and storm warnings.

**Special Publication 236** describes in detail the standard frequency and time service of the National Bureau of Standards. Single copies may be obtained upon request from the National Bureau of Standards, Boulder, Colorado 80302. Quantities may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

## 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 the Director (C322), National Ocean Survey, Rockville, Md. 20852.

**Chart symbols and abbreviations.**-The standard symbols and abbreviations approved for use on all regular nautical charts published by the Defense Mapping Agency Hydrographic Center and NOS are contained in **Chart No. 1,** United States of America **Nautical Chart Symbols and Abbreviations.** The publication is available at all Defense Mapping Agency Hydrographic Center and NOS 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 tidal datum for depths** on NOS charts is the mean of all low waters for the Atlantic coast of the United States, including the West Indies, and the mean of the lower low waters for the Pacific coast, including the Hawaiian Islands and Alaska. The plane most frequently used on foreign charts is mean low water springs. The effect of strong winds, in combination with the regular tidal action, may at times cause the water level to fall considerably below the reference plane.

**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 Division (C44), National Ocean Survey, 6501 Lafayette Avenue, Riverdale, Md. 20840.

**NOTE:** Effective July 1, 1974, the National Ocean Survey and the Defense Mapping Agency Hydrographic Center adopted a uniform **U.S. Nautical Chart Numbering System.** Prefix C&GS and suffix SC, for charts published by NOS, and prefix N.O. for charts published by the Defense Mapping Agency Hydrographic Center, are not used in the new numbering system. The Coast Pilot reflects the new numbers followed by the former C&GS and/or N.O. numbers in parentheses as appropriate. However, until further notice, users are requested to order NOS charts by the former C&GS numbers. Any changes in chart ordering procedures will be announced in the Weekly and Local Notices to Mariners. Charts mentioned in the Coast Pilot that are published and sold by the Defense Mapping Agency Hydrographic Center and its authorized sales agents are preceded by an asterisk.

**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 1:100,000 to 1:600,000, are for coastwise navigation outside of outlying reefs and shoals.

**Coast charts,** scales 1:50,000 to 1:100,000 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 normal 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 Pilots.

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.

**Dumping grounds** are areas established by federal regulation (Part 205, Title 33, Code of Federal Regulations) in which dumping of dredged material and other nonbuoyant objects is prohibited or in which such dumping is allowed with the permission of and under the supervision of the Corps of Engineers.

**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 chart 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, but soundings and depth curves are usually retained and blue tinting is seldom used. Navigators should be cautious about passing over fish havens or anchoring in their vicinity.

**Fishtrap areas** are areas established by the Corps of Engineers in which traps may be built and maintained according to established regulations. The areas and regulations are in Part 206, Title 33, Code of Federal 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, fresh water. 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 visibility of lights is given in the Light Lists and on the charts. The Light Lists give both the nominal range and geographic range, whereas the charts show only the shorter range (charts with edition or revision dates prior to July 1969 may not conform to this policy). **Nominal range** is the luminous range (a function of light intensity) in clear weather (meteorological visibility 10 miles), and **geographic range** is the maximum distance at which a light can be seen with perfect visibility (without regard to light intensity) with the observer's eye 15 feet above sea level. The actual luminous range for meteorological visibilities other than 10 miles may be determined graphically. (See the Light List.) 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 other than 15 feet, the geographic range from the Light List or chart 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.

**Lights and clearance gages on bridges.**-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 Pilots. All bridge piers (and their protective fenders) and abutments which are in or adjacent to a navigation channel are marked on all channel sides by red lights. On each channel span of a fixed bridge, there is a range of two green lights marking the center of the channel and a red light marking both edges of the channel, except that when the margins of the channel are confined by bridge piers, the red lights on the span are omitted, since the pier lights then mark the channel edges; for multiplespan fixed bridges, the main-channel span may also be marked by three white lights in a vertical line above the green range lights.

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.

A complete description of bridge lighting is contained in Coast Guard Publication 208. Bridges and their lighting, construction, maintenance, and operation are set forth in the Code of Federal Regulations, Title 33, Parts 68 and 114-117. 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 Pilots.

**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 insuring 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 a 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 buoy symbol is used to indicate the approximate position of the buoy body and the sinker which secures the buoy to the seabed. 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 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 the 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 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. There is included in these publications the procedure to follow for the use of radiobeacons for calibration of radio direction-finders as well as a list of 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 insure 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 N) will be as follows: In N latitude, the minus sign is used when the ship is E of the radiobeacon and the plus sign used when the ship is W of the radiobeacon. In S latitude, the plus sign is used when the ship is E of the radiobeacon, and the minus sign is used when the ship is W of the radiobeacon.

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.

**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 Center. The National Ocean Survey shows Loran lines on general 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 geometric errors exceeding 2 nautical miles per microsecond 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 insure that the ground wave signal of one station is not unknowingly matched with a skywave signal of the other station of the pair, or a one-hop skywave signal from station with a two-hop skywave signal from the other.

**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 employing more aids bearing the USWMS geometric shapes described below.

Two categories of waterway markers are employed. 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 S or W, indicating that danger lies to the N or E of the buoy. White buoys with black tops should be passed to the N or E, in-

dicating that danger lies to the S or W. Vertical red and white striped buoys indicate a boat should not pass between the buoy and the nearest shore. Danger lies inshore of the buoy.

**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 Honolulu Observatory 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.**-Pilot Rules for Inland Waters, §80.33, state that by day a surveying vessel of the National Ocean Survey (NOS), underway and employed in hydrographic surveying, may carry in a vertical line, one over the other not less than 6 feet apart where they can best be seen, three shapes not less than 2 feet in diameter of which the highest and lowest shall be globular in shape and green in color and the middle one diamond in shape and white.

(a) Vessels of the NOS shall carry the above-prescribed marks while actually engaged in hydrographic surveying and underway, including drag work. Launches and other boats shall carry the prescribed marks when necessary.

(b) It must be distinctly understood that these special signals serve only to indicate the nature of the work upon which the vessel is engaged and in no way give the surveying vessel the right-of-way over other vessels or obviate the necessity for a strict observance of the rules for preventing collision of vessels.

(c) By night a surveying vessel of the NOS, underway and employed in hydrographic surveying, shall carry the regular lights prescribed by the rules of the road.

(d) A vessel of the NOS, when at anchor in a fairway on surveying operations, shall display from the mast during the daytime two black balls in a vertical line and 6 feet apart. At night two red lights shall be displayed in the same manner. In the case of a small vessel the distance between the balls and between the lights may be reduced to not less than 3 feet if necessary.

(e) Such vessels, when at anchor in a fairway on surveying operations, shall have at hand and show, if necessary, in order to attract attention, a flare-up light in addition to the lights which are, by this section required to be carried.

International Rules of the Road, Part B, Rule 4 (c), states that a vessel engaged in laying or in picking up a submarine cable or navigation mark, or a vessel engaged in surveying or underwater operations, or a vessel engaged in replenishment at sea, or in the launching or recovery of aircraft when from the nature of her work she is unable to get out of the way of approaching vessels, shall carry in lieu of the lights prescribed in Rule 2 (a) (i) and (ii), or Rule 7 (a) (i), three lights in a vertical line one over the other so that the upper and lower lights shall be the same distance from, and not less than 6 feet above or below, the middle light. The highest and lowest of these lights shall be red, and the middle light shall be white, and they shall be of such a character as to be visible all round the horizon at a distance of at least 2 miles. By day, she shall carry in a vertical line one over the other not less than 6 feet apart, where they can best be seen, three shapes each not less than 2 feet in diameter, of which the highest and lowest shall be globular in shape and red in color, and the middle one diamond in shape and white.

The **wire drags** used by the NOS 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:**

**Inland waters (Inland Rules):**

DAY, two orange and white vertically striped balls in a vertical line not less than 3 feet nor more than 6 feet apart displayed from the yardarm.

NIGHT, two red lights in a vertical line not less than 3 feet nor more than 6 feet apart.

Vessels, with or without tows, passing Coast Guard vessels displaying this signal shall reduce speed sufficiently to insure the safety of both vessels, and when passing within 200 feet of the Coast Guard vessel displaying this signal, their speed shall not exceed 5 miles per hour.

**High seas (International Rules):**

DAY, three shapes each not less than 2 feet in diameter in a vertical line not less than 6 feet apart, the highest and lowest being red globular shapes and the middle being a white diamond shape.

NIGHT, three lights in a vertical line not less than 6 feet apart, the highest and lowest being red and the middle being white in color.

**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 the fore truck and a black ball at the fore yard on the side or sides on which it is dangerous to pass; there may be thus two or three black balls displayed; **By night,** all around 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 1,500 feet on either beam and vessels are not to cross astern closer than 3,000 feet. 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).

**Submarine emergency identification signals.**-U.S. submarines are equipped with signals 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 three hundred to four hundred 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.

Submarine marker buoys consist of 2 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 additional to the red signal. Submarine also may use these other means of attracting attention: release of dye marker or air bubble; ejection of oil; pounding on hull; ejection of lifejackets and other floating objects; ejection of emergency transmitter buoy, which sends the CW coded signal "SOS SUB SUNK SOS" on 121.5 MHz.

**Special signals for deep-draft ships in narrow channel.**-The following "Recommendation on Additional Signals for Deep-Draught Ships in Narrow Channels" was adopted by the Inter-Governmental Maritime Consultative Organization (IMCO) on November 26, 1968:

"A power-driven vessel under way in a narrow channel which, owing to its draught, can navigate only inside such channel, may carry in addition to the lights prescribed in Rule 2 (a) (i), (ii), (v) and Rule 10 (a) of the International Regulations for Preventing Collisions at Seas and during the same circumstances as prescribed in the Regulations for these lights, three red lights in a vertical line one over the other so that the upper and lower lights shall be the same distance from and not less than 6 feet (1.83 meters) above or below the middle light. They shall be carried where they can best be seen and visible all around the horizon at a distance of at least 2 miles. By day such a vessel may carry, where it can best be seen, a black cylinder of not less than two feet (0.61 meters) in diameter and a height of not less than 3.5 feet (1.07 meters)."

The recommendation is not mandatory but may be used on an optional basis. Familiarity with the signals is necessary as it may be encountered in use by U.S. and/or foreign flag vessels throughout the world. The night signal recommended above is similar to the U.S. Pilot Rules provisions for vessels engaged in underwater construction and related operations, but confusion between these vastly different situations is considered unlikely.

## NAVIGATION RESTRICTIONS AND REQUIREMENTS

**Traffic separation schemes.**-To increase the safety of navigation, particularly in areas of high shipping density, routes incorporating traffic separation have, with the approval of 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 should use such routes, as far as circumstances permit, by day and by night and in all weather conditions. The routes which are intended for use by all vessels are **not mandatory**, and do not give any special rights to vessels using them.

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

(1) The International Regulations for Preventing Collisions at Sea and the Inland Rules of the Road, as appropriate, must be observed at all times.

(2) Ships navigating in lanes should keep to starboard of the separation line or separation (buffer) zone.

(3) Ships entering or leaving traffic lanes should normally do so at the ends of the lanes. When necessary to enter or leave lanes from the sides, ships should do so at as small an angle as practicable.

(4) Ships navigating in lanes should insure, as far as possible, that their courses conform with the axis of the lanes.

(5) Ships should avoid crossing traffic lanes.

(6) When necessary to cross traffic lanes, ships should, as far as practicable, do so at right angles.

(7) Other than by crossing ships, the separation (buffer) zone should not be crossed except in cases of emergency to avoid immediate danger.

(8) The arrows printed in the tracks shown on charts are intended only to give the general direction of traffic, and ships need not set their courses strictly along the arrows; the full width of each lane should be considered as available for navigation.

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

**Oil Pollution.**-The Oil Pollution Act, 1961, as amended, provides for **prohibited zones** throughout the world within which the discharge of oil or any oily mixture is unlawful. The prohibited zones for the United States, Puerto Rico, the U.S. Virgin Islands, and adjacent foreign territory include sea areas within 50 miles from the nearest land and the following sea areas extending more than 50 miles from the nearest land: North-West Atlantic Zone, comprising the sea areas within a line drawn from 38°47'N., 73°43'W., to 39°58'N., 68°34'W., thence to 42°05'N., 64°37'W., thence along the E coast of Canada at a distance of 100 miles from the nearest

land. Canadian Western Zone (Pacific Ocean), extending for a distance of 100 miles from the nearest land along the W coast of Canada.

The law applies (with the exceptions stated below) to any seagoing vessel of any type whatsoever of American registry or nationality, including floating craft towed by another vessel making a sea voyage; this includes a **"tanker"**, defined as a type of ship in which the greater part of the cargo space is constructed or adapted for the carriage of liquid cargoes in bulk and which is not, for the time being, carrying a cargo other than oil in that part of its cargo space. The excepted categories of vessels are: tankers of under 150 gross tons, and other ships of under 500 gross tons; ships for the time being engaged in the whaling industry when actually employed on whaling operations; ships for the time being navigating the Great Lakes of North America and their connecting and tributary waters as far east as the lower exit of St. Lambert Lock at Montreal in the Province of Quebec, Canada; naval ships and ships for the time being used as naval auxiliaries.

**Foreign vessels** to which the International Convention for the Prevention of the Pollution of the Sea by Oil (1954, as amended) applies, while in the territorial waters of the United States, may be boarded, examined, and required to produce records as provided in Section 11 of the Oil Pollution Act of 1961, as amended. (For a complete discussion of the Oil Pollution Regulations, see the Code of Federal Regulations, Title 33, Part 151.)

The Federal Water Pollution Control Act, as amended, prohibits the discharge of harmful quantities of oil into the navigable waters of the United States, the contiguous zone, or onto adjoining shorelines. Discharges that do occur must be reported to the Coast Guard by the most rapid available means. If the spiller or other industry organization, or State or local government, does not clean up the spill, the Federal Government may. The spiller will be liable for the cleanup costs. A harmful discharge of oil has been defined as one which causes a film or sheen upon or discoloration of the surface of the water, violates applicable State water quality standards, or causes a sludge or emulsion to be deposited beneath the surface of the water. (For regulations pertaining to this Act, see the Code of Federal Regulations, Title 33, Part 153.)

**Other requirements for the protection of navigable waters.**-U.S. laws prohibit discharge from any vessel or shore establishment of any refuse matter, other than that flowing from streets and sewers in a liquid state, into any navigable water. 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 while underway in low visibility.**-Failure on the part of a vessel equipped with radar to make use of it while underway in low visibility has been held by a court to be directly contributory to a collision in which the vessel was involved. Rule 29 of the International Rules of the Road and Article 29 of the Inland Rules of the Road are applicable. This decision 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.

Recommendations on the use of radar during restricted visibility are included within the Annex of the International Rules of the Road.

**Danger signal.**-It is stated in the **Pilot Rules for Inland Waters,** §80.1, if, when steam vessels are approaching each other, either vessel fails to understand the course or intention of the other, from any cause, the vessel so in doubt shall immediately signify the same by giving several short and rapid blasts, not less than four, of the steam whistle, the danger signal. Article 18, Rule III, of the **Inland Rules of the Road** also contains this provision. The **International Rules of the Road,** Part D, Rule 28 (b), states, in part, that, whenever a power-driven vessel which, under these Rules is to keep her course and speed, is in sight of another vessel and is in doubt whether sufficient action is being taken by the other vessel to avert collision, she may indicate such doubt by giving at least five short and rapid blasts on the whistle.

**Narrow channels.**-Sailing vessels and power-driven vessels of less than 65 feet in length shall not hamper the safe passage of larger steam vessels which can navigate only inside that channel.

**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 United States 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 Pubs. 117A or 117B for emergency procedures and communication instructions.)

**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 RULES OF THE ROAD.

# 2. NAVIGATION REGULATIONS

This chapter contains the sections of **Code of Federal Regulations, Title 33, Navigation and Navigable Waters,** that are of most importance in the areas covered by Coast Pilot 5. The sections are from Part 26, Vessel Bridge-to-Bridge Radiotelephone Regulations; Part 82, Boundary Lines of Inland Waters; Part 110, Anchorage Regulations; Part 117, Drawbridge Operation Regulations; Part 124, Control over Movement of Vessels; Part 160, Ports and Waterways Safety; Part 204, Danger Zone Regulations; Part 205, Dumping Grounds Regulations; Part 207, Navigation Regulations; and Part 209, Administrative Procedure.

**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.A. sections 1201-1208;

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

"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," means those waters governed by the Navigation Rules for Harbors, Rivers, and Inland Waters (33 U.S.C. sec. 151 et seq.), the Navigation Rules for Great Lakes and their Connecting and Tributary Waters (33 U.S.C. sec. 241 et seq.), and the Navigation Rules for Red River of the North and Rivers emptying into Gulf of Mexico and Tributaries (33 U.S.C. sec. 301 et seq.);

"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 subparagraph (4) of this paragraph, 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.A. section 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 has designated the frequency 156.65 MHz for the use of bridge-to-bridge radiotelephone stations.

**§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 radiotelephone.**

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 radio- telephone 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.A. section 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 (M), 400 Seventh Street S.W., Washington, DC 20590, 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.

**§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 82-Boundary Lines of Inland Waters:**

**§82.1 General basis and purpose of boundary lines.** Under section 2 of the act of February 19, 1895, as amended (28 Stat. 672, 33 U.S.C. 151), the regulations in this part are prescribed to establish the lines dividing the high seas from rivers, harbors, and inland waters in accordance with the intent of the statute and to obtain its correct and uniform administration. The waters inshore of the lines described in this part are "inland waters," and upon them the inland rules and pilot rules made in pursuance thereof apply. The waters outside of the lines described in this part are the high seas and upon them the international rules apply. The regulations in this part do not apply to the Great Lakes or their connecting and tribuary waters.

**§82.2 General rules for inland waters.** At all buoyed entrances from seaward to bays, sounds, rivers, or other estuaries for which specific lines are not described in this part, the waters inshore of a line approximately parallel with the general trend of the shore, drawn through the outermost buoy or other aid to navigation of any system of aids, are inland waters, and upon them the inland rules and pilot rules made in pursuance thereof apply, except that Pilot Rules for Western Rivers apply to the Red River of the North, the Mississippi River and its tributaries above Huey P. Long Bridge, and that part of the Atchafalaya River above its junction with the Plaquemine-Morgan City alternate waterway.

**§82.55 Florida Reefs and Keys from Miami to Marquesas Keys.** A line drawn from the east end of the north jetty at the entrance to Miami Harbor, to Miami Lighted Whistle Buoy M; thence to Fowey Rocks Light; thence to Pacific Reef Light; thence to Carysfort Reef Light; thence to Molasses Reef Light; thence to Alligator Reef Light; thence to Tennessee Reef Light; thence to Sombrero Key Light; thence to American Shoal Light; thence to Key West Entrance Lighted Whistle Buoy; thence to Sand Key Light; thence to Cosgrove Shoal Light; thence to the westernmost extremity of Marquesas Keys.

**§82.60 Florida Keys from Marquesas to Cape Sable.** A line drawn from the northwesternmost extremity of Marquesas Keys to Northwest Channel Entrance Lighted Bell Buoy 1; thence to the southernmost extremity of East Cape, Cape Sable.

**§82.65 San Carlos Bay and tributaries.** A line drawn from the northwesternmost point of Estero Island to Caloosa Lighted Bell Buoy 2; thence to Sanibel Island Light.

**§82.70 Charlotte Harbor, Fla., and tributaries,** Eastward of Charlotte Harbor Entrance Lighted Bell Buoy off Boca Grande.

**§82.80 Tampa Bay and tributaries.** A line drawn from the southernmost extremity of Long Key, Fla., to Tampa Bay Lighted Whistle Buoy; thence to Southwest Channel Entrance Lighted Bell Buoy 1; thence to the shore on the northwest side of Anna Maria Key, bearing 109° true.

**§82.89 Apalachee Bay, Fla.** Those waters lying north of a line drawn from Lighthouse Point on St. James Island to Gamble Point on the east side of the entrance to the Aucilla River, Fla.

**§82.95 Mobile Bay, Ala., to Mississippi Passes, La.** Starting from a point which is located 1 mile, 90° true, from Mobile Point Light, a line drawn to Mobile Entrance Lighted Whistle Buoy 1; thence to Ship Island Light; thence to Chandeleur Light; thence in a curved line following the general trend of the seaward, highwater shorelines of the Chandeleur Islands to the southwesternmost extremity of Errol Shoal (29°35.8′N. latitude, 89°00.8′W. longitude); thence to a point 5.1 miles 107° true, from Pass a Loutre Daybeacon.

**§82.100 Mississippi River.** The Pilot Rules for Western Rivers are to be followed in the Mississippi River and its tributaries above the Huey P. Long Bridge.

**§82.103 Mississippi Passes, La., to Sabine Pass, Tex.** A line drawn from a point 5.1 miles, 107° true, from Pass a Loutre Abandoned Lighthouse to South Pass Lighted Whistle Buoy 2; thence to Southwest Pass Entrance Midchannel Lighted Whistle Buoy; thence to Ship Shoal Daybeacon; thence to Calcasieu Channel Lighted Whistle Buoy 20; thence to Sabine Bank Channel Lighted Bell Buoy 18.

**§82.106 Sabine Pass, Tex., to Galveston, Tex.** A line drawn from Sabine Bank Channel Lighted Bell Buoy 18 to Galveston Bay Entrance Channel Lighted Whistle Buoy 1. .

**§82.111 Galveston, Tex., to Brazos River, Tex.** A line drawn from Galveston Bay Entrance Channel Lighted Whistle Buoy 1 to Freeport Entrance Lighted Whistle Buoy 1.

**§82.116 Brazos River, Tex., to the Rio Grande, Tex.** A line drawn from Freeport Entrance Lighted Buoy 1 to a point 4,350 yards, 118° true, from Matagorda Light; thence to Aransas Pass Lighted Whistle Buoy AP; thence to a position 10.5 miles, 90° true, from the north end of Lopeno Island (27°00.1′N. latitude, 97°15.5′W. longitude); thence to Brazos Santiago Entrance Lighted Whistle Buoy 1.

**§82.200 Bahia de San Juan.** A line drawn from the northwesternmost extremity of Punta del Morro to Puerto San Juan Lighted Buoy 1; thence to Puerto San Juan Lighted Buoy 2; thence to the northernmost extremity of Isla de Cabras.

**§82.205 Puerto Arecibo.** A line drawn from the westernmost extremity of the breakwater through Puerto Arecibo Buoy 1; thence through Puerto Arecibo Buoy 2; thence to shore in line with the Church tower in Arecibo.

**§82.210 Bahia de Mayaguez.** A line drawn from the southernmost extremity of Punta Algarrobo to Bahia de Mayaguez Entrance Lighted Buoy 3; thence to Bahia de Mayaguez Entrance Lighted Buoy 4; thence to the northwesternmost extremity of Punta Guanajibo.

**§82.215 Bahia de Guanica.** A line drawn from the easternmost extremity of Punta Brea through Bahia de Guanica Lighted Buoy 6; thence to the westernmost extremity of Punta Jacinto.

**§82.220 Bahia de Guayanilla.** A line drawn from the southernmost extremity of Punta Ventana through Bahia de Guayanilla entrance Lighted Buoy 2; thence to the southeasternmost extremity of Punta Guayanilla.

**§82.225 Bahia de Ponce.** A line drawn from the southeasternmost extremity of Punta Cuchara through Bahia de Ponce Lighted Buoy 1; thence to Bahia de Ponce Lighted Buoy 2; thence to the southwesternmost extremity of Punta Cabullon.

**§82.230 Bahia de Jobos.** A line drawn from Punta Arenas through Bahia de Jobos Light; thence to Bahia de Jobos entrance Lighted Buoy 2; thence to the southernmost extremity of Cayo Morrillo; thence to the southernmost extremity of Cayo de Pajaros.

**§82.235 St. Thomas Harbor, St. Thomas.** A line drawn from the southernmost extremity of Red Point through West Gregerie Channel Buoy 1; thence to West Gregerie Channel Lighted Buoy 2; thence to the southernmost extremity of Flamingo Point; thence to St. Thomas Harbor Entrance Lighted Buoy 2; thence to the Green Cay.

**§82.240 Christiansted Harbor, Island of St. Croix, Virgin Islands.** A line drawn from Shoy Point to Christiansted Harbor Channel Lighted Buoy 1; thence to stack at Little Princess northwestward of leper settlement.

**§82.245 Sonda de Vieques.** A line drawn from the easternmost extremity of Punta Yeguas, Puerto Rico, to a point 1 mile due south of Puerto Ferro Light; thence eastward in a straight line to a point 1 mile southeast of Punta Este Light, Isla de Vieques; thence in a straight line to the easternmost extremity of Punta del Este, Isla Culebrita. A line from the northernmost extremity of Cayo Notre to Piedra Stevens Lighted Buoy 1; thence to Las Cucarachas Light; thence to Cabo San Juan Light.

**Part 110-Anchorage Regulations:**

**§110.1 General.** (a) The areas described in the 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 this part are referred to true meridian.

**Subpart A-Special Anchorage Areas:**

**§110.74 Marco Island, Marco River, Fla.** Beginning at a point approximately 300 feet east of the Captains Landing Docks at latitude 25°58′04″N., longitude 81° 43′31″W.; thence 108°, 450 feet; thence 198°, 900 feet; thence 288°, 450 feet; thence 018°, 900 feet to the point of beginning.

NOTE: The area is principally for use by yachts and other recreational craft. Fore and aft moorings will be allowed. Temporary floats or buoys for marking anchors in place will be allowed. Fixed mooring piles or stakes are prohibited. All moorings shall be so placed that no vessel, when anchored, shall at any time extend beyond the limits of the area.

**§110.75 Corpus Christi Bay, Tex.** (a) South area. Southward of the southernmost T-head pier at the foot of Cooper Avenue and of a line bearing 156°44′, 340.6 feet, from the southerly corner of said pier to a point on the rubble breakwater; westward and northward of said breakwater; and eastward of the Corpus Christi sea wall.

**Subpart B-Anchorage Grounds.**

**§110.189a Key West Harbor, Key West, Fla.; naval explosives anchorage area** (a) The anchorage ground. A circular area with its center at latitude 24°30′50.6″, longitude 81°50′31.6′ with a radius of 300 yards, for use for ammunition exceeding the prescribed limits for pierside handling.

(b) The regulations. (1) When occupied by a vessel handling explosives, no other vessel may enter the area unless authorized by the enforcing agency.

(2) Only one vessel handling explosives may anchor in the area at one time.

(3) No more than 300,000 pounds net of high explosives or equivalent may be handled in the area at any one time.

(4) The regulations in this section shall be enforced by the Commander, U.S. Naval Base, Key West, Fla., and any other agencies he may designate.

**§110.190 Tortugas Harbor, in the vicinity of Garden Key, Dry Tortugas, Fla.** (a) The anchorage grounds. All of Bird Key Harbor, southwest of Garden Key, bounded by the surrounding reefs and shoals and, on the northeast, by a line extending from Fort Jefferson West Channel Daybeacon 2 to Fort Jefferson West Channel Daybeacon 4, thence to Fort Jefferson West Channel Daybeacon 6, and thence to Fort Jefferson West Channel Daybeacon 8.

(b) The regulations. Except in cases of emergency involving danger to life or property, no vessel engaged in commercial fishing or shrimping shall anchor in any of the channels, harbors or lagoons in the vicinity of Garden Key, Bush Key, or the surrounding shoals, outside of Bird Key Harbor.

**§110.193 Tampa Bay, Fla.** (a) The anchorage grounds-(1) Explosives anchorage east of Mullet Key. A rectangular area in Tampa Bay, approximately 4,459 yards long and 1,419 yards wide, beginning at latitude 27°38′30″, longitude 82°39′09″, and extending northeasterly to latitude 27°39′48″, longitude 82°37′15″; thence southeasterly to latitude 27°39′17″, longitude 82°36′46″; thence southwesterly to latitude 27°37′52″, longitude 82°38′38″; thence northwesterly to the point of beginning.

(2) Temporary explosives anchorage south of Interbay Peninsula. Beginning at a point bearing 107°, 1,750 yards from Cut F Range Front Light; thence to a point bearing 125°, 2,050 yards, from Cut F Range Front Light; thence to a point bearing 180°, 1,725 yards, from Cut F Range Front Light; thence to a point bearing 222°, 2,180 yards, from Cut F Range Front Light; thence to a point bearing 251°, 1,540 yards, from Cut F Range Front Light; and thence to the point of beginning.

(3) Temporary explosives anchorage off Port Tampa. A circular area with a radius of 200 yards with the point at latitude 27°50′22″, longitude 82°34′15″.

(4) Quarantine Anchorage. Southeast of the temporary explosive anchorage, beginning at a point bearing 97° true, 4,370 yards, from Cut "F" Range Front Light; thence to a point bearing 113°30′, 5,370 yards, from Cut "F" Range Front Light; thence to a point bearing 161°30′, 3,770 yards, from Cut "F" Range Front Light; thence to a point bearing 163°30′, 2,070 yards, from Cut "F" Range Front Light; thence to the point of beginning.

(5) Barge Fleeting Area, Hillsborough Bay. Located 400 feet west of Cut "D" Channel at a point beginning at latitude 27°54′34″, longitude

82°26′35″; thence northerly 1,000 feet to latitude 27°54′43″, longitude 82°26′40″; thence westerly 500 feet to latitude 27°54′41″, longitude 82°26′45″; thence southerly 1,000 feet to latitude 27°54°32″, longitude 82°26′40″; thence easterly 500 feet to the point of beginning.

NOTE: This area is reserved for transient barges only. Barges shall not occupy this anchorage for a period longer than 96 hours unless permission is obtained from the Captain of the Port for this purpose.

(b) The regulations. (1) The explosives anchorage east of Mullet Key shall be used by vessels awaiting loading or unloading at Port Tampa that have explosives actually on board and where the duration of anchorage will exceed 72 hours.

(2) The temporary explosives anchorages south of Interbay Peninsula and off Port Tampa shall be used for vessels engaged in loading explosives when the duration of the anchorage is less than 72 hours.

**§110.193a St. Joseph Bay, Fla.** (a) The anchorage grounds-(1) Explosives Anchorage Area 1. A rectangular area 3,000 yards long by 700 yards wide beginning at a point 1,350 yards west of U.S. Highway 98 Bridge over Gulf County Canal. The area is parallel to and 450 yards northeast of the north entrance channel to Port St. Joe, Florida.

(2) Explosives Anchorage Area 2. A circular area with a 500-yard radius around a center point located at latitude 29°47′30″; longitude 85°21′30″, 3,100 yards southeast of FW South Channel Light and 5,250 yards south of FW North Channel Light, in St. Joseph Bay, Port St. Joe, Florida.

(b) The regulations. (1) The explosives anchorage areas shall be used as temporary anchorage for vessels engaged in loading and unloading explosives at the port of Port St. Joe, Florida, when the duration of the anchorage period is less than 96 hours.

(2) No vessel shall occupy this anchorage without obtaining a permit from the Captain of the Port.

**§110.194 Mobile Bay, Ala., at entrance.** (a) The anchorage grounds. The waters within a radius of 750 yards from a point located 1,000 yards true north from Fort Morgan Light.

(b) The regulations. (1) This anchorage shall be used by vessels loading or discharging high explosives. It shall also be used by vessels carrying dangerous or inflammable cargoes requiring an anchorage. It may be used for a general anchorage when not required for vessels carrying explosives or dangerous or inflammable cargoes.

(2) No vessel shall occupy this anchorage without obtaining a permit from the Captain of the Port.

**§110.194a Mobile Bay, Ala., and Mississippi Sound, Miss.**

(a) The anchorage grounds. (1) The waters of lower Mobile Bay, near Cedar Point, within an area bounded on the north by latitude 30°21′00″, on the east by longitude 88°05′00″, on the south by latitude 30°20′00″, and on the west by longitude 88°06′00″.

(2) The waters of Mississippi Sound, south of Biloxi, within an area bounded on the north by latitude 30°20′00″, on the east by longitude 88°54′00″, on the south by latitude 30°19′00″, and on the west by longitude 88°55′00″.

(b) The regulations. (1) The anchorages are exclusively for the use of unmanned barges, canal boats, scows, and other nondescript vessels. Such craft shall be so anchored that they will not at any time extend outside the limits of the anchorages.

(2) In emergencies or whenever maritime or commercial interests of the United States so require, the Captain of the Port is authorized to shift the position of any craft in the anchorages.

(3) Whenever in the opinion of the Captain of the Port, such action may be necessary, any or all craft in these anchorages may be required to be moored with two or more anchors.

(4) No vessel shall be navigated within the anchorages at a speed exceeding six knots.

**§110.194b Mississippi Sound and Gulf of Mexico, near Petit Bois Island, Miss.**

(a) The anchorage grounds-(1) Explosives Anchorage Area No. 1. A circular area with one-half mile radius with its center located at latitude 30°14′09″, longitude 88°29′13″, in the waters of Mississippi Sound north of the west end of Petit Bois Island.

(2) Explosives Anchorage Area No. 2. A circular area with a three-fourths mile radius with its center located at latitude 30°11′12″, longitude 88°30′07″, in the waters of Gulf of Mexico south of the west end of Petit Bois Island.

(b) The regulations. (1) The areas shall be used as temporary anchorages for vessels engaged in loading and unloading explosives at the Port of Pascagoula, Miss.

(2) No vessel shall occupy the areas without obtaining a permit from the Captain of the Port.

**§110.195 Mississippi River below Baton Rouge, La., including South and Southwest Passes.** (a) The anchorage grounds-(1) Pilottown Anchorage. An area approximately 5.2 miles in length along the right descending bank or west side of the river. The east limit of the anchorage area at the upstream end starts at a point approximately 1,600 feet from the east bank at Mile 6.7 above Head of Passes and extends downstream generally parallel to and 1,600 feet from the east bank line to a point directly opposite Old Quarantine Station Light at Mile 3.7 above Head of Passes; thence to a point 1,600 feet directly opposite Cubits Gap Light at Mile 2.8 above Head of Passes; thence to a point 1,600 feet directly opposite Pilottown Wingdam Light at Mile 1.5 above Head of Passes, which is the downstream limit of the anchorage area. The area is marked by large signs, "Pilottown Anchorage," located on the right bank at the lower and upper limits. This anchorage is for ships which

cannot proceed to sea because of fog at the Gulf ends of South and Southwest Passes or for any other reason.

(2) Explosives anchorage. An area along the right descending bank or west side of the river, 1,000 feet wide, extending upstream and downstream from a point located 1.4 miles upstream from Oak Point Light. The Commander, Eighth Coast Guard District, will designate anchorages upstream and downstream from this point. This anchorage is reserved for vessels carrying explosives. It may be used for a general anchorage when not required for vessels carrying explosives or dangerous or inflammable cargo. No vessel shall occupy this anchorage without obtaining a permit from the Commander, Eighth Coast Guard District.

(3) New Orleans general anchorage. The New Orleans General Anchorage is an area contained within a line beginning at a point on the right descending bank of the Mississippi River 0.7 statute mile downstream of the U.S. Quarantine Station Wharf (the approximate location of this point is marked by a large sign reading "General Anchorage"), from the beginning point to a point 800 feet perpendicular to the bank at the beginning point, thence 2.1 statute miles downstream along a line parallel to the right descending bank, thence to a point on the right descending bank 0.5 statute mile upstream of the Algiers Cutoff Canal Entrance Light (the approximate location of this point is marked by a large sign reading "General Anchorage"), thence along the bank to the beginning point. Vessels may anchor alongside of other vessels or in fleets within this anchorage ground. During slack or low water periods, vessels anchoring alongside of other vessels or in fleets shall use bow and stern anchors.

(4) Quarantine anchorage. An area approximately 4,000 feet in length along the right descending bank or southwest side of the river, 800 feet wide, extending from the upper limits of the New Orleans general anchorage, approximately 0.7 mile downstream from the United States Quarantine Station Wharf, upstream to a point marked by a sign located at the lower end of the Todd- Johnson Wharf, approximately 160 feet upstream from the Quarantine Station Wharf. This anchorage must be used by vessels awaiting inspection by United States Public Health officials or under actual quarantine, and is under the supervision of the Officer in Charge of the United States Quarantine Station (section 364, Public Health Service Act, July 1, 1944, 58 Stat. 704; 42 U.S.C. 267).

(5) Cargo transfer anchorage. An area approximately 1.7 miles in length along the left descending bank of the river, about 600 feet wide, extending from Mile 127.3 to Mile 129.0 above Head of Passes. This area is located adjacent to the river end of Bonnet Carre Spillway. During the time when the Bonnet Carre Spillway is operating, vessels will not be permitted to use this area but will moor at areas as directed by the District Commander. Upon completion of the transfer of cargo, vessels shall move from this area.

(6) Temporary anchorages, Baton Rouge, New Orleans to Head of Passes. Vessels awaiting berthing at riverside wharves between Head of Passes and mile 233 above Head of Passes will anchor in a manner and area as prescribed by the District Commander.

(7) Baton Rouge general anchorage. An area, 1,400 feet wide, between Mile 225.8 and Mile 227.3 above Head of Passes with its west limit along the low water line.

(b) The regulations. (1) Except in cases of poor visibility or other emergency anchoring is prohibited in the Mississippi River below Baton Rouge outside of the established anchorages or in South and Southwest Passes. If it becomes necessary in an emergency to anchor a vessel outside of the prescribed anchorages the vessel shall be so anchored that it will not interfere with or endanger other vessels, and it shall be moved as soon as the emergency is over. If it becomes necessary in an emergency to anchor a vessel in South Pass or Southwest Pass, the vessel shall take a position as close to the east bank as possible.

(2) When tied up individually or in fleets vessels shall be moored with sufficient lines and shore fastenings to insure their remaining in place and withstanding the action of winds, currents, or the suction of passing vessels.

(3) Except in case of great emergency, no vessel or craft shall anchor over revetted banks of the river. Every precaution shall be exercised at all times to avoid damage to the revetment works. The location of mattress work in New Orleans Harbor is indicated by warning signs erected at the ends and center of each reach of mattress work. Generally, mattress work extends out into the river 600 feet from the low water line. Information as to the location of revetted areas may be obtained from, and will be published from time to time by, the District Engineer, Corps of Engineers, New Orleans, Louisiana.

(4) The masters and pilots of all seagoing steamers, tugboats, and other vessels passing the explosives anchorage shall regulate the speed of their vessels over the bed of the river so as not to exceed seven miles per hour going downstream or five miles per hour going upstream whenever any vessel is anchored or moored within the explosives anchorage and engaged in handling explosives.

**§110.196 Sabine Pass Channel, Sabine Pass, Tex.** (a) The anchorage area. The navigable waters of Sabine Pass within a trapezoidal area 1,500 feet wide and varying uniformly in length from 5,800 feet to 3,000 feet with the long side adjacent to the northeasterly edge of Sabine Pass Channel at a location opposite the town of Sabine Pass.

(b) The regulations. (1) The anchorage area is for the temporary use of vessels of all types, but especially for naval and merchant vessels awaiting

weather and tidal conditions favorable to the resumption of their voyages.

(2) Except when stress of weather or adverse tides or currents make sailing impractical or hazardous, vessels shall not anchor in the anchorage area for periods exceeding 48 hours unless expressly authorized by the Captain of the Port to anchor for longer periods.

(3) Vessels shall not anchor so as to obstruct the passage of other vessels proceeding to or from available anchorage spaces.

(4) Anchors shall not be placed channelward from the anchorage area, and no portion of the hull or rigging of any anchored vessel shall extend channelward from the limits of the anchorage area.

(5) Vessels using spuds for anchors shall anchor as close to shore as practicable having due regard for the provisions in subparagraph (3) of this paragraph.

(6) Fixed moorings, piles or stakes, and floats or buoys for marking anchorages or moorings in place are prohibited.

(7) 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 of the anchorage area including any vessel which is moored or anchored so as to obstruct navigation or interfere with range lights.

**§110.197 Galveston Harbor, Bolivar Roads Channel, Tex.** (a) The anchorage area. The area in Bolivar Roads bounded by the north channel edge extending west from Buoy "10", latitude 29°20′48.5″, longitude 94°42′52.5″; thence to Buoy "12", latitude 29°20′43″, longitude 94°44′46.5″; thence 029° to Buoy "B", latitude 29°21′15″, longitude 94°44′27″; thence 096° to Buoy "A", latitude 29°21′05.3″, longitude 94°42′51.4″; thence 183°30′ to the point of beginning.

(b) The regulations. (1) The anchorage area is for the temporary use of vessels of all types, but especially for naval and merchant vessels awaiting weather and other conditions favorable to the resumption of their voyages.

(2) Except when stress of weather makes sailing impractical or hazardous, vessels shall not anchor in the anchorage area for periods exceeding 48 hours unless expressly authorized by the Captain of the Port to anchor for such longer periods.

(3) Vessels shall not anchor so as to obstruct the passage of other vessels proceeding to or from available anchorage spaces.

(4) Anchors shall not be placed in the channel and no portion of the hull or rigging of any anchored vessel shall extend outside the limits of the anchorage area.

(5) Vessels using spuds for anchors shall anchor as close to shore as practicable, having due regard for the provisions in subparagraph 3 of this paragraph.

(6) Fixed moorings, piles or stakes, and floats or buoys for marking anchorages or moorings in place, are prohibited.

(7) Whenever the maritime or commercial interests of the United States so require, the Captain of the Port, or his authorized representative, is hereby empowered to shift the position of any vessel anchored or moored within the anchorage area.

**§110.240 San Juan Harbor, P.R.** (a) The anchorage grounds-(1) Yacht, schooner and small craft Anchorage D. That part of San Antonio Channel eastward of longitude 66°05′45″.

(2) Temporary Anchorage E (general). Beginning at a point which bears 214°24′, 948 yards from Isla Grande Light; thence along a line 75°47′, 498 yards; thence along a line 134°49′, 721 yards; thence along a line 224°49′ to the northerly channel limit of Graving Dock Channel; thence along the northerly channel limit of Graving Dock Channel, 307 yards; and thence to the point of beginning.

(3) Restricted Anchorage F. Beginning at a point which bears 212°30′, 1,337.5 yards from Isla Grande Light; thence along a line 269°00′, 550 yards; thence along a line 330°00′ to the westerly channel limit of Anegado Channel; and thence along the westerly channel limit of Anegado Channel to the point of beginning.

(b) The regulations. (1) The anchorage described in paragraph (a)(1) of this section shall be reserved for the anchorage of yachts, schooners, and small craft.

(2) Vessels awaiting customs or quarantine shall use the anchorage described in paragraph (a)(2) of this section. No vessel shall remain in this anchorage more than 24 hours without a permit from the U.S. Coast Guard Captain of the Port.

(3) Restricted Anchorage F shall serve both as an additional general anchorage area in cases where the temporary anchorage is full, and as an explosives anchorage for vessels loading or unloading explosives in quantities no greater than forty (40) tons, Commercial Class "A" Explosives, when so authorized by the United States Coast Guard Captain of the Port. No vessel shall enter or anchor therein without first obtaining a permit from the United States Coast Guard Captain of the Port.

**§110.245 Vieques Passage and Vieques Sound, near Vieques Island, P.R.**

(a) The anchorage grounds-(1) Vieques Passage explosives anchorage and ammunition handling berth (Area 1). A circular area having a radius of 2,000 yards with its center at latitude 19°09′10″, longitude 65°32′40″.

(2) Vieques Sound explosives anchorage and ammunition handling berth (Area 2). A circular area having a radius of 2,000 yards with its center at latitude 18°11′48″, longitude 65°26′06″.

(3) Southern Vieques Passage explosives anchorage and ammunition handling berth (Area 3). A circular area having a radius of 2,000 yards with its center at latitude 18°05′51″, longitude 65°36′14″.

(b) The regulations. (1) No vessel or craft shall enter or remain in these anchorages while occupied

by vessels having on board explosives or other dangerous cargo. Explosives in quantities no greater than 1,625 short tons will be handled in any area at one time.

(2) The regulations of this section shall be enforced by the Commander, Greater Antilles Section, U.S. Coast Guard Base, San Juan, Puerto Rico, and such agencies as he may designate.

**§110.250 St. Thomas Harbor, Charlotte Amalie, V.I.** (a) The anchorage grounds-(1) Inner harbor anchorage. Beginning at a point bearing 85°, 525 yards from the outer end of a pier at latitude 18°20′19″, longitude 64°56′26″ (approximate); thence 146°, 800 yards; thence 70°, 860 yards; thence 340°, 500 yards; and thence to the point of beginning.

(2) Outer harbor anchorage. Beginning at Scorpion Rock lighted buoy No. 1 (latitude 18°19′25.6″, longitude 64°55′41.8″); thence 180° 1,580 yards; thence 264°30′, 2,490 yards; thence due north 1,255 yards; thence due east to the southerly tip of Sprat Point, Water Island; thence to Cowell Point, Hassel Island; and thence to the point of beginning.

(3) East Gregerie Channel anchorage (general purpose). Bounded on the northeast by Hassel Island; on the southeast by the northwest boundary of the outer harbor anchorage; on the southwest by Water Island; and on the northwest by a line running from Banana Point, Water Island, 55° to Hassel Island.

(4) Small-craft anchorage. All the waters north of a line passing through the outer end of a pier at latitude 18°20′19″, longitude 64°56′26″ (Approximate) and ranging 85°.

(5) Deep-draft anchorage. A circular area having a radius of 400 yards with its center at latitude 18°19′12.2″, longitude 64°58′47.8″.

(6) Long Bay anchorage. The waters of Long Bay bounded on the north by the southerly limit line of Anchorage E, on the west by the easterly limit line of Anchorage A to a point to latitude 18°20′18″, thence to latitude 18°20′13″, longitude 64°55′21″; and thence to the shore line at latitude 18°20′15″, longitude 64°55′13″.

(b) The regulations. (1) The outer harbor anchorage shall be used by vessels undergoing examination by quarantine, customs, immigration, and Coast Guard officers. Upon completion of these examinations vessels shall move promptly to anchorage. This anchorage shall also be used by vessels having drafts too great to permit them to use the inner harbor anchorage. No vessel shall remain more than 48 hours in this anchorage without a permit from the Harbor Master.

(2) The small-craft anchorage shall be used by small vessels undergoing examination and also by small vessels anchoring under permit from the Harbor Master.

(3) The requirements of the Navy shall predominate in the deep-draft anchorage. When occupied by naval vessels all other vessels and craft shall remain clear of the area. When the area is not required for naval vessels, the Harbor Master may upon application made in advance assign other vessels to the area. Vessels so assigned and occupying the area shall move promptly upon notification by the Harbor Master.

(4) The harbor regulations for for the Port of St. Thomas, V.I. of the United States and approaches thereto, including all waters under its jurisdiction, as adopted by the Government of the Virgin Islands, will apply to the Long Bay Anchorage.

(5) In addition, the Long Bay Anchorage is reserved for all types of small vessels, including sailing and motor pleasure craft, and such craft shall anchor in no other area except Anchorage E, in the northern portion of the harbor of Charlotte Amalie.

(6) Floats for marking anchors in place will be allowed in the Long Bay anchorage; stakes or mooring piles are prohibited.

(7) Vessels not more than 65 feet in length are not required to exhibit or carry anchor lights within the Long Bay anchorage, but must display them if emergency requires anchoring in any other part of the harbor.

(8) No vessel may anchor in any of the St. Thomas Harbor Anchorages without a permit from the Harbor Master.

(9) The U.S. Coast Guard Captain of the Port of St. Thomas, is hereby empowered, whenever the maritime or commercial interests of the United States so require, to shift the position of any vessel anchored within the Long Bay anchorage, and of any vessel which is so moored or anchored as to impede or obstruct vessel movement in the harbor, and to enforce all regulations of this section should the need arise.

**§110.255 Ponce Harbor, P.R.** (a) Small-craft anchorage. On the northwest of Ponce Municipal Pier and northeast of Cayitos Reef, bounded as follows: Beginning at latitude 17°58′27″, longitude 66°37′29.5″, bearing approximately 325° true, 2,200 feet from the most southwest corner of Ponce Municipal Pier; thence 273°30′ true, 1,800 feet; thence 15° true, 900 feet; thence 93°30′ true, 1,800 feet; thence 195° true, 900 feet to the point of beginning.

(b) The regulations. (1) The Commonwealth Captain of the Port may authorize use of this anchorage whenever he finds such use required in safeguarding the maritime or commercial interests.

(2) No vessel shall anchor within the area until assigned a berth by the Commonwealth Captain of the Port. Application for permission to occupy the anchorage must be submitted in advance by the master or authorized representative of the vessel.

(3) Vessels occupying the anchorage will at all times keep within the limits of the area, and shall move or shift their position promptly upon notification by the Commonwealth Captain of the Port.

(4) The anchorage is reserved for all types of small craft, including schooners, fishing vessels, yachts and pleasure craft.

(5) Floats for marking anchors in place will be allowed; stakes or mooring piles are prohibited.

**Part 117-Drawbridge Operation Regulations:**

**§117.1 General.** (a) The operation of drawbridges, in the absence of specific regulations in this part, shall be as required by section 5 of the act of August 18, 1894, as amended (28 Stat. 362; 33 U.S.C. 499). It shall be the duty of persons owning, operating, and tending drawbridges built across navigable waters of the United States, to open, or cause to be opened, the draws of such bridges under such rules and regulations as in the opinion of the Commandant the public interests require. Insofar as criminal liability on the part of the bridge owner is concerned, the Commandant is of the opinion that, in the absence of Federal regulations, there is no Federal authority requiring the opening of any drawbridge to which the General Bridge Act of March 23, 1906, does not apply. With reference to the civil liability of the bridge owner, however, it has been held that the duty to take proper care of a bridge includes the duty to make proper provision for the passage of vessels through the draw. In constructing a bridge with a draw, and in undertaking to open and manage the draw so as to allow vessels to pass, the owner has recognized the right of vessels to pass through without any appeal to the national authority to protect that right. Having thus recognized the rights of commerce, and undertaken to provide accommodations for the passage of vessels, the owner is bound that the custodians of the bridge shall use ordinary diligence to avoid accidents to vessels going through the draw at customary hours, and in the customary manner, as one of the incidents of the care, management, and control of the bridge itself. The owner is responsible, therefore, for the want of ordinary care and diligence in his servants, and for the consequent damage.

(b) The Attorney General has held (Jan. 28, 1899; 22 Opin. 314) that the first part of section 5 of the 1894 act is merely declaratory of the legal duty of the owners or operators which attaches to the maintenance and operation of a drawbridge across navigable waters. "It is the duty of all persons operating such drawbridges to open or cause them to be opened in a reasonable manner and at a reasonable time, consistent with the uses for which drawbridges are constructed, for the passage of vessels. The repair of such draws and of the bridges with which they are connected is also necessary for their maintenance. It is reasonable that a sufficient time should be allowed for such repairs and if they cannot be prosecuted without closing the bridge for a number of successive days, such closing cannot be considered an unreasonable interference with navigation." "It is entirely competent for the Secretary of the Army to make rules and regulations governing this subject, but in the absence of such rules and regulations the law is as I have above stated it." (The Commandant prescribes these rules and regulations.)

(c) Notwithstanding any general or special regulation heretofore or hereafter prescribed, drawbridges across navigable waters of the United States will not be opened to navigation for certain periods determined by the proper civil defense authorities to be in the interest of public safety during a major disaster or civil defense emergency indicated by a civil defense condition of "Air Raid Warning" (attack by enemy aircraft probable, imminent, or taking place).

(d) As used in this part, the term "long blast" means a distinct blast of a whistle, horn, siren, or other efficient sound producing device, of approximately three (3) seconds' duration. The term "blast" or "short blast" means a distinct blast of one (1) second's duration, or where specified, a distinct stroke of a bell.

(e) The Commandant may require the owner or operator to install and operate a radiotelephone station or stations of appropriate characteristics on a drawbridge when he finds that for navigation or safety it is essential that in addition to the use of sound or visual signals prescribed a supplemental means be available by which vessels may communicate to confirm requests for opening of the draw as well as exchange information with the drawtender concerning the condition of the draw or governing its operation.

(1) The Commandant's determination is based on such factors as location and navigational clearance of the particular bridge, character and volume of marine traffic, configuration of the navigational channel, restrictions in channel approaches, currents in the approaches to or through the drawbridge, obstructions and conditions limiting visibility, and similar conditions affecting navigation or safety through or in the vicinity of the drawbridge.

(2) Each station shall be subject to the rules and regulations of the Federal Communications Commission or the Director of Telecommunications Management as applicable governing the assignment of operating frequencies, licensing, and operation of radiotelephone stations.

(3) When the Commandant proposes that a radiotelephone station, or stations, be installed and operated on a specific drawbridge, he gives written notice of the proposed requirement to the bridge owner (or operator as appropriate) who shall have 30 days in which to submit comments or objections to the proposal. If the Commandant determines that such installation is necessary the bridge owner (or operator) shall have a reasonable time, but normally not more than 6 months, in which to effect installation and commence operation.

(4) Radiotelephone communications pursuant to this section supplement the sound and visual signals prescribed elsewhere in this part for the operation of drawbridges in general or for specific bridges and do not alter any obligation with respect to their use. The provisions of this section are not intended to restrict the voluntary installation and

operation of radiotelephone stations on drawbridges.

**§117.1a Temporary departures from regulations in this part.** (a) Temporary closures of drawbridges. Notwithstanding any general or special regulation in this part, heretofore or hereafter prescribed, a specific drawbridge across navigable waters of the United States need not be open to navigation for specified periods of time when such a bridge may be undergoing repairs or maintenance work or when the public interest, health, or safety so requires.

(b) Delegation to District Commanders. The Commandant further delegates pursuant to 49 CFR 1.4 (g) to District Commanders authority to place in effect the provisions of paragraph (a) of this section with respect to drawbridges in their respective Coast Guard Districts for periods of time determined to be necessary but in no event to exceed 15 calendar days. For a specific drawbridge the District Commander having jurisdiction may suspend any drawbridge operation regulations applicable thereto and if necessary establish other operational requirements without prior notice and public procedures thereon for such actions. Where practicable, notice of the District Commander's actions taken pursuant to this section shall be disseminated in Notices to Mariners, or otherwise, for the information of all concerned.

(c) Closure for repairs or maintenance. (1) When a draw must be closed for scheduled repairs or maintenance work, approval of the District Commander should be obtained at least 10 days prior to the date of the intended closure by the owners of or the agency controlling the drawbridge. The request for approval of the proposed closure shall include a brief description of the nature of the work to be performed and the times and dates of such closure. The granting of the approval will depend upon the necessity for the closure, the reasonableness of the time(s) and date(s) requested, and the overall effect on navigation.

(2) When a draw is closed for repairs in case of emergency or damage to the structure or for vital maintenance that may not be delayed, the owners of or the agency controlling the drawbridge shall immediately inform the District Commander concerned of the closure, the reasons for the closure, and the expected completion date of the emergency repairs. Normally, the extension of any period of emergency closure to include the accomplishment of routine maintenance or for other nonemergency purposes will not be authorized.

(d) Closure for public interest, health, and safety. In situations where the public interest, health, or safety so requires, including the holding of public functions or events such as street parades and marine regattas, the District Commander may authorize the temporary closure of a drawbridge. A request for approval of a temporary closure of a drawbridge for a street parade or marine regatta or otherwise should include a brief description of the proposed event or reason why closure of the drawbridge is desired, and the time and date of such closure. The closure of a drawbridge for public interest, health, or safety will depend upon the necessity for the closure, the reasonableness of the time and date (if requested), and the overall effect on navigation.

(e) 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, he shall take all reasonable measures necessary to have the draw closed at the time the emergency vehicle arrives at the bridge.

**§117.240 Navigable waters discharging into the Atlantic Ocean south of Delaware Bay (including the Lewes and Rehobeth Canal, Del.), and 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; bridges.** (a) Corporations or persons owning or controlling a drawbridge shall provide the same with the necessary tenders and the proper mechanical appliances for the safe, prompt, and efficient opening of the draw for the passage of vessels.

(b) If the weather conditions are good and sound signals can be heard when a vessel approaches a drawbridge and desires to pass through the draw, three distinct blasts of a whistle or horn shall be sounded or three calls through a megaphone shall be made from the vessel when within reasonable hearing distance of the bridge.

(1) When the draw of the bridge can be opened immediately, the drawtender shall reply by three distinct blasts of a whistle or horn, by three calls through a megaphone, or by three loud and distinct strokes of a bell.

(2) When the draw of the bridge cannot be opened immediately or when the bridge is open and is to be closed immediately, the drawtender shall reply by four or more short, distinct blasts of a whistle or horn, by four or more calls through a megaphone, or by four or more loud and distinct strokes of a bell (danger signal).

(c) When weather conditions prevent hearing the sound signals when a vessel approaches a drawbridge and desires to pass through the draw, signals shall be made from the vessel by swinging in circles at arm's length a lighted lantern at night and a flag by day.

(1) When the draw of the bridge can be opened immediately, the drawtender shall reply by raising and lowering in vertical plane a number of times a lighted lantern at night and a flag by day.

(2) When the draw of the bridge cannot be opened immediately or when the bridge is open and is to be closed immediately, the drawtender shall reply by swinging to and fro horizontally a number of times a lighted lantern at night and a flag by day.

(d) When a vessel wishes to pass two or more bridges close together or crossing a section of the waterway less than 500 feet in length, signals as prescribed above shall be given from the vessel for opening the first bridge, followed at an interval of about five seconds by the same signals for the second bridge, and so on, thus giving, at intervals of about five seconds, separate signals for each bridge the vessel desires to pass.

(e) When two or more vessels are approaching a bridge at nearly the same time from the same or opposite directions with the draw opened or closed, each of these vessels shall signal independently for the opening of the draw, and the drawtender shall reply as prescribed and in turn to the signal of each vessel.

(f) Where bridges are less than 500 feet apart, the signals to govern the movements of the approaching vessel shall be given from the bridge nearest the vessel. If the bridge can be opened immediately, the bridgetender shall await the reply signals from the other bridges and then give the signal circumstances require. If the nearest bridge cannot be opened immediately, the prescribed signal shall be given the approaching vessel at once to be followed as soon as possible by the signal from that bridge that the draws are about to open.

(g) The draw shall be opened with the least possible delay upon receiving the prescribed signal: Provided, That the drawspan shall not be opened when a train is approaching so closely that it cannot safely be stopped before reaching the bridge, or when a passenger or mail train is approaching within sight or hearing of the operator of the drawspan.

(h) When a bridgetender is about to close a draw, he shall sound four or more short, distinct blasts of a whistle or horn, four or more calls through a megaphone, or four or more loud and distinct strokes of a bell (danger signal).

(i) Trains, wagons, and other vehicles shall not be stopped on a drawbridge for the purpose of delaying its opening, nor shall watercraft be so manipulated as to hinder or delay the operations of a drawspan, but all passage over, through, or under drawbridge shall be prompt, to prevent delay to either land or water traffic.

(j) The following provisions shall not relieve the owner of or agency controlling a drawbridge from opening the draw for the passage of vessels in accordance with paragraphs (a) through (i) of this section.

(1) A vessel shall not require the opening of the draw when such opening is needed only to provide additional clearance for appurtenances unessential to navigation of the vessel, or for appurtenances essential to navigation but which may be altered by hinging, telescoping, collapsing, or otherwise, so as to require no greater clearance than the highest fixed and essentially unalterable point of the vessel.

(2) Appurtenances unessential to navigation shall include but not be limited to fishing outriggers, radio antennae which are or can reasonably be made flexible or collapsible, television antennae, false stacks, and masts purely for ornamental purposes. Appurtenances unessential to navigation shall not include radar antennae, flying bridges, sailboat masts, piledriver leads, spud frames on hydraulic dredges, drilling derricks, derrick substructures and/or buildings, cranes on drilling or construction vessels, or other items of permanent and fixed equipment clearly necessary to the intended use of the vessel.

(3) Owners of or agencies controlling drawbridges shall report to the District Commander in charge of the locality the names of any vessels causing bridge openings considered to be in violation of this paragraph. The District Commander may at any time cause an inspection to be made of any craft so reported and is empowered to decide in each case whether or not the appurtenances are unessential to navigation. If the District Commander decides a vessel has appurtenances unessential to navigation, he shall notify the vessel owner of his decision, specifying a reasonable time for making necessary alterations. If the vessel owner is aggrieved by the decision of the District Commander, he may within 30 days after receipt of the request to perform necessary alterations appeal the decision to the Commandant in writing. If the Commandant rules that an appurtenance is unessential to navigation, the District Commander shall again specify to the vessel owner a reasonable time for making necessary alterations to the appurtenance, and after the expiration of the time specified, any operation of the vessel in such a manner as to require drawbridge openings shall be deemed in violation of the regulations of this paragraph unless the necessary alterations shall have been made.

(4) The provisions of subparagraphs (1), (2) and (3) of this paragraph shall not be applicable to ocean or coastwise vessels engaged in foreign or domestic commerce.

(k) Clearance gages, of a type to be approved by the Commandant, shall be installed on the upstream and downstream sides of each drawbridge by and at the expense of the owner of or agency controlling the bridge and such gages shall be kept in good repair and legible condition.

Note.-The special regulations contained in §117.245 to §117.491, prescribed where local conditions require to govern the operation of certain bridges, supplement the general regulations contained in §117.240.

**§117.245 Navigable waters discharging into the Atlantic Ocean south of and including Chesapeake Bay and into the Gulf of Mexico, except the Mississippi River and its tributaries and outlets; bridges where constant attendance of draw tenders is not required.** (a) The owners of or agencies controlling certain bridges will not be required to keep

draw tenders in constant attendance. The bridges to which this section applies are listed, and the special regulations applicable in each case are set forth, in paragraphs (f) to (j) inclusive, of this section. At all times not covered by the regulations in this section, and in all other respects, the regulations contained in §117.240 shall govern the operations of these bridges.

(b) Whenever a vessel unable to pass under a closed bridge desires to pass through the draw, advance notice, as specified, of the time the opening is required shall be given to the authorized representative of the owner of or agency controlling the bridge.

(c) Upon receipt of such advance notice, the authorized representative of the owner of or agency controlling the bridge, in compliance therewith, shall arrange for the prompt opening of the draw at the time specified in the notice for the passage of the vessel.

(d) The owners of or agencies controlling the bridges shall keep conspicuously posted on both the upstream and downstream sides thereof, in such a manner that it can easily be read at any time, a copy of the regulations in this section together with a notice stating exactly how the representative specified in paragraph (b) of this section may be reached.

(e) The operating machinery of the draws shall be maintained in a serviceable condition, and the draws shall be opened and closed at intervals frequent enough to make certain the machinery is in proper order for satisfactory operation.

(f), (g), and (h) apply to waterways discharging into the Atlantic Ocean south of and including Chesapeake Bay.

(i) Waterways discharging into Gulf of Mexico east of Mississippi River. (1) Caloosahatchee Canal, Fla.; Atlantic Coast Line Railroad Company bridge at Moore Haven. Between 10:00 p.m. and 6:00 a.m., the draw need not be opened for the passage of vessels.

(1-a) applies to waters not covered by this volume.

(2) Orange River, Florida; Florida State Road Department bridge, mile 0.9. The draw shall open on signal if at least 24 hours notice is given. However, during a hurricane alert for the Caloosahatchee and Orange Rivers area issued by the National Weather Service a draw tender shall be constantly on duty and the draw shall open at any time for the passage of vessels giving the signals set forth in §117.240.

(2-a) Big Carlos Pass, Florida; State Road S-865 drawbridge. The draw shall open on signal from 8 a.m. to 7 p.m. The draw need not open from 7 p.m. to 8 a.m.

(2-b) Matlacha Pass, Florida; State Road S-78 drawbridge. The draw shall open on signal from 8 a.m. to 7 p.m. The draw need not open from 7 p.m. to 8 a.m.

(3) Myakka River, Seaboard Coast Line railroad bridge near Charlotte Beach. From 7 a.m. to 7 p.m. the draw shall open on signal. From 7 p.m. to 7 a.m. the draw shall open on signal if at least 6 hours notice has been given.

(3-a) Gasparilla Sound, Fla.: Seaboard Air Line Railroad Company bridge between the mainland and Gasparilla Island. Between the hours of 6:00 p.m. and 6:00 a.m. the following day, the southerly swingspan in the bridge need not be opened for the passage of vessels.

(3-b) Hudson Bayou, Sarasota, Fla. The draw of the Orange Avenue bridge across Hudson Bayou may remain closed and paragraphs (a) through (e) of this section do not apply to this bridge.

(3-c) Longboat Pass bridge between Longboat Key and Anna Maria Key near Bradenton Beach, Fla. From 6 a.m. to 6 p.m. the draw shall open on signal. From 6 p.m. to 6 a.m., the draw shall open on signal if at least 3 hours notice is given.

(4) Coffee Pot Bayou, St. Petersburg, Fla.; highway bridge at foot of Poplar Street. At least one hour's advance notice required.

(5) Little Manatee River, Fla.; Seaboard Coast Line Railroad bridge at Ruskin. The draw shall open on signal if at least three hours notice is given.

(5-a) Whitcomb Bayou, Fla. The draw shall open on signal from 9 a.m. to 6 p.m. on Saturdays and Sundays. At all other times the draw shall open on signal if at least 2 hours notice is given.

(6) Suwannee River, Fla.; Atlantic Coast Line Railroad Company bridge at Old Town. At least five days' advance notice required.

(6-a) St. Marks River, Fla.; Florida State Road Department bridge over St. Marks River on U.S. Highway 98 at Newport. At least 48 hours' advance notice to be given to State Road Department Maintenance Office, Tallahassee, Fla.

(6-b) Carrabelle River, Fla. The draw shall open promptly on signal if at least 12 hours notice has been given. However, during periods of severe storms or hurricanes from the time the National Weather Service sounds an "alert" for the area until the "all clear" is sounded constant attendance of the draw is required and the draw shall open promptly on signal.

(6-c) Blackwater River, Fla., State Road 10 bridge at Milton. The draw shall open promptly on signal if at least 12 hours notice has been given.

(7) Flint River, Ga.; Seaboard Coast Line Railroad bridges at Bainbridge. At least 15 days advance notice required.

(7a) Flint River, Ga., U.S. Highway 84 bridge at Bainbridge. The draw need not open for the passage of vessels and paragraphs (b) through (e) of this section do not apply to this bridge.

(8) Chattahoochee River, Ga. and Ala.; State of Alabama Highway Department bridge on U.S. Highway 84 and Atlantic Coast Line Railroad Company bridge at Alaga, Ala., Central of Georgia

Railway Company bridge at Columbia, Ala., and Seaboard Air Line Railway Company bridge near Omaha, Ga. At least 6 hours' advance notice required.

(9) (Reserved).

(10) Choctawhatchee River, Fla.; State Road Department of Florida bridge on State Road No. 10 approximately 14 miles east of Freeport. At least 12 hours advance notice required.

(11) Bayou Chico, Florida. Escambia County bridge in Pensacola. Between 7:30 a.m. and 8:30 a.m., 3:30 p.m. and 4:30 p.m., and 5:00 p.m. and 5:30 p.m., except Saturdays, Sundays and national holidays, the draw need not be opened for the passage of vessels: Provided, That the draw shall be opened at any time for the passage of a tow: And provided further, That the draw shall be opened at any time for the passage of a vessel in an emergency involving danger to life or property which shall be indicated by four blasts of the signalling device.

(12) Alabama River, Ala.; St. Louis-San Francisco Railway Company bridge at Yellow Bluff, near Coy. At least 48 hours' advance notice required.

(12-a) Alabama River, Ala.; U.S. Highway 31 and 82 Swing Bridge, mile 278.2 near Montgomery. The draw shall open on signal if at least 24 hours notice has been given.

(12-b) Alabama River, Ala., Louisville and Nashville Railroad Bridge, mile 293.3 near Montgomery. The draw shall open on signal if at least 24 hours notice is given.

(13) Coosa River, Ala.; Seaboard Air Line Railway Company bridge at Lock. At least 24 hours' advance notice required.

(14) Coosa River, Ala.; Louisville and Nashville Railroad Company bridge at Gadsden. At least six hours' advance notice required.

(15) Tombigbee River, Ala.; Southern Railway Company bridge near Epes. At least 24 hours' advance notice required, to be given to the railroad company's station agent at Epes between 8:00 a.m. and 4:00 p.m. on any day except Saturdays and Sundays, either by telephone maintained on the bridge by the railroad company for the purpose or in any other manner convenient to the operator of the vessel.

(16) Tensaw River, Alabama. State of Alabama Highway Department bridge over the Tensaw River on U.S. Highway No. 90 near Mobile, Alabama. The draw need not be opened for the passage of vessels, and paragraphs (b) and (e), inclusive, of this section shall not apply to this bridge.

(17) Tensaw River, Ala.; Louisville and Nashville railroad bridge, mile 15.

(i) The draw shall open on signal from 8 a.m. to 12 midnight. The draw need not open from 12 midnight to 8 a.m.

(ii) During periods of severe storms or hurricanes from the time the U.S. Weather Bureau sounds an "alert" for the area until the "all clear" is sounded drawtenders shall be constantly on duty and the draw shall open on signal for the passage of vessels.

(18) Bayou Sara, Ala.; Louisville and Nashville Railroad Company bridge near Satsuma. Between 6 a.m. and 10 p.m., daily, the bridge will be opened on signal for the passage of vessels. Between 10 p.m. and 6 a.m. daily, at least 4 hours' advance notice required, except during hurricane alerts for the area when a bridge tender will be on duty and the bridge opened on signal for the passage of vessels. The notice posted in accordance with paragraph (d) of this section shall state exactly how the draw tender may be reached by telephone or otherwise between 10 p.m. and 6 a.m.

(19) Three Mile Creek, Ala.; State of Alabama Highway Department bridge at Mobile. Between 7:00 a.m. and 9:00 a.m. and between 4:30 p.m. and 6:30 p.m. daily the draw need not be opened for the passage of vessels. At all other times, at least 12 hours' advance notice required.

(20) Three Mile Creek, Ala. The draw shall open on signal if at least 5 days notice has been given.

(i) From November 15, 1972, through April 1, 1973, the draw need not open for the passage of vessels.

(20-a) Back Bay of Biloxi, mile 2.8, Mississippi. The draw need not open for the passage of vessels from 7 a.m. to 9 a.m., Monday through Friday except holidays, from August 29, 1974 through January 31, 1975.

(21) West Pearl River, La.; New Orleans and Northeastern Railroad Company bridge at Pearl River Station. At least six hours' advance notice required.

(22) (Reserved).

(23) Bayou Lacombe, La; Louisiana Department of Highways bridge at Lacombe. At least 48 hours' advance notice required.

(23-a) Lake Pontchartrain, La.; Louisiana Department of Highways and Southern Railway System bridges near New Orleans. At least 48 hours advance notice required for opening the south drawspan except in case of an emergency, the drawspans shall be placed in operation not later than 12 hours after notice of the emergency and shall be kept in condition for immediate operation until the emergency is over.

(23-b) Lake Pontchartrain, La.; Greater New Orleans Expressway Commission causeway across Lake Pontchartrain, north bascule spans. At least 3 hours' advance notice required.

(24) (Revoked).

(25) Amite River, La.; Louisiana Department of Highways bridge near French Settlement. At least 48 hours' advance notice required.

(26) Bayou Colyell, La.; Louisiana Department of Highways bridge near Port Vincent. At least 48 hours' advance notice required.

(j) Waterways discharging into Gulf of Mexico west of Mississippi River. (1) Bayou Plaquemine, La.; The Texas and Pacific Railway Company and the Louisiana Department of Highways bridges at Plaquemine. The draws need not be opened for the passage of vessels, and the special regulations contained in paragraphs (b) to (e), inclusive, of this section shall not apply to these bridges.

(2) Bayou Terrebonne, La.; State of Louisiana. Department of Highways bridge near Presque Isle. At least 24 hours' advance notice required.

(3) Bayou Lafourche, La.; Texas and New Orleans Railroad Co. bridge at Lafourche. At least 48 hours' advance notice required.

(4) Bayou Lafourche, La.; The State of Louisiana, Department of Highways bridge at Thibodaux and all bridges above. The draws need not be opened for the passage of vessels, and the special regulations contained in paragraphs (b) to (e), inclusive, of this section shall not apply to these bridges.

(5) Grand Bayou, La.; State of Louisiana Department of Highways bridge near Paincourtville. At least 24 hours' advance notice required.

(6) Bayou Black, La.; Morgan's Louisiana and Texas Railroad and Steamship Company bridge at Southdown. At least 24 hours' advance notice required.

(7) Bayou Black, La.; Louisiana Department of Highways bridge near Gibson, and the Terrebonne Parish Police Jury and Southdown, Incorporated, bridges (6) between Gibson and Houma. At least 24 hours' advance notice required.

(8) Little Bayou Black, La.; Texas and New Orleans Railroad Company bridge at Southdown. The draw need not be opened for the passage of vessels, and the special regulations contained in paragraphs (b) to (e), inclusive of this section shall not apply to this bridge.

(9) Bayou Grosse Tete, La.; The Texas and Pacific Railway Company bridge at Grosse Tete, and Louisiana Department of Highways bridge near Rosedale. At least 48 hours' advance notice required.

(10) Bayou Teche, La.; Louisiana Department of Highways bridge at Ruth. At least 48 hours' advance notice required.

(11) Bayou Teche, Louisiana: State of Louisiana, Department of Highways, and Southern Pacific Lines (Morgan's Louisiana and Texas Railroad and Steamship Company) bridges at Breaux Bridge, at least 48 hours' advance notice required.

(12) Stumpy Bayou, La.; Louisiana Department of Highways bridge near Weeks Island. At least 6 days' advance notice required.

(13) Bayou Courtableau, La.; Texas and New Orleans Railroad Company bridge at Washington. The draw need not be opened for the passage of vessels, and paragraphs (b) to (e), inclusive, of this section shall not apply to this bridge.

(14) Vermilion River, La.; Louisiana Department of Highways bridge near Lafayette. At least 48 hours' advance notice required.

(15) (Reserved).

(16) Bayou Plaquemine Brule, La.; Texas and New Orleans Railroad Company bridge near Midland. At least 24 hours' advance notice required.

(17) Bayou Nezpique, La.; Louisiana Department of Highways bridge near Jennings. At least 48 hours' advance notice required.

(18) Bayou Choupique, La.; Louisiana Department of Highways bridges near Calcasieu. At least 48 hours' advance notice required.

(19) Bayou Lacassine, La.; State of Louisiana, Department of Highways, bridge near Hayes. At least 24 hours' advance notice required.

(20) Bayou Lacassine, La.; Texas and New Orleans Railroad Company bridge near Hayes. At least 24 hours' advance notice required.

(21) (Revoked).

(22) Bayou D'Inde, La.; railroad bridge of Defense Plant Corporation, Cities Service Refining Corporation, Agent. At least 72 hours' advance notice required.

(23) (Reserved).

(24) Houston River, La.; The Kansas City Southern Railway Company bridge near Lake Charles. At least 24 hours' advance notice required.

(25) (Revoked)

(26) Sabine River, La. and Tex.; Texas and New Orleans Railroad Company bridge near Echo, Tex., Kansas City Southern Railway Company bridge near Ruliff, Tex., and Louisiana Department of Highways bridge between Starks, La., and Deweyville, Tex. At least 24 hours' advance notice required.

(26-a) Sabine River (Old Channel) behind Orange Harbor Island, Orange, Tex. The draw shall be opened promptly on signal from 7 a.m. to 12 Midnight Monday through Friday, except holidays. At all other times, including legal holidays, 8-hours' advance notice is required.

(27) Cow Bayou, Tex.; Orange County highway bridge on Round Bunch Road and Texas Highway Department bridge at Bridge City. At least 6 hours' advance notice required.

(28) Neches River, Tex.; Gulf, Colorado and Sante Fe Railway Company bridge at Evadale. The draw need not be opened for the passage of vessels, and paragraphs (b) to (e), inclusive, of this section shall not apply to this bridge.

(29) Taylors Bayou, Tex.; Texas and New Orleans Railroad Company bridge and Texas Highway Department bridge at West Port Arthur. The draws need not be opened for the passage of vessels, and paragraphs (b) to (e), inclusive, of this section shall not apply to these bridges.

(30) Trinity River, Tex.; Texas and New Orleans Railroad Company bridge at Liberty, Missouri Pacific Railroad Company bridges near Kenefick and at Riverside, and Gulf, Colorado and Santa Fe Railway Company bridge near Romayor. The draws need not be opened for the passage of ves-

sels, and paragraphs (b) to (e), inclusive, of this section shall not apply to these bridges.

(31) Buffalo Bayou, Tex.; (i) Texas and New Orleans Railroad Company bridge at the head of Houston Turning Basin, Houston, and drawbridges upstream therefrom to, but not including the Houston Belt & Terminal Railway Company bridge near Shiloh Street, Houston. At least 24 hours' advance notice required.

(ii) Houston Belt & Terminal Railway Company bridges near Shiloh Street and at Mary Street, Houston. The draws need not be opened for the passage of vessels and paragraphs (b) to (e), inclusive, of this section shall not apply to these bridges.

(32) (Reserved).

(33) Clear Creek, Tex.; Texas and New Orleans Railroad Company bridge at Seabrook. The draw will be maintained in the open position for the passage of vessels except when it is necessary to close the draw for the passage of trains. A draw tender shall be in constant attendance when the draw is closed. Paragraphs (b) to (d), inclusive, of this section shall not apply to this bridge.

(34) Chocolate Bayou, Tex.; Missouri Pacific Railroad Company bridge near Liverpool. The draw is fixed in the closed position to navigation. Paragraphs (b) to (e), inclusive, of this section shall not apply to this bridge.

(35) Freeport Harbor, Tex.; Missouri Pacific Railroad Company bridge between Freeport and Velasco. At least 24 hours' advance notice required.

(36) Brazos River, Tex. (i) Texas Highway Department bridge near Freeport. At least 12 hours' advance notice required.

(ii) Missouri Pacific Railroad Company bridge at Brazoria. The draw is fixed in the closed position to navigation. Paragraphs (b) to (e), inclusive, of this section shall not apply to this bridge.

(37) Colorado River, Tex.; Texas Highway Department bridge near Wadsworth. At least 24 hours' advance notice required.

(38) Lavaca River, Tex.; Missouri Pacific Railroad Company and Texas Highway Department bridges near Vanderbilt. At least 48 hours' advance notice required, except in emergencies, when the draws will be opened as soon as possible after the receipt of notice.

(39) Nueces Bay, Tex.; Texas Highway Department bridge between Corpus Christi and Portland. The draw need not be opened for the passage of vessels, and the special regulations contained in paragraphs (b) to (e), inclusive, of this section shall not apply to this bridge.

(40) Revoked.

(41) Arroyo Colorado, Tex.; Texas Highway Department bridge at Rio Hondo. At least 12 hours' advance notice required.

**§117.432a Matanzas Pass, Fla., State Road Department bridge (State Road 865) at Fort Myers Beach.** (a) The owner of or agency controlling the bridge shall not be required to open the draw from 7 a.m. to 9 a.m. and 4 p.m. to 6 p.m. except at 8 a.m. and 5 p.m. to allow accumulated vessels to pass. From 9 a.m. to 4 p.m., the draw shall open on the hour and half hour to allow accumulated vessels to pass. From 6 p.m. to 7 a.m. the draw shall open on signal.

(b) Public vessels of the United States, tugs with tows, or vessels in distress shall pass the draw at any time. The signal for these vessels is 4 blasts of a whistle or horn.

(c) The owner of or agency controlling the bridge shall keep conspicuously posted on both the upstream and downstream sides of the bridge in such manner that they can easily be read at any time, signs setting forth the salient features of the regulations of this section.

**§117.462 Caloosahatchee River, Fla.; Florida State Road Department bridge (Edison Bridge) at Fort Myers.**

(a) Except as otherwise provided in paragraphs (b) and (c) of this section, the owner of or agency controlling the bridge shall not be required to open the drawspan between the hours of 4:30 p.m. , and 5:30 p.m., daily except on Sundays and the following legal holidays: New Year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day and Christmas Day.

(b) The regulations in this section shall not apply to vessels owned or operated by the United States. All such vessels shall be passed without delay through the draw of the bridge at any time on giving the usual signal.

(c) The draw of the bridge shall be opened at any time for the passage of a tow or of a vessel in an emergency involving danger of life or property. Such an emergency shall be indicated by four blasts of a whistle, horn, or megaphone.

(d) The owner of or agency controlling the bridge shall keep conspicuously posted on both the upstream and downstream sides of the bridge, in a manner that they can easily be read at any time, signs setting forth the salient features of the regulations in this section.

**§117.463 Manatee River, Fla.; U.S. Route 41 drawbridge near Bradenton.** (a) The draw shall open on signal from 6 a.m. to 7 a.m. and 9 a.m. to 4 p.m.

(b) The draw need not open for the passage of vessels from 7 a.m. to 9 a.m. and 4 p.m. to 6 p.m., however the draw shall open at 6 p.m. if any vessels are waiting to pass.

(c) From 6 p.m. to 6 a.m. the draw shall open on signal if at least three hours notice is given.

(d) The draw shall open on signal from 6 a.m. to 6 p.m. for the passage of public vessels of the United States, tugs with tows and vessels in distress. From 6 p.m. to 6 a.m. the draw shall open as soon as possible for the passage of such vessels. The opening signal from such vessels is four blasts of a whistle or horn or by shouting.

(e) During a hurricane alert issued by the National Weather Service affecting the area the draw shall open on signal.

(f) The owner of or agency controlling the bridge shall conspicuously post notices containing the substance of these regulations, both upstream and downstream, on the bridge or elsewhere, in such a manner that they may be easily read at all times from an approaching vessel. This notice shall state exactly how the authorized representative may be reached for openings of the draw.

**§117.464 Old Tampa Bay, Fla., Courtney Campbell Causeway.** (a) The draw shall open on signal from 7 a.m. to 7 p.m. and shall open on signal from 7 p.m. to 7 a.m. if at least 3 hours' notice has been given.

(b) The owner of or agency controlling this bridge shall conspicuously post notice containing the provisions of these regulations both upstream and downstream of the drawbridge on the bridge or elsewhere in such a manner that they can easily be read at all times from an approaching vessel. The notice shall state how the authorized representative may be reached.

**§117.465 Hillsborough River, Tampa, Florida.** (a) City of Tampa highway bridges at Platt Street, Brorein Street and Kennedy Boulevard. From 7:30 a.m. to 9 a.m. and 4 p.m. to 6:15 p.m., Monday through Saturday, the draws of these bridges need not be opened for the passage of vessels. At all other times the draws shall be opened promptly on signal.

(b) City of Tampa and Florida State Road Department highway bridges at West Columbus Drive and West Hillsborough Avenue. At least 1 hour's advance notice is required from 6 p.m. to 8 a.m. At all other times the draws shall be opened promptly on signal.

(c) All other drawbridges across the Hillsborough River shall be opened promptly on signal.

(d) Public vessels and vessels in distress. Public vessels of the United States or vessels of foreign States, not engaged in commerce, or vessels owned or operated by State, county, or local governments in use for public safety purposes, or any vessel in an emergency caused by rough weather or otherwise to an extent sufficient to endanger life or property, shall be passed through the draw with the least possible delay even though special operation regulations may be in effect that do not require the draw to open at that time. The opening signal is four or more short blasts.

(e) Posting of special operation regulations. The owners of or agencies controlling the drawbridge shall keep conspicuously posted both upstream and downstream of the drawbridge, on the bridge or elsewhere, in such a manner that they can easily be read at any time, from an approaching vessel a brief statement of the special operation regulations pertaining to that bridge unless specifically exempted from this requirement. When applicable, information as to whom notice should be given when passage through the draw is desired and how such persons may be reached by telephone or otherwise shall be included.

**§117.466 Clearwater Harbor, Fla.; the city of Clearwater bridge (Memorial Causeway), Clearwater, Fla.** (a) The draw shall be opened promptly on signal except that: (1) From 12 p.m. to 6 p.m. on Saturdays, Sundays, and legal holidays the draw need not be opened except on the hour and half hour to allow all accumulated vessels to pass.

(b) The regulations in this section shall not apply to vessels owned or operated by the United States. All such vessels shall be passed without delay through the draw of the bridge at any time on giving the usual signal.

(c) The draw of the bridge shall be opened at any time for the passage of a tow or of a vessel in an emergency involving danger to life or property. Such an emergency shall be indicated by four blasts of a whistle, horn, or megaphone.

(d) The owner of or agency controlling the bridge shall keep a copy of the regulations in this section conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can be easily read at any time.

**§117.480 Intracoastal Waterway, Santa Rosa Sound, Fla.; Santa Rosa Island Authority highway bridge between Gulf Breeze and Santa Rosa Island, State Road 399.** (a) Except as otherwise provided in paragraphs (b), (c), and (d) of this section, it will not be necessary to open the draw span from 3 p.m. to 6 p.m., on Saturdays, Sundays, and national holidays from Memorial Day through Labor Day annually.

(b) Vessels owned or operated by the United States or commercial vessels shall be passed without delay through the draw of the bridge at any time on giving the signals prescribed in §117.240 (b) or (c).

(c) During the display or notification of small craft warnings or warnings for winds of greater force by the U.S. Weather Bureau, the bridge shall be opened for the passage of vessels giving the prescribed signals at any time.

(d) The draw of the bridge shall be opened at any time for the passage of any vessel in an emergency involving danger to life or property. Such an emergency shall be indicated by four blasts of a whistle, horn, or megaphone.

(e) The owner of or agency controlling the bridge shall keep a copy of the regulations conspicuously posted on both sides thereof, in such manner that it can be easily read.

**§117.485 Escatawpa River, Miss.; Mississippi State Highway 63 Bridge; mile 1.0.** The draw need not be opened for the passage of vessels, from 6 a.m. to 6:45 a.m., 7 a.m. to 7:30 a.m., 3:25 p.m. to 4 p.m., and 4:15 p.m. to 5 p.m., Monday through Friday, except on national holidays, when the draw shall open promptly on signal. At all other times the draw shall open promptly on signal.

**§117.491 Mobile River and Chickasaw Creek, Ala. Alabama State Highway bridge across Mobile River and Alabama State Highway bridge across Mobile River and Louisville and Nashville Railroad Company bridge across Chickasaw Creek at Mobile, Ala.** (a) Sound signals for vessels. (1) For vessels proceeding up or down Mobile River and requiring an opening of the highway bridge only, the vessel will give a signal of three long blasts.

(2) For vessels coming down Mobile River and intending to proceed up Chickasaw Creek, requiring an opening of the railroad bridge, the vessel will give a signal of one long blast, followed after a one minute interval by three long blasts.

(3) For vessels coming up Mobile River and intending to proceed up Chickasaw Creek, requiring an opening of both bridges, the vessel will give a signal of three long blasts, a one minute interval, and one long blast followed by three long blasts.

(4) The owners of or agencies controlling the bridges shall keep a legible copy of these regulations posted conspicuously on both the upstream and downstream sides of the bridges.

**§117.495 Pascagoula River at Pascagoula, Miss.; U.S. 90 Highway Bridge.** The draw need not be opened for the passage of vessels from 6:15 a.m. to 7:15 a.m., 7:25 a.m. to 8 a.m., 3:15 p.m. to 4:15 p.m., and 4:30 p.m. to 5:30 p.m., Monday through Friday, except on national holidays when the draw shall open promptly on signal. At all other times the draw shall open promptly on signal.

**§117.535 Inner Harbor Navigation Canal, New Orleans, La.** The draws of each bridge shall be opened promptly on signal except that from 7 a.m. to 8:30 a.m., and 5 p.m. to 6:30 p.m., Monday through Friday, the draws of the New Seabrook vehicular bridge and the Danziger bridge at Chef Menteur Highway (U.S. 90) need not be opened for the passage of vessels except in an emergency.

**§117.536 Harvey Canal, La., Missouri Pacific-Texas Pacific railroad drawbridge, mile 0.2.** The draw shall open on signal except that from 7 to 9 a.m. and 4 to 6 p.m., Monday through Friday, except holidays, the draw need not open for the passage of vessels.

**§117.540 Bridges in Louisiana where constant attendance is not required.** (a) The draws of the bridges listed below shall:

(1) Open on signal from 5 a.m. to 9 p.m.

(2) Open on signal from 9 p.m. to 5 a.m. if at least 3 hours notice is given from October 1 through January 31.

(3) Open on signal from 9 p.m. to 5 a.m. if at least 12 hours notice is given from February 1 through September 30.

Bayou Teche, mile 3.9, S-182 highway drawbridge at Calumet.

Bayou Teche, mile 11.8, S-87 highway drawbridge at Centerville.

Bayou Teche, mile 17.2, S-3069 highway drawbridge at Franklin.

Bayou Teche, mile 19.8, S-322 highway drawbridge at Sterling.

Bayou Teche, mile 22.3, S-323 highway drawbridge at Oaklawn.

Bayou Teche, mile 27.0, S-87 highway drawbridge at Baldwin.

Bayou Teche, mile 32.5, S-324 highway drawbridge at Charenton.

Bayou Teche, mile 37.0, S-670 highway drawbridge at Adeline.

Bayou Teche, mile 38.9, S-318 highway drawbridge at Sorell.

Bayou Teche, mile 41.8, S-671 highway drawbridge at Jeanerette.

Bayou Teche, mile 48.7, S-320 highway drawbridge at Olivier.

Franklin Canal, mile 4.8, Chatsworth drawbridge at Franklin.

Lower Atchafalaya River, mile 26.8, S-182 highway drawbridge at Patterson.

(b) The draws of the bridges listed below shall:

(1) Open on signal from 5 a.m. to 9 p.m.

(2) Open on signal from 9 p.m. to 5 a.m. if at least 12 hours notice is given.

West Pearl River, mile 7.9, U.S. 90 highway drawbridge near Pearlington.

Bayou Liberty, mile 2.0, S-433 highway drawbridge at Slidell.

Bayou Bonfouca, mile 7.0, S-433 highway drawbridge at Slidell.

Amite River, mile 6.0, S-22 highway drawbridge at Clio.

Houma Canal, mile 1.7, U.S. 90 highway drawbridge at Houma.

Bayou Du Large, mile 23.2, S-315 highway drawbridge, near Theriot.

Bayou des Allemands, mile 13.9, S-631 highway drawbridge at Des Allemands.

Bayou Little (Petit) Caillou, mile 25.7, S-58 highway drawbridge at Sarah.

Bayou Little (Petit) Caillou, mile 26.6, S-56 highway (Smith River) drawbridge near Montegut.

Bayou Little (Petit) Caillou, mile 29.9, S-56 highway (Duplantis) drawbridge near Bourg.

Bayou Little (Petit) Caillou, mile 33.7, S-24 highway drawbridge at Petit Caillou.

Bayou Terrebonne, mile 33.9, S-3087 highway drawbridge at Prospect.

Bayou Lafourche, mile 58.2, U.S. 90 highway drawbridge at Raceland.

Bayou Lafourche, mile 66.1, S-18 highway drawbridge at St. Charles.

Vermilion River, mile 22.4, S-82 highway drawbridge at Perry.

Vermilion River, mile 25.4, S-14 highway drawbridge at Abbeville.

Vermilion River, mile 26.0, S-14 highway drawbridge at Abbeville.

Vermilion River, mile 34.2, S-82 highway drawbridge, three miles south of Milton.

Vermilion River, mile 37.6, S-92 highway drawbridge at Milton.

Vermilion River, mile 41.0, S-733 highway drawbridge at Eloi Broussard.

Vermilion River, mile 44.9, S-3073 highway drawbridge at New Flanders.

Bayou Teche, mile 62.5, S-344 highway drawbridge at Loreauville.

Bayou Teche, mile 69.0, S-86 highway drawbridge at Daspit.

Bayou Teche, mile 75.2, S-96 highway drawbridge at St. Martinville.

Bayou Teche, mile 82.0, S-350 highway drawbridge at Parks.

Bayou Teche, mile 2.3, S-330 highway drawbridge at Delcambre.

Superior Oil Co. Canal, mile 6.3, S-82 highway drawbridge in Cameron Parish.

Bayou Patout, mile 0.4, S-83 highway drawbridge at Weeks.

(c) In all other respects, the provisions of 117.240 of this part shall govern the operations of these bridges.

**§117.550 Cedar Bayou, Texas, Missouri Pacific automated drawbridge.** (a) The bridge need not be manned by a regular attendant.

(b) The lift span shall be maintained at a vertical clearance of 81.4 feet above mean high water. Fixed green navigation lights shall be displayed in the center of the lift span.

(c) When a train approaches the bridge, the navigation lights shall be changed from green to red, alternating flashing red lights shall be turned on, a horn shall be sounded for 6 minutes, and at the end of 6 minutes the horn shall be stopped and the draw may be lowered and locked if the scanning equipment does not detect any object under the span. If the scanning equipment detects an obstruction, the draw shall be raised until the obstruction is cleared.

(d) After a train has cleared the bridge, the draw shall be raised to 81.4 feet above mean high water, the flashing red lights shall be stopped, and the navigation lights shall be changed from red to green.

**§117.553 Pelican Island Causeway drawbridge, Galveston, Texas.** (a) The draw shall open on signal except that from 7 a.m. to 8:30 a.m., 12 noon to 1 p.m. and 4:15 p.m. to 5:15 p.m., Monday through Saturday, except national holidays, the draw need not open for the passage of vessels.

(b) The draw shall open at any time for public vessels of the United States or vessels in distress. The opening signal is four blasts of a whistle or horn or by shouting.

(c) The owner of or agency controlling this bridge shall conspicuously post notices containing the provisions of this regulation on the upstream and downstream sides of the drawbridge or elsewhere in a manner that they may be easily read at all times from an approaching vessel.

**§117.555 Mississippi River and its navigable tributaries and outlets, including the Atchafalaya River, La., above Grand Lake; bridges.** (a) The owner of or the agency controlling a drawbridge crossing a navigable water of the United States shall provide the appliances and the personnel necessary for the safe, prompt, and efficient operation of the draw.

(b) The draw shall be opened promptly when the signal prescribed in paragraph (d) of this section for the opening of the draw is received from an approaching vessel or other water craft which cannot pass under the closed draw, excepting when an approaching train is so close that it cannot be stopped safely before reaching the bridge or an approaching passenger or mail train is within sight or hearing of the bridge operator.

(c) Trains, vehicles, vessels, or other water craft shall not be stopped or manipulated in a manner hindering or delaying the operation of the draw, but all passage over the drawspan or through the draw opening shall be in a manner to expedite both land and water traffic.

(d) Signals-(1) Call signals for opening of draw- (i) Sound signals. The general signal shall be one long blast of a whistle, horn, or siren, or one loud and distinct stroke of a bell, repeated at intervals until the acknowledging signal hereinafter prescribed is received from the bridge operator, except when a vessel or other water craft is about to leave a point between two drawbridges and within sight or hearing of them to pass through the draw downstream or in the direction of the ebb current, the signal shall be followed after a brief interval by an additional blast or distinct stroke of a bell.

(ii) Visual signal. A white flag by day, a white light by night, swung in full circles at arm's length in full sight of the bridge and facing the draw. This signal is to be used in conjunction with sound signals when conditions are such that sound signals may not be heard.

(2) Acknowledging signals by bridge operation-(i) Sound Signals. Draw to be opened immediately: Same as call signal. If draw cannot be opened immediately, or if open must be closed immediately: Four or more short and rapid blasts of a whisle, horn, or siren, or four sharp and rapid strokes of a bell, to be repeated at regular intervals until acknowledged by the vessel.

(ii) Visual signals. The system of sight signals (hereinafter described) to be used in each individual case will be subject to the approval of the District Commander. They will be used in conjunction with sound signals when conditions are such that sound signals alone are insufficient. Draw to be opened immediately: Green light (or a white flag during daylight hours) swung up and down vertically a number of times in full sight of the vessel, or three flashing green lights so located as to be visible to approaching vessels, or during daylight hours three cylinders or balls so located as to be visible to approaching vessels. Draw cannot be opened immediately, or if open must be closed immediately: A red light (or a red flag during daylight hours) swung to and fro horizontally in full sight of the vessel, or during daylight hours

one cylinder or ball so located as to be visible to approaching vessels.

(3) Acknowledging signals by the vessel. Vessels or other watercraft having signaled for the opening of a draw and having received a signal that the draw cannot be opened immediately, or if open must be closed immediately, will acknowledge said signal by one long blast followed by a short blast or by swinging to and fro horizontally a red flag by day or a red light at night.

(e) A vessel approaching to pass two or more bridges less than 800 feet apart shall signal the first bridge as prescribed in paragraph (d) of this section and give the same signals for the second bridge after an interval of about 10 seconds, and so on, thus giving at intervals of about 10 seconds separate signals for each bridge to be passed. The operator of each bridge shall reply as prescribed in paragraph (d) of this section.

(f) When two or more vessels are approaching to pass a drawbridge from opposite directions, the person in charge of each vessel shall signal for the opening of the draw as prescribed in paragraph (d) of this section. The vessel running with the current shall have the right of way. At slack tide the vessel running in ebb current direction shall have right of way. The bridge operator shall reply as prescribed in paragraph (d) of this section.

(g) When vessels are approaching a bridge span or a draw from the same direction, each vessel shall signal independently for the opening of the draw and shall be navigated in accordance with the pilot rule applicable to the waterway governing such vessels.

(h) Special supplemental regulations may be prescribed to provide for closed or open periods when land or water traffic predominates and to provide for intermittent attendance of bridge operators on bridges across streams where water traffic is minor or at times nonexistent. Owners of or the agency controlling bridges for which such special supplemental regulations are prescribed will be required to keep a copy thereof posted in a conspicuous place on both the upstream and downstream sides of the bridges.

Note.-The special regulations contained in **§117.560**, prescribed where local conditions require to govern the operation of certain bridges, supplement the general regulations contained in **§117.555**.

**§117.560 Mississippi River and its tributaries and outlets; bridges where constant attendance of draw tenders is not required.** (a) The owners of or agencies controlling certain bridges will not be required to keep draw tenders in constant attendance. The bridges to which this section applies are listed, and the special regulations applicable in each case are set forth in paragraphs (f) and (g) of this section.

(b) Whenever a vessel unable to pass under a closed bridge desires to pass through the draw, advance notice, as specified, of the time the opening is required shall be given to the authorized representative of the owner of or agency controlling the bridge.

(c) Upon receipt of such advance notice, the authorized representative of the owner of or agency controlling the bridge, in compliance therewith, shall arrange for the prompt opening of the draw at the time specified in the notice for the passage of the vessel.

(d) The owners of or agencies controlling the bridges shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can easily be read at any time, a copy of the regulations in this section together with a notice stating exactly how the representative specified in paragraph (b) of this section may be reached.

(e) The operating machinery of the draws shall be maintained in a serviceable condition, and the draws shall be opened and closed at intervals frequent enough to make certain that the machinery is in proper order for satisfactory operation.

(f) and (g) These bridges are not mentioned specifically in Coast Pilot 5.

**Part 124-Control Over Movement of Vessels:**

**§124.10 Advance notice of vessel's time of arrival to Captain of the Port.** (a) The master or agents of every registered vessel of the United States, and every foreign vessel arriving at a United States port or place from a port or place outside the United States, or any such vessel destined from one port or place in the United States to another port or place in the United States, shall give at least 24 hours advance notice of arrival to the Captain of the Port at every port or place where the vessel is to arrive, except as follows:

(1) Registered United States pleasure vessels and registered United States fishing vessels are not required to submit advance notice of arrival report.

(2) When the port of arrival is not located within the geographical area assigned to a particular Captain of the Port, this advance notice of time of arrival shall be made to the Commander of the Coast Guard District in which such port or place is located.

(3) When the arrival is a direct result of the operation of "force majeure," and it is not possible to give at least 24 hours' advance notice of time of arrival, then advance notice as early as practicable shall be furnished.

(4) When the vessel, while in United States waters, does not navigate any portion of the high seas, i.e., does not navigate beyond the low water mark along the coasts or beyond the waters contained within the headlands of the United States.

(5) When a vessel is engaged upon a scheduled route if a copy of the schedule is filed with the Captain of the Port for each port of call named in the schedule and the times of arrival at each such port are adhered to.

(6) When the master of a merchant vessel (except on a coastwise voyage of 24 hours or less)

reports in accordance with the U.S. Coast Guard's voluntary Automated Merchant Vessel Report (AMVER) System, he shall be considered to be in constructive compliance with the requirements of paragraph (a) of this section and no additional advance notice of vessel's arrival reports to the Captain of the Port is required. The master or agent of a vessel on coastwise voyages of 24 hours or less shall report the advance notice of vessel's arrival to the Captain of the Port at next port of call prior to or upon departure from port.

(7) For that vessel which is engaged in operations in and out of the same port to sea and return without entering any other port, or on coastwise voyages between ports in the same Coast Guard District, or on voyages between ports in the First, Ninth, Thirteenth, or Seventeenth Coast Guard Districts and adjacent Canadian ports, or between ports of the Commonwealth of Puerto Rico and ports in the Lesser Antilles, or between ports in the Lesser Antilles, or between ports on the east coast of Florida and the Bahama Islands, the Coast Guard District Commander having jurisdiction may, when no reason exists which renders such action prejudicial to the rights and interests of the United States, prescribe conditions under which such vessels may be considered by the Captains of the Port as being in constructive compliance with the requirements of this section.

(8) A westbound vessel which is to proceed to or through United States waters of the St. Lawrence River and/or the Great Lakes shall be subject to compliance with paragraph (b) of this section.

(b) The master or agent of every vessel other than vessels of United States or Canadian nationality engaged in the coastal trade of their respective countries or in trade between their two countries without calling at any other country en route, when proceeding westbound to United States waters of the St. Lawrence River and/or the Great Lakes shall:

(1) At least 24 hours in advance of the vessel's arrival at the Snell Lock, Massena, New York, advise the Commander Ninth Coast Guard District, Cleveland, Ohio, of estimated time of arrival of such vessel at the Snell Lock.

(2) In addition, at least 24 hours in advance of the vessel's arrival at the first United States port-of-call, advise the Commander, Ninth Coast Guard District, Cleveland, Ohio, of the estimated time of arrival at that port.

(3) (Reserved).

(4) A master of a vessel who reports in accordance with the U.S. Coast Guard's voluntary Automated Merchant Vessel Report (AMVER) System and who includes in this report an estimated time of arrival at the Snell Lock, Massena, New York, shall be considered to be in constructive compliance with the requirements of subparagraph (1) of this paragraph and no additional advance notice of vessel's arrival at the Snell Lock is required. Likewise a master of such vessel who indicates in this report the name of the first intended United States port of call and estimated time of arrival at the port shall be considered in constructive compliance with subparagraph (2) of this paragraph and no additional advance notice of arrival is required.

(5) A master or agent of a vessel who files a copy of the scheduled route with the Commander, Ninth Coast Guard District, Cleveland, Ohio, at least 24 hours prior to arrival at Snell Lock, and who includes in the schedule the estimated time of arrival at the Snell Lock, Massena, N.Y., shall be considered to be in constructive compliance with requirements of subparagraph (1) of this paragraph and no additional advance notice of the vessel's arrival at the Snell Lock is required. Likewise, a master or agent of such vessel who indicates in this schedule the name of the first intended United States port-of-call and estimated time of arrival at that port shall be considered in constructive compliance with subparagraph (2) of this paragraph and no additional advance notice of arrival is required.

(6) When the arrival is a direct result of the operation of "force majeure," and it is not possible to give at least 24 hours advance notice of time of arrival, then advance notice as early as practicable shall be furnished.

**§124.14 Advance notice of arrival of vessel laden with explosives or certain specified dangerous cargoes.** (a) The master, agent, or person in charge of any domestic or foreign vessel which is bound for a port or place in the United States and which is carrying as cargo any of the dangerous cargoes described in this paragraph whether for discharge in the United States or not, shall at least 24 hours in advance of arrival at each port or place, notify the Captain of the Port or the Commander of the Coast Guard District in which such port or place is located concerning the amount and location of stowage on board the vessel of any of the following:

(1) Explosives, class A (commercial or military).

(2) Oxidizing materials for which a special permit for water transportation is required by 46 CFR 146.22.

(3) Radioactive materials for which a special approval by the Commandant for water transportation is required by 46 CFR 146.25-30.

(4) Any dangerous cargo considered to involve a particular hazard, when transported or handled in bulk quantities, as futher described in paragraph (b) of this section.

(b)(1) A dangerous cargo considered to involve a particular hazard, when transported in bulk quantities on board vessels, or when handled in bulk quantities on waterfront facilities, is any commodity which by virtue of its properties would create an unusual hazard if released. The commodities subject to this section are:

Acetaldehyde Ethylenimine

| | |
|---|---|
| Acetone Cyanohydrin | Ethyl Ether |
| Acrolein | Hydrofluoric Acid, aqueous (70 percent) |
| Acrylonitrile | Hydrogen Chloride, anhydrous |
| Allyl chloride | Hydrogen Fluoride, anhydrous |
| Ammonia, anhydrous | Methane |
| Butadiene | Methyl Acetylene, Propadiene Mixture, stabilized |
| Butane | Methyl Bromide |
| Butene | Methyl Chloride |
| Butylene Oxide | Motor Fuel Antiknock Compounds containing Lead Alkyls |
| Carbon Disulfide | Oleum |
| Chlorine | Phosphorus, elemental |
| Chlorosulfonic Acid | Propane |
| Dimethylamine | Propylene |
| Epichlorohydrin | Propylene Oxide |
| Ethane | Sulfur Dioxide |
| Ethylene | Toluene Diisocyanate |
| Ethylene Oxide | Vinyl Chloride |

(2) Each commodity listed in subparagraph (1) of this paragraph is considered to possess one or more of the following properties:

(i) Is highly reactive or unstable; or

(ii) Has severe or unusual fire hazards; or

(iii) Has severe toxic properties; or

(iv) Requires refrigeration for its safe containment; or

(v) Can cause brittle fracture of normal ship structural materials or ashore containment materials by reason of its being carried at low temperatures, or because of its low boiling point at atmospheric pressure (unless uncontrolled release of the cargo is not a major hazard to life).

(c) For U.S. vessels, this section is applicable to such vessels on international voyages, coastwise voyages, or Great Lakes voyages. For foreign vessels this section is applicable to such vessels when bound to a port or place in the United States, or a port or place under the jurisdiction of the United States.

(d) When the arrival is a direct result of "force majeure" and it is not possible to give at least 24 hours advance notice, then advance notice as early as possible will be given.

**§124.16 Advance notice of fire or other abnormal condition on arriving vessel.** (a) The master, agent, or person in charge of any domestic or foreign vessel which is bound for a port or place in the United States shall give notice to the Captain of the Port or the Commander of the Coast Guard District in which such port or place is located as early as possible in advance of arrival of any fire or other abnormal condition which may jeopardize the vessel's safety or that of other vessels or facilities in port.

**§124.20 Penalties for violations.** Failure to give advance notice will subject the master or agents of a vessel to the penalties of fine and imprisonment, as well as subject the vessel to seizure and forfeiture, as provided in section 2, Title II of the Act of June 15, 1917, as amended, 50 U.S.C. 192. In addition, such failure may result in delay in the movement of the vessel from the harbor entrance to her facility destination within the particular port.

**Part 160–Ports and Waterways Safety:**

**Subpart A–General:**

**§160.1 Purpose.**

Part 160 contains regulations implementing Title I of the Ports and Waterways Safety Act of 1972.

**§160.11 Definitions.**

For the purpose of this part:

(a) "United States" includes the fifty States, the District of Columbia, Puerto Rico, the territories and possessions of the United States, and the Trust Territory of the Pacific Islands.

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

(c) "Commandant" means the Commandant of the U.S. Coast Guard.

(d) "District Commander" means the Coast Guard officer designated by the Commandant to command a Coast Guard District described in the Code of Federal Regulations, Title 33, Chapter 1, Part 3.

(e) "Captain of the Port" means the Coast Guard officer, under the command of a District Commander, designated by the Commandant for the purpose of giving immediate direction to Coast Guard law enforcement activities within his assigned area as described in the Code of Federal Regulations, Title 33, Chapter 1, Part 3.

(f) "Person" includes an individual, firm, corporation, association, governmental entity, and a partnership.

**§160.15 Penalties.**

33 U.S.C. 1226 prescribes that whoever violates a regulation issued under Title I of the Ports and Waterways Safety Act of 1972 is liable to a civil penalty of not more than $10,000. A vessel used or employed in a violation of these regulations is liable in rem. 33 U.S.C. 1227 prescribes that whoever willfully violates a regulation issued under Title I of the Ports and Waterways Safety Act of 1972 shall be fined not less than $5,000 or more than $50,000 or imprisoned for not more than five years, or both.

**Subpart B–Orders and Directions of the Captain of the Port and District Commander:**

**§160.31 Applicability.**

This subpart applies to all vessels on the navigable waters of the United States, except the Saint Lawrence Seaway and the Panama Canal.

**§160.35 Delegations.**

To prevent damage to, or the destruction or loss of any vessel, 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 environmental harm resulting from vessel or structure damage, destruction, or loss-

(a) Each District Commander, Captain of the Port, or their authorized representative may direct the anchoring, mooring, or movement of a vessel when necessary to prevent damage to or by that vessel or her cargo, stores, supplies, or fuel; and

(b) Each District Commander, Captain of the Port, or their authorized representative may temporarily control vessel traffic in an area which he determines to be especially hazardous, or under conditions of reduced visibility, adverse weather, vessel congestion, or other hazardous circumstances by issuing orders.

(1) Specifying times of vessel entry, movement, or departure to, from, within, or through ports, harbors, or other waters;

(2) Establishing vessel traffic routing schemes;

(3) Establishing vessel size and speed limitations and vessel operating conditions; and

(4) Restricting vessel operation, in a hazardous area or under hazardous conditions, to vessels which have particular operating characteristics and capabilities which he considers necessary for safe operation under the circumstances.

**§160.39 Compliance with directions and orders.**

Each person who has notice of the terms of an order or direction issued under §160.35 shall comply with that order or direction.

**§160.45 Appeals.**

(a) Any person directly affected by an order or direction issued under this part may request reconsideration by the official who issued the order or direction and may appeal the order or direction through the Captain of the Port to the District Commander and then to the Commandant, whose decision shall be final.

(b) Requests for reconsideration and appeals may be written or oral, but if oral must be followed by no less than a written outline of the key points made. The Coast Guard official to whom the request or appeal is made will provide a written decision if requested.

(c) While any request or appeal is pending the order or direction remains in effect.

**Part 204-Danger Zone Regulations:**

**§204.90 Straits of Florida; Navy restricted area surrounding Woman Key and Ballast Key.** (a) The danger zone. The waters within a rectangular area, approximately 3.0 nautical miles long from east to west and 2.4 nautical miles wide from north to south, with Woman Key at or near the center, bounded on the north by latitude 24°32′37″ (approximately one nautical mile north of the north shore of Woman Key); on the east by longitude 81°56′40″ (approximately one nautical mile east of the east shore of Ballast Key); on the south by latitude 24°30′12″ (approximately one nautical mile south of the south shore of Ballast Key); and on the west by longitude 81°59′53″ (approximately one nautical mile west of the west shore of Woman Key). The danger zone will be marked by buoys located at the four corners.

(b) The regulations. (1) The danger zone is open to navigation except when naval operations are in progress, when no vessel or other craft shall enter or remain within the area.

(2) Since naval operations will take place in the area at frequent and irregular intervals throughout the year regardless of season, advance notice will be given of the date on which the first such operations will begin. At intervals of not more than three months thereafter, notice will be sent out that operations are continuing. Such notices will appear in the local newspapers and in "Notice to Mariners."

(3) Prior to the conduct of operations the area will be patrolled by naval craft which will warn navigation to leave the area. Upon receiving such warning any watercraft within the danger zone shall leave it and no craft shall enter the area until operations have ceased.

(4) This section shall be enforced by the Commandant, Sixth Naval District, Charleston, South Carolina, and such agencies as he may designate.

**§204.95 Straits of Florida and Florida Bay in vicinity of Key West, Fla.; operational training area, aerial gunnery range, and bombing and strafing target areas, Naval Air Station, Key West, Fla.** (a) The danger zones.- (1) Operational training area. Waters of the Straits of Florida and Gulf of Mexico southwest, west and northwest of Key West bounded as follows: Beginning at latitude 25°45′00″, longitude 82°07′00″; thence southeast to latitude 24°49′00″, longitude 81°55′00″; thence southwest to latitude 24°37′30″, longitude 82°00′30″; thence westerly to latitude 24°37′30″, longitude 82°06′00″; thence southerly to latitude 24°28′30″, longitude 82°06′00″; thence southerly to latitude 24°25′00″, longitude 82°06′30″; thence easterly to latitude 24°25′00″, longitude 81°57′00″ thence southwesterly to latitude 23°30′00″, longitude 82°19′00″; thence westerly to latitude 23°30′00″, longitude 82°46′00″; thence northwesterly to latitude 23°52′30″, longitude 83°11′00″; thence northerly to latitude 24°25′00″, longitude 83°11′00″; thence easterly to latitude 24°25′00″, longitude 83°08′00″; thence clockwise along the arc of a circle with a radius of 92 miles centered at latitude 24°35′00″, longitude 81°41′15″ to latitude 25°45′05″, longitude 82°23′30″; thence east to point of beginning.

(2) Bombing and strafing target areas.

(i) A circular area immediately west of Marquesas Keys with a radius of two nautical miles having its center at latitude 24°33.4′ and longitude 82°10.9′, not to include land area and area

within Marquesas Keys. The target located within this area, a grounded LSIL will be used for bombing and aircraft rocket exercises.

(ii) A circular area located directly west of Marquesas Keys with a radius of three statute miles having its center at latitude 24°35.6′ and longitude 82°11.6′, not to include land area within Marquesas Keys. The targets located within this area, pile-mounted platforms, will be used as high altitude horizontal bombing range utilizing live ordnance up to and including 1,800 pounds of high explosives. In general, these explosives will be of an air-burst type, above 1,500 feet.

(iii) A circular area located west of Marquesas Keys with a radius of two nautical miles having its center at latitude 24°34′30″ and longitude 82°14′00″.

(b) The regulations. (1) In advance of scheduled air or surface operations which, in the opinion of the enforcing agency, may be dangerous to watercraft, appropriate warnings will be issued to navigation interests through official government and civilian channels or in such other manner as the District Engineer, Corps of Engineers, Jacksonville, Florida, may direct. Such warnings will specify the location, type, time, and duration of operations, and give such other pertinent information as may be required in the interests of safety.

(2) Watercraft shall not be prohibited from passing through the operational training area except when the operations being conducted are of such nature that the exclusion of watercraft is required in the interest of safety or for accomplishment of the mission, or is considered important to the national security.

(3) When the warning to navigation interests states that bombing and strafing operations will take place over the designated target areas or that other operations hazardous to watercraft are proposed to be conducted in a specifically described portion of the overall area, all watercraft will be excluded from the target area or otherwise described zone of operations and no vessel shall enter or remain therein during the period operations are in progress.

(4) Aircraft and naval vessels conducting operations in any part of the operational training area will exercise caution in order not to endanger watercraft. Operations which may be dangerous to watercraft will not be conducted without first ascertaining that the zone of operations is clear. Any vessel in the zone of operations will be warned to leave and upon being so warned the vessel shall leave immediately.

(5) The regulations in this section shall be enforced by the Commandant, Sixth Naval District, Charleston, S.C., and such agencies as he may designate.

**§204.100 Tampa Bay south of MacDill Air Force Base, Fla.; small arms firing range and aircraft jettison, United States Air Force, MacDill Air Force Base.** (a) The danger zone. Shoreward of a line beginning at latitude 27°49′27.38″, longitude 82°29′35.83″; thence to latitude 27°49′20.14″, longitude 82°29′42.78″; thence to latitude 27°48′44.82″, longitude 82°31′10.0″; thence to latitude 27°49′09.35″, longitude 82°32′24.56″; thence to latitude 27°49′38.62″, longitude 82°33′02.44″; and thence to a point on the shore line of MacDill Air Force Base at latitude 27°50′28.57″, longitude 82°32′15.0″. The area will be marked by suitable boundary signs or buoys.

(b) The regulations. (1) Vessels and other watercraft are prohibited from entering the danger zone at all times.

(2) Advance notice will be given of the date on which the first firing practice shall begin. At intervals of not more than three months thereafter, notice will be sent out that firing practice is continuing. Such notices will appear in local newspapers and in "Notice to Mariners."

(3) The regulations in the section shall be enforced by the proper Air Force Authority at MacDill Air Force Base.

**§204.111 Gulf of Mexico south of Apalachee Bay, Fla.; Air Force rocket firing range.** (a) The danger zone. An area about 45 statute miles wide and 60 statute miles long, approximately parallel to and about 30 miles off the west coast of Florida, south of Apalachee Bay. The area is bounded as follows: Beginning at latitude 29°42′30″, longitude 84°40′00″; thence east along latitude 29°42′30″ to longitude 84°00′00″; thence southeast to latitude 28°56′00″, longitude 83°31′00″; thence southwest to latitude 28°37′00″, longitude 84°11′00″; thence northwest to latitude 29°17′30″, longitude 84°40′00″; thence northwest to latitude 29°32′00″, longitude 85°00′00″; thence northeast along a line three miles off the meanderings of the shore to the point of beginning.

(b) The regulations. (1) The fact that aerial rocket firing will be conducted over the danger zone will be advertised to the public through the usual media for the dissemination of information. Inasmuch as such firing is likely to be conducted during the day or night throughout the year without regard to season, such advertising of firing will be repeated at intervals not exceeding three months and at more frequent intervals when in the opinion of the enforcing agency, repetition is necessary in the interest of public safety.

(2) Prior to the conduct of rocket firing, the area will be patrolled by surface patrol boat and/or patrol aircraft to insure that no watercraft are within the danger zone and to warn any such watercraft seen in the vicinity that rocket firing is about to take place in the area. When aircraft is used to patrol the area, low flight of the aircraft across the bow will be used as a signal or warning.

(3) Any such watercraft shall, upon being so warned, immediately leave the area, and, until the conclusion of the firing, shall remain at such a distance that it will be safe from the fallout resulting from such rocket firing.

(4) The regulations in this section shall not deny access to or egress from harbors contiguous to the danger zone proceeding to or from such harbors. In the case of the presence of any such vessel in the danger zone the officer in charge shall cause the cessation or postponement of fire until the vessel shall have cleared that part of the area in which it might be endangered by the fallout. The vessel shall proceed on its normal course and shall not delay its progress unnecessarily. Masters are requested to avoid the danger zone whenever possible so that interference with firing training may be minimized.

(c) The regulations in this section shall be enforced by the Commander, Moody Air Force Base, Valdosta, Georgia, and such agencies as he may designate.

**§204.112 Gulf of Mexico, south of St. George Island, Fla.; test firing range.** (a) The danger zone. A fanshaped area bounded as follows:

NW corner (29°35′15″N., 85°03′12″W.)
SW corner (29°31′18″N., 85°07′31″W.)
SE corner (29°30′18″N., 84°59′18″W.)
NE corner (29°35′09″N., 85°01′53″W.)

The seaward end of the area is an arc with a 10,500 meter radius with its center located on the south shore line of St. George Island 1,500 feet east of Cape St. George Light.

(b) The regulations. (1) The area shall be used from sunrise to sunset daily Mondays through Fridays for test firing helicopter armament.

(2) During firing, the entire area plus 5 miles beyond in all directions shall be kept under surveillance by one control helicopter equipped with FM and UHF communications to the Safety Office at range control to insure cease fire if an aircraft or surface vessel is observed approaching the area.

(3) The regulations in this section shall be enforced by the Commanding Officer, U.S. Army Aviation Test Board, Fort Rucker, Ala., and such agencies as he may designate.

**§204.113 Gulf of Mexico and Apalachicola Bay south of Apalachicola, Florida, Drone Recovery Area, Tyndall Air Force Base, Florida.** (a) The restricted area. A rectangular area excluding St. George Island with the eastern boundary of the area west of the channel through St. George Island within the following co-ordinates: Beginning at a point designated as the northeast corner latitude 29°38′20″N., longitude 84°58′30″W.; thence southeast to latitude 29°35′23″N., longitude 84°56′54″W.; thence southwest to latitude 29°34′15″N., longitude 85°00′35″W.; thence northwest to latitude 29°37′10″N., longitude 85°02′00″W.; thence northeast to point of beginning.

(b) The regulations. (1) The area will be used twice daily and during usage will be restricted to navigation for a period of one hour. It may be used freely at all other times.

(2) Patrol boats and aircraft will warn navigation out of the area before each testing period.

(3) The regulations in this section shall be enforced by the Commander, Headquarters 4756th Air Defense Wing (Weapons) U.S. Air Force, Tyndall Air Force Base, Florida, and such other agencies as he may designate.

**§204.114 Gulf of Mexico south and west of Apalachicola, San Blas, and St. Joseph Bays; air-to-air firing practice range, Tyndall Air Force Base, Fla.** (a) The danger zone. Beginning at latitude 29°40′00″, longitude 85°21′30″, in the vicinity of Cape San Blas; thence southeasterly to latitude 29°23′00″, longitude 84°39′00″; thence southwesterly to latitude 28°39′00″, longitude 84°49′00″; thence northwesterly to latitude 29°43′00″, longitude 85°53′00″; thence northeasterly to latitude 29° 56′30″, longitude 85°38′30″; and thence southeasterly to the point of beginning.

(b) The regulations. (1) Air-to-air firing practice will ordinarily take place in the area during the hours of daylight, seven days per week. During periods of firing, passage through the area will not be denied to cargo-carrying or passenger-carrying vessels or tows proceeding on established routes. In case any such vessel is within the danger area, the officer in charge of firing practice operations will cause the cessation or postponement of fire until the vessel has cleared that part of the area within range of the weapons being used. The vessel shall proceed on its normal course and not delay its progress.

(2) Other vessels will be warned to leave the danger area during firing practice by surface patrol boat and/or patrol aircraft. When aircraft is used to patrol the area, low flight of the aircraft across the bow will be used as a signal or warning. Upon being so warned such vessels shall clear the area immediately.

(3) The area will be open to all vessels whenever firing practice is not being conducted.

(4) The regulations in this section shall be enforced by the Commanding Officer, Tyndall Air Force Base, Florida, and such agencies as he may designate.

**§204.120 Gulf of Mexico, southeast of St. Andrew Bay East Entrance, Small Arms Firing Range, Tyndall Air Force Base, Fla.** (a) The Danger Zones-(1) Area No. 1. The waters of the Gulf of Mexico, southeast of St. Andrew Bay East Entrance within a rectangular area beginning at a point on shore at latitude 30°04′32″, longitude 85°37′07″; thence to latitude 30°03′03″, longitude 85°38′42″; thence to latitude 30°02′14″, longitude 85°37′15″; thence to a point on shore at latitude 30°04′13″, longitude 85°36′47″; thence along the shoreline to the point of beginning.

(2) Area No. 2. The waters of the Gulf of Mexico and St. Andrew Sound within an area described as follows, but excluding Crooked Island: Beginning at a point on shore at latitude 30°02′56″, longitude 85°34′35″; thence to latitude 30°02′18″, longitude 85°36′18″; thence to latitude 30°01′24″, longitude 85°35′40″; thence to latitude 30°00′45″,

longitude 85°34′41″; thence to a point on shore at latitude 30°02′10″, longitude 85°33′42″; thence along the shore line to the point of beginning.

(b) The regulations. (1) No vessel or other craft shall enter or remain in the areas during periods of firing. Area No. 1 will be used for firing practice between 6:30 a.m. and 5:00 p.m., as scheduled, Monday through Friday, with possibly some sporadic firings on Saturdays and Sundays. A 10′ x 18′ red flag will be displayed on a pole at the shoreline whenever firing is in progress.

(2) Area No. 2 will be operated on a sporadic schedule, with firings likely each day including Saturdays, Sundays, and holidays, between the hours of 6:00 a.m. and 5:00 p.m. A 10′ x 18′ red flag will be displayed on a pole at the shore line whenever firing is in progress.

(3) The regulations in this section shall be enforced by the Commanding Officer, Tyndall Air Force Base, Florida, and such agencies as he may designate.

**§204.126 Gulf of Mexico, south of Panama City, Florida; underwater experimental areas, U.S. Navy Mine Defense Laboratory, Panama City, Florida.** (a) The prohibited areas. (1) A circular area with a radius of 300 yards around existing research platform No. 1 located at latitude 30°00′34″, longitude 85°54′12″.

(2) A circular area with a radius of 300 yards around existing research platform No. 2 located at latitude 30°07′14″, longitude 85°46′30″.

(b) The regulations. The areas will be buoyed and marked by the U.S. Coast Guard and will be prohibited to navigation at all times.

**§204.130 Choctawhatchee Bay, Aerial Gunnery Ranges, Air Proving Ground Center, Air Research and Development Command, Eglin Air Force Base, Fla.** (a) The danger zones. (1) Aerial gunnery range in west part of Choctawhatchee Bay. The waters of Choctawhatchee Bay within an area described as follows: Beginning at a point on the west shore at latitude 30°28′30″, longitude 86°30′00″; thence southeasterly to latitude 30°25′30″, longitude 86°21′30″; thence southwesterly to a point on the south shore at latitude 30°23′30″, longitude 86°23′00″; thence northwesterly to a point on the south shore at latitude 30°24′00″, longitude 86°25′00″; and thence northwesterly to the point of beginning; excluding that part of the area included within the aerial gunnery range along the north shore of Choctawhatchee Bay (described in subparagraph (2) of this paragraph).

(2) Aerial gunnery range along north shore of Choctawhatchee Bay. The waters of Choctawhatchee Bay within an area described as follows: Beginning at a point in the waters of Choctawhatchee Bay at latitude 30°26′00″, longitude 85°25′30″; thence north to the shore at longitude 86°25′30″; thence southeasterly and northeasterly along the shore to longitude 86°15′00″; thence south to latitude 30°26′29″, longitude 86°15′00″; thence southwesterly to latitude 30°26′12″, longitude 86°20′35″; thence north to latitude 30°26′57″, longitude 86°20′35″; thence southwesterly to the point of beginning.

(b) The regulations-(1) Aerial gunnery ranges. (i) The aerial gunnery range in the west part of Choctawhatchee Bay (described in paragraph (a)(1) of this section) may be used by watercraft except during periods when firing is conducted. During these periods, firing will be controlled by observation posts, and watercraft will be warned by patrol boats. During periods of firing, traverse of this area shall not be denied to regular cargo-carrying or passenger-carrying vessels or tows proceeding on established routes. In case any such vessel is within the area, the officer in charge of gunnery operations will cause the cessation or postponement of fire until the vessel has cleared that part of the area within the range of the weapons being used. The vessel shall proceed on its normal course and shall not delay its progress.

(ii) No vessel or other craft shall enter or remain within the aerial gunnery range along the north shore of Choctawhatchee Bay (described in paragraph (a)(2) of this section) at any time.

(2) Enforcing Agency. The regulations in this section shall be enforced by the Commander, Air Proving Ground Center, Eglin AFB, and such agencies as he may designate.

**§204.134 The Narrows and Gulf of Mexico adjacent to Santa Rosa Island, Air Force Proving Ground Command, Eglin Air Force Base, Florida.** (a) The restricted area. The waters of The Narrows and the Gulf of Mexico easterly of the periphery of a circular area 5 nautical miles in radius, centered at latitude 30°23′10.074″, longitude 86°48′25.433″ (USC&GS Station Tuck 3), within the segment of a circle, 3 nautical miles in radius, centered at latitude 30°24′00″, longitude 86°41′47″.

(b) The regulations. (1) The area will be used intermittently during daylight hours. During periods of use the area will be prohibited to navigation.

(2) The regulations in this section shall be enforced by the Commander, Air Force Proving Ground Command, Eglin Air Force Base, Florida, and such agencies as he may designate.

**§204.135 Gulf of Mexico, south from Choctawhatchee Bay; guided missiles test operations area, Headquarters Air Proving Ground Command, United States Air Force, Eglin Air Force Base, Florida.** (a) The danger zone. The waters of the Gulf of Mexico south from Choctawhatchee Bay within an area described as follows: Beginning at a point five nautical miles southeasterly from USC&GS Station Tuck 3, at latitude 30°23′10.074″, longitude 86°48′25.433″, 3 nautical miles offshore of Santa Rosa Island; thence easterly three nautical miles offshore and parallel to shore, to a point south of Apalachicola Bay, Florida, latitude 29°32′00″, longitude 85°00′00″; thence southeast-

erly to latitude 29°17′30″, longitude 84°40′00″; thence southwesterly to latitude 28°40′00″, longitude 84°49′00″; thence southeasterly to latitude 28°10′00″, longitude 84°30′00″; thence 270° true to longitude 86°48′00″; thence due north along longitude 86°48′00″ to the intersection of the line with a circle of five nautical miles radius centered on USC&GS Station Tuck 3, at latitude 30°23′10.074″, longitude 86°48′25.433″, thence northeasterly along the arc of the circle to the point of beginning.

(b) The regulations. (1) The area will be used intermittently during daylight hours for a week or 10 days at a time. Firing will take place once or twice a day for periods ordinarly of not more than one hour. Advance notice of such firings will be published in local newspapers and in such other manners as the District Engineer, Corps of Engineers, Mobile, Alabama, may direct.

(2) During periods of firing, passage through the area will not be denied to cargo-carrying or passenger-carrying vessels or tows proceeding on established routes. In case any such vessel is within the danger area, the officer in charge of firing operations will cause the cessation or postponement of fire until the vessel shall have cleared the portion of the danger area involved. The entire area involved will be under constant observation of both surface patrol vessels and air patrol planes prior to and during periods of firing and notice will be given to vessels and tows of intention to fire by buzzing low over the vessel, upon which signal vessels and tows shall proceed on their established course promptly and clear the area as soon as possible.

(3) Other vessels will be warned to leave the immediate danger area during firing periods by surface patrol craft. Upon being so warned such vessels shall clear the area immediately. Such period normally will not exceed two hours.

(4) The regulations in this section shall be enforced by the Commanding Officer, Air Force Proving Ground Command, Eglin Field, Florida, and such agencies as he may designate.

**§204.136 Waters of Santa Rosa Sound and Gulf of Mexico adjacent to Santa Rosa Island, Air Force Proving Ground Command, Eglin Air Force Base, Florida.** (a) The danger zones-(1) Prohibited area. Waters of Santa Rosa Sound and Gulf of Mexico within a circle one nautical mile in radius, centered at latitude 30°23′10.074″, longitude 86°48′25.433″ (USC&GS Station Tuck 3). The portion of the area in Santa Rosa Sound includes the Gulf Intracoastal Waterway between miles 209.6 and 211.4 from Harvey Lock, Louisiana.

(2) Restricted area. The waters of Santa Rosa Sound and Gulf of Mexico surrounding the prohibited area described in subparagraph (1) of this paragraph, within a circle five nautical miles in radius centered at latitude 30°23′10.074″, longitude 86°48′25.433″ (USC&GS Station Tuck 3). The portion of the area in Santa Rosa Sound includes the Gulf Intracoastal Waterway between miles 204.6 and 216.4 from Harvey Lock, Louisiana.

(b) The regulations. (1) Experimental test operations will be conducted by the United States Air Force within the prohibited area on an intermittent basis. Such test operations shall not exceed one hour, and shall not occur more than twice weekly.

(2) No vessel or other watercraft shall enter the prohibited area, except to navigate the Gulf Intracoastal Waterway. Such vessels and other watercraft shall confine their movements to the waters within the limits of the Intracoastal Waterway and shall make the passage as promptly as possible under normal vessel speed.

(3) During periods when experimental test operations are underway no vessels or other watercraft shall enter or navigate the waters of the restricted area.

(4) Warning signs will be erected on the shore lines of Santa Rosa Sound and the Gulf of Mexico to mark the limits of the respective areas.

(5) The regulations in this section shall be enforced by the Commander, Headquarters Air Proving Ground Command, Eglin Air Force Base, Florida, and such agencies as he may designate.

**§204.140** (Revoked)

**§204.162 Gulf of Mexico off Matagorda Island, Tex.; Air Force practice gunnery, bombing, and rocket firing range.** (a) The danger zone. (1) The waters of the Gulf of Mexico encompassed by an arc of a circle having a radius of 5 statute miles centered at latitude 28°17′, longitude 96°32′.

(2) Use of area. The area will be in continuous use, both day and night, for air-to-ground gunnery, dive bombing, rocket firing, horizontal bombing and firing at radio controlled targets.

(b) The regulations. (1) Except in an emergency involving danger to life or property, no vessel shall enter or remain in the danger zone unless authorized to do so in writing by the enforcing agency.

(2) Vessels making scheduled trips over prescribed routes will be given prior written permission to transit the danger zone by the enforcing agency. Vessels so authorized to transit the danger zone shall pass directly through without unnecessary delay and shall display such identification as may be required by the enforcing agency.

(3) The regulations in this section shall be enforced by the Commander, Matagorda Air Force Range, Tex., and such agencies as he may designate.

**§204.228 Atlantic Ocean off north coast of Puerto Rico; practice firing areas, United States Army Forces Antilles.** (a) The danger zones-(1) Westerly small-arms range. The waters within the sector of a circle bounded by radii of 10,000 yards bearing 279° and 315° respectively, from latitude 18°28′31″, longitude 66°25′37″, and the included arc.

NOTE: All bearings in this section are referred to true meridian.

(2) Camp Tortuguero artillery range. The waters within the quadrant of a circle bounded by radii of 20,000 yards bearing 315° and 45′, respectively, from latitude 18°28′31″, longitude 66°25′37″, and the included arc.

(3) Easterly small-arms range. The waters within the sector of a circle bounded by radii of 7,210 yards bearing 45° and 70°, respectively, from a point on the southeast boundary of the artillery range 2,790 yards from its southerly end, and the included arc.

NOTE: The outer boundaries of the danger zones will not be marked, but signs will be posted along shore to warn against trespassing in the firing areas.

(b) The regulations. (1) The danger zones shall be open to navigation at all times except when practice firing is being conducted. When practice firing is being conducted no vessel or other craft except those engaged in towing targets or patrolling the areas shall enter or remain within the danger zones: Provided, That any vessel propelled by mechanical power at a speed greater than five knots may proceed through the Camp Tortuguero artillery range at any time to and from points beyond, but not from one point to another in, the danger zone, between latitude 18°31′ and 18°32′, at its regular rate of speed without stopping or altering its course, except when notified to the contrary.

(2) The fact that practice firing is to take place over the designated area will be advertised to the public through the usual media for the dissemination of such information. Factual information as to the dates, time, and characteristics of the firing will be advertised in advance of each session of firing but in no case less than one week nor more than four weeks before such firing is scheduled to take place.

(3) Prior to conducting each practice firing, the entire danger zone will be patrolled by aircraft or surface vessels to insure that no watercraft are within the danger zone. Any watercraft in the vicinity will be warned that practice firing is about to take place. Any such watercraft shall, upon being so warned, leave the danger zone immediately and shall not return until such practice shall have been terminated and notification to that effect shall have been given by the patrol craft, except that vessels proceeding on a regular course through the area will be allowed to proceed out of the area without warning, and firing will not commence until such vessels are clear of the area.

(4) This section shall be enforced by the Commanding General, United States Army Forces Antilles, and such agencies as he may designate.

**§204.230 Atlantic Ocean and Vieques Sound, in vicinity of Culebra Island bombing and gunnery target area.** (a) The Danger Zone. From Punta Resaca on the north coast of Culebra at latitude 18°20′12″, longitude 65°17′29″ to the charted position of buoy "4RA" at latitude 18°24′07″, longitude 65°12′07″; thence to the charted position of buoy "2RA" at latitude 18°26′31″, longitude 65°16′45″; thence to latitude 18°23′00″, longitude 65°24′30″; thence to the charted position of nun buoy "2" at latitude 18°20′19″, longitude 65°24′51″; thence to the charted position of buoy "24" at latitude 18°18′47″, longitude 65°24′35″; thence to latitude 18°15′30″, longitude 65°21′30″; thence to a point on the southeast coast of Cayo de Luis Pena at latitude 18°17′51″, longitude 65°19′41″; and thence to Punta Tamarindo on the west coast of Culebra at latitude 18°19′12″, longitude 65°19′22″.

(b) The Regulations. (1) The danger zone is subject to use as a target area for bombing and gunnery practice. It will be open to navigation at all times except when firing is being conducted. At such times no surface vessels, except those patrolling the area, shall enter or remain within the danger area. Prior to conducting each firing or dropping of ordnance the danger area will be patrolled to insure that no watercraft are within the area. Any watercraft in the vicinity will be warned that practice firing is about to take place and advised to vacate the area.

(2) The regulations in this section shall be enforced by the Commander, Caribbean Sea Frontier, San Juan, Puerto Rico, and such agencies as he may designate.

**§204.232** (Revoked).

**§204.234 Caribbean Sea and Vieques Sound in vicinity of Eastern Vieques, bombing and gunnery target area.** (a) The Danger Zone. From Punta Conejo on the south coast of Vieques at latitude 18°06′30″, longitude 65°22′33″; thence to latitude 18°03′00″, longitude 65°21′00″; thence to latitude 18°03′00″, longitude 65°15′30″; thence to latitude 18°11′30″, longitude 65°14′30″; thence to latitude 18°12′00″, longitude 65°20′00″; and thence to Cabellos Colorados on the north coast of Vieques at latitude 18°09′49″, longitude 65°23′27″.

(b) Regulations. (1) It will be open to navigation at all times except when firing is being conducted. At such times no surface vessels, except those patrolling the area, shall enter or remain within the danger area. Prior to conducting each firing or dropping of ordnance the danger area will be patrolled to insure that no watercraft are within the danger area. Any watercraft in the vicinity will be warned that practice firing is about to take place and advised to vacate the area.

(2) The regulations will be enforced by the Commander, Carribean Sea Frontier, San Juan, P.R., and such agencies as he may designate.

**Part 205–Dumping Grounds Regulations:**

**§205.80 Entrance to seaports.** (a) The regulations. (1) The areas prescribed in paragraph (b) of this section, except as provided in subparagraphs (9), (10), and (12), may be used only for the dumping of suitable nonfloatable materials, not easily transported by the currents. Dumping of objects

and materials of any type or class within the areas described in paragraph (c) of this section is strictly prohibited.

(2) No dumping shall be done in areas established for this purpose until prior permission therefore has been obtained from the District Engineer, in charge of the locality. The district engineer may suspend the work or revoke the permission at any time. If inspections or any other operations by the United States are necessary in the interests of navigation, all expenses connected therewith shall be borne by the party responsible for the dumping.

(3) Maps showing the location of the dumping grounds may be seen at the office of the district engineer, in charge of the locality, or upon request, he will furnish a written description of the location of the grounds.

(4) The regulations in this section shall be enforced by the Commanders, Eastern Sea Frontier, Caribbean Sea Frontier and Western Sea Frontier, and such agencies as they may designate.

(b) Dumping grounds. (1) to (5) do not include areas covered by this Coast Pilot.

(6) The waters of the Straits of Florida south of Key West Harbor, Florida, within a circle having a radius of five miles with its center at latitude 23°54′00″, longitude 81°37′00″.

(7) The waters of the Gulf of Mexico off the South Pass of the Mississippi River, within a circle having a radius of two nautical miles with its center at latitude 29°03′00″, longitude 88°57′18″.

(8) The waters of the Gulf of Mexico off the Southwest Pass of the Mississippi River, within a rectangular area described as follows: Beginning at latitude 28°52′33″, longitude 89°28′58″, thence to latitude 28°51′00″, longitude 89°31′54″, thence to latitude 28°52′42″, longitude 89°33′00″, thence to latitude 28°54′18″, longitude 89°30′12″, thence to the point of beginning.

(9) The waters of the Gulf of Mexico off Calcasieu Pass, La., within the following areas:

(i) Area A. Beginning at West Jetty at latitude 29°44′59″, longitude 93°20′36″; thence to latitude 29°44′51″, longitude 93°21′33″; thence to latitude 29°45′38″, longitude 93°21′41″; thence along the mean high tide shore line to West Jetty; thence along West Jetty to point of beginning.

(ii) Area B. Beginning at East Jetty at latitude 29°45′00″, longitude 93°20′25″; thence along East Jetty to the mean high tide shore line; thence along the mean high tide shore line to latitude 29°46′02″, longitude 93°19′37″; thence to latitude 29°45′07″, longitude 93°19′28″; thence to point of beginning.

(iii) Area C. Beginning at latitude 29°39′47″, longitude 93°19′44″; thence to latitude 29°39′39″, longitude 93°20′44″; thence to latitude 29°44′22″, longitude 93°21′31″; thence to latitude 29°44′30″, longitude 93°20′32″; thence to point of beginning.

(iv) Area D. Beginning at latitude 29°34′08″, longitude 93°16′19″; thence to latitude 29°33′06″, longitude 93°16′38″; thence to latitude 29°37′21″, longitude 93°20′22″; thence to latitude 29°37′45″, longitude 93°20′26″; thence to latitude 29°37′52″, longitude 93°19′25″; thence to latitude 29°37′29″, longitude 93°19′23″; thence to point of beginning.

(10) The waters of the Gulf of Mexico off Sabine Pass, Tex., within the following areas:

(i) Area A. Beginning at latitude 29°38′09″, longitude 93°49′23″; thence to latitude 29°35′53″, longitude 93°48′18″; thence to latitude 29°35′06″, longitude 93°50′24″; thence to latitude 29°36′37″, longitude 93°51′09″; thence to latitude 29°37′00″, longitude 93°50′06″; thence to latitude 29°37′46″, longitude 93°50′26″; thence to point of beginning.

(ii) Area B. Beginning at latitude 29°38′13″, longitude 93°49′13″; thence to latitude 29°38′36″, longitude 93°48′09″; thence to latitude 29°36′20″, longitude 93°47′04″; thence to latitude 29°35′57″, longitude 93°48′07″; thence to point of beginning.

(11) The waters of the Gulf of Mexico off Sabine Pass, Texas bounded by the mean high tide shore line, Sabine Pass West Jetty, the 12-foot depth contour and a line 1½ nautical miles westerly from and parallel to Sabine Pass West Jetty.

(12) The waters of the Gulf of Mexico off Galveston Entrance, Tex., within the following areas:

(i) Area A. Beginning at latitude 29°20′02″, longitude 94°40′46″; thence to latitude 29°18′56″, longitude 94°38′40″; thence to latitude 29°18′04″, longitude 94°39′15″; thence to latitude 29°19′11″, longitude 94°41′21″; thence to point of beginning.

(ii) Area B. Beginning at latitude 29°20′11″, longitude 94°40′40″; thence to latitude 29°21′02″, longitude 94°40′05″; thence to latitude 29°19′56″, longitude 94°37′59″; thence to latitude 29°19′04″, longitude 94°38′34″; thence to point of beginning.

(iii) Area C. Beginning at latitude 29°16′54″, longitude 94°41′30″; thence to latitude 29°14′24″, longitude 94°38′42″; thence to latitude 29°15′54″, longitude 94°37′06″; thence to latitude 29°18′00″, longitude 94°39′30″; thence to point of beginning.

(13) The waters of the Gulf of Mexico off Galveston Entrance, Texas bounded by the mean high tide shore line, Galveston North Jetty, and the following lines: Beginning at Galveston North Jetty Light at latitude 29°20′44″, longitude 94°40′44″; thence to latitude 29°23′24″, longitude 94°42′30″; thence to latitude 29°25′18″, longitude 94°40′00″; thence along longitude 94°40′00″ to shore.

NOTE: The areas prescribed in subparagraphs (9), (10), and (12) of this paragraph are reserved for the dumping of spoil removed from Federal project channels by Government dredges. The areas prescribed in subparagraphs (11) and (13) of this paragraph may be used for the disposal of wrecks and similar obstructions.

(c) Prohibited dumping grounds. (1) does not include area covered by this Coast Pilot.

(2) The waters of the Straits of Florida south of Key West Harbor, Florida, within the 30-foot main ship channel and a triangular area including the approaches and entrance to the channel

bounded as follows: Beginning at latitude 24°28′10.2″, longitude 81°48′06″, thence to latitude 24°26′00″, longitude 81°46′00″, thence to latitude 24°26′00″, longitude 81°50′00″, thence to the point of beginning.

(3) The waters of the Gulf of Mexico at the mouth of the South Pass of the Mississippi River, within an area prescribed by lines bearing 96° true and 159° true from South Pass (Range Rear) Light and extending seaward to the 40-fathom curve.

(4) The waters of the Gulf of Mexico at the mouth of the Southwest Pass of the Mississippi River, within an area prescribed by lines bearing 124° true and 217° true from Southwest Pass East Jetty End Light and extending seaward to the 40-fathom curve.

(5) The waters of the Gulf of Mexico off Louisiana and Texas Coasts, except as provided in paragraph (b) (9) through (13) of this section, bounded by the mean high tide shore line and the following lines: Beginning at Galveston Jetty Light at latitude 29°19′39″, longitude 94°41′33″; thence to latitude 28°01′12″, longitude 94°41′33″, thence along the 40 fathom line to latitude 28°01′18″, longitude 94°13′42″; thence to Heald Bank Lighted Whistle Buoy 2 at latitude 29°05′00″, longitude 94°13′42″; thence to Sabine Bank Light at latitude 29°28′18″, longitude 93°43′24″; thence to Sabine Bank East End Lighted Whistle Buoy 1 at latitude 29°27′00″, longitude 93°18′30″; thence 015° (true) to shore.

(6) to (11) do not include areas covered by this Coast Pilot.

(12) The waters at the entrance to and in San Juan Harbor, Puerto Rico, within an area bounded as follows: Beginning at the northwesterly point of Isla de Cabras at latitude 18°28′38″, longitude 66°08′25″; thence to latitude 18°28′55″, longitude 66°08′20″; thence to latitude 18°28′33″, longitude 66°07′05″, thence to the beach of Isla San Juan at latitude 18°28′19″, longitude 66°07′05″; thence around the entire harbor of San Juan to the point of beginning.

(13) The waters of Vieques Passage on the eastern coast of Puerto Rico within an area bounded as follows: Beginning at a point on the beach of the Bahia Lima at latitude 18°11′06″; longitude 65°42′; thence south from the beach along longitude 65°42′ to latitude 18°06′; thence to latitude 18°04′, longitude 65°37′; thence along latitude 18°04′ to longitude 65°32′; thence to the south beach of Isla de Vieques at Punta Vaca at latitude 18°04′57″, longitude 65°32′; thence along the shore line of the west end of Isla de Vieques to a point on the north beach at latitude 18°07′35″, longitude 65°32′; thence to latitude 18°14′, longitude 65°32′; thence to latitude 18°15′, longitude 65°34′58″ on Isla Pineros; thence along the southerly shore line to latitude 18°15′, longitude 65°35′57″; thence across Pasaje Medio Mundo to latitude 18°15′, longitude 65°36′23″ on the beach of Puerto Rico mainland; thence along the shore line to the point of beginning.

**Part 207–Navigation Regulations:**

**§207.160 All waterways tributary to the Atlantic Ocean south of Chesapeake Bay and all waterways tributary to the Gulf of Mexico east and south of St. Marks, Fla.; use, administration, and navigation.**

(a) Description. This section applies to the following:

(1) Waterways. All navigable waters of the United States, natural or artificial, including bays, lakes, sounds, rivers, creeks, intracoastal waterways, as well as canals and channels of all types, which are tributary to or connected by other waterways with the Atlantic Ocean south of Chesapeake Bay or with the Gulf of Mexico east and south of St. Marks, Florida.

(2) Locks. All Government owned or operated locks and hurricane gate chambers and appurtenant structures in any of the waterways described in subparagraph (1) of this paragraph.

(3) United States property. All river and harbor lands owned by the United States in or along the waterways described in subparagraph (1) of this paragraph, including lock sites and all structures thereon, other sites for Government structures and for the accommodation and use of employees of the United States, and rights of way and spoil disposal areas to the extent of Federal interest therein.

(4) Vessels and rafts. The term "vessel" as used in this section includes all floating things moved over these waterways other than rafts.

(b) Authority of District Engineers. The use, administration, and navigation of these waterways, Federal locks and hurricane gate chambers shall be under the direction of the officers of the Corps of Engineers, United States Army, detailed in charge of the respective sections, and their authorized assistants. The cities in which the U.S. District Engineers are located are as follows:

U.S. District Engineer, Norfolk, Virginia.

U.S. District Engineer, Wilmington, North Carolina.

U.S. District Engineer, Charleston, South Carolina.

U.S. District Engineer, Savannah, Georgia.

U.S. District Engineer, Jacksonville, Florida.

(c) Commercial statistics. (1) As required by section 11 of the River and Harbor Act of September 22, 1922 (42 Stat. 1043; 33 U.S.C. 555), owners, agents, masters and clerks of vessels plying upon the waterways described in paragraph (a)(1) of this section shall submit a report on such activities for statistical purposes which must contain the following information.

(i) Name of vessel.

(ii) Name and address of owner or operator.

(iii) Type of vessel–steam, motor, sail, barge, or other type.

(iv) Net registered tonnage–if not registered, approximate net tonnage.

(v) Maximum draft at time of passage.

(vi) Number of passengers.

(vii) Cargo-by commodities, expressed in short tons, or other units by which such commodities are customarily measured, giving origin and destination.

(2) All persons rafting and towing logs shall submit a report of their activities containing such information as may be called for by the District Engineer concerned.

(3) The report should be presented to the lockmaster of the federally operated locks for each trip made. Where no federally operated lock is passed, they shall be mailed promptly to the District Engineer. On written request, persons or corporations making frequent use of these waterways may be granted permission to submit monthly statements in lieu of reports by trips. Reports may be submitted on forms furnished free of charge by the District Engineer.

(d) Bridges. (For regulations governing the operation of bridges, see §§117.1, 117.240 and 117.245 of this title.)

(e) Locks-(1) Authority of lockmasters. The lockmaster shall be charged with the immediate control and management of the lock, and of the area set aside as the lock area, including the lock approach channels. He shall see that all laws, rules and regulations for the use of the lock and lock area are duly complied with, to which end he is authorized to give all necessary orders and directions in accordance therewith, both to employees of the Government and to any and every person within the limits of the lock and lock area, whether navigating the lock or not. No one shall cause any movement of any vessel, boat, or other floating thing in the lock or approaches except by or under the direction of the lockmaster or his assistants.

(2) Signals. Vessels desiring lockage in either direction shall give notice to the lockmaster at not more than three-quarters of a mile nor less than one-quarter of a mile from the lock, by two long and two short blasts of a whistle. When the lock is available, a green light, semaphore or flag will be displayed; when not available, a red light, semaphore or flag will be displayed. No vessel or rafts shall approach within 300 feet of any lock entrance unless signalled to do so by the lockmaster.

(3) Precedence at locks. (i) The vessel arriving first at a lock shall be first to lock through; but precedence shall be given to vessels belonging to the United States and to commercial vessels in the order named. Arrival posts or markers may be established ashore above or below the locks. Vessels arriving at or opposite such posts or markers will be considered as having arrived at the locks within the meaning of this subparagraph.

(ii) The lockage of pleasure boats, house boats or like craft shall be expedited by locking them through with commercial craft (other than barges carrying petroleum products or highly hazardous materials) in order to utilize the capacity of the lock to its maximum. If, after the arrival of such craft, no separate or combined lockage can be accomplished within a reasonable time not to exceed the time required for three other lockages, then separate lockage shall be made.

(4) Entrance to and exit from locks. No vessel or raft shall enter or leave the locks before being signalled to do so. While waiting their turns, vessels or rafts must not obstruct traffic and must remain at a safe distance from the lock. They shall take position in rear of any vessels or rafts that may precede them, and there arrange the tow for locking in sections if necessary. Masters and pilots of vessels or in charge of rafts shall cause no undue delay in entering or leaving the lock, and will be held to a strict accountability that the approaches are not at any time unnecessarily obstructed by parts of a tow awaiting lockage or already passed through. They shall provide sufficient men to move through the lock promptly without damage to the structures. Vessels or tows that fail to enter the locks with reasonable promptness after being signalled to do so will lose their turn.

(5) Lockage of vessels. (i) Vessels must enter and leave the locks carefully at slow speed, must be provided with suitable lines and fenders, must always use fenders to protect the walls and gates, and when locking at night must be provided with suitable lights and use them as directed.

(ii) Vessels which do not draw at least six inches less than the depth of miter sills or breast walls, or which have projections or sharp corners liable to damage gates or walls, shall not enter a lock or approaches.

(iii) No vessel having chains or lines either hanging over the sides or ends, or dragging on the bottom, for steering or other purposes, will be permitted to pass a lock or dam.

(iv) Power vessels must accompany tows through the locks when so directed by the lockmaster.

(v) No vessel whose cargo projects beyond its sides will be admitted to lockage.

(vi) Vessels in a sinking condition shall not enter a lock or approaches.

(vii) The passing of coal from flats or barges to steamers while in locks is prohibited.

(viii) Where special regulations for safeguarding human life and property are desirable for special situations, the same may be indicated by printed signs, and in such cases such signs will have the same force as other regulations in this section.

(ix) The lockmaster may refuse to lock vessels which, in his judgment, fail to comply with this paragraph.

(6) Lockage of rafts. Rafts shall be locked through in sections as directed by the lockmaster. No raft will be locked that is not constructed in accordance with the requirements stated in paragraph (g) of this section. The party in charge of a raft desiring lockage shall register with the

lockmaster immediately upon arriving at the lock and receive instructions for locking.

(7) Number of lockages. Tows or rafts locking in sections will generally be allowed only two consecutive lockages if one or more single vessels are waiting for lockage, but may be allowed more in special cases. If tows or rafts are waiting above and below a lock for lockage, sections will be locked both ways alternately whenever practicable. When there are two or more tows or rafts awaiting lockage in the same direction, no part of one shall pass the lock until the whole of the one preceding it shall have passed.

(8) Mooring. (i) Vessels and rafts when in the lock shall be moored where directed by the lockmaster by bow, stern and spring lines to the snubbing posts or hooks provided for that purpose, and lines shall not be let go until signal is given for vessel or raft to leave. Tying boats to the lock ladders is prohibited.

(ii) The mooring of vessels or rafts near the approaches to locks except while waiting for lockage, or at other places in the pools where such mooring interferes with general navigation of the waterway is prohibited.

(9) Maneuvering locks. The lock gates, valves, and accessories will be moved only under the direction of the lockmaster; but if required, all vessels and rafts using the locks must furnish ample help on the lock walls for handling lines and maneuvering the various parts of the lock under the direction of the lockmaster.

(f) Waterways-(1) Fairway. A clear channel shall at all times be left open to permit free and unobstructed navigation by all types of vessels and rafts that normally use the various waterways or sections thereof. The District Engineer may specify the width of the fairway required in the various waterways under his charge.

(2) Stoppage in waterway, anchorage or mooring. (i) No vessels or rafts shall anchor or moor in any of the land cuts or other narrow parts of the waterway, except in case of an emergency. Whenever it becomes necessary for a vessel or raft to stop in any such portions of the waterway it shall be securely fastened to one bank and as close to the bank as possible. This shall be done only at such a place and under such conditions as will not obstruct or prevent the passage of other vessels or craft. Stoppages shall be only for such periods as may be necessary.

(ii) No vessel or raft will be allowed to use any portion of the fairway as a mooring place except temporarily as authorized above without the written permission from the District Engineer.

(iii) When tied up, all vessels must be moored by bow and stern lines. Rafts and tows shall be secured at sufficiently close intervals to insure their not being drawn away from the bank by winds, currents or the suction of passing vessels. Tow lines shall be shortened so that the different parts of the tow shall be as close together as possible. In narrow sections, no vessel or raft shall be tied abreast of another.

(iv) Lights shall be displayed in accordance with provisions of the Federal Pilot Rules.

(v) No vessel, even if fastened to the bank as prescribed in subdivision (i) of this subparagraph, shall be left without a sufficient crew to care for it properly.

(vi) Vessels will not be permitted to load or unload in any of the land cuts except at a regular established landing or wharf without written permission secured in advance from the District Engineer.

(vii) No vessel, regardless of size, shall anchor in a dredged channel or narrow portion of a waterway for the purpose of fishing, if navigation is obstructed thereby.

(viii) Except in cases of emergency the dropping of anchors, weights, or other ground tackle, within areas occupied by submarine cable or pipe crossings, is prohibited. Such crossings will ordinarily be marked by signboards on each bank of the shore or indicated on coast charts.

(3) Speed. (i) Vessels shall proceed at a speed which will not endanger other vessels or structures and will not interfere with any work in progress incident to maintaining, improving, surveying or marking the channel.

(ii) Official signs indicating limiting speeds through critical portions of the waterways shall be strictly obeyed.

(iii) Vessels approaching and passing through a bridge shall so govern their speed as to insure passage through the bridge without damage to the bridge or its fenders.

(iv) A vessel being overtaken by another shall slacken speed sufficiently to permit the passage to be effected with safety to both vessels.

(4) Assembly and handling of tows.

(i) All vessels drawing tows not equipped with rudders shall use two tow lines or a bridle and shorten them to the greatest possible extent so as to have full control at all times. The various parts of a tow shall be securely assembled with the individual units connected by lines as short as practicable. If necessary, as in the case of lengthy or cumbersome tows or tows in restricted channels, the District Engineer may require that tows be broken up and may require the installation of a rudder, drag or other approved steering device on the tow in order to avoid obstructing navigation or damaging the property of others, including aids to navigation maintained by the United States or under its authorization, by collision or otherwise.

(ii) No tow shall be drawn by a vessel that has insufficient power or crew to permit ready maneuverability and safe handling.

(iii) Tows desiring to pass a bridge shall approach the opening along the axis of the channel so as to pass through without danger of striking the bridge or its fenders. No vessel or tow shall navigate through a drawbridge until the movable span is fully opened.

(iv) In the event that it is evident to the master of a towing vessel that a tow cannot be safely handled through a bridge, it will be brought to anchor and the towed vessels will be taken through the bridge in small units, or singly if necessary, or the tow will wait until navigation conditions have improved to such an extent that the tow can pass through the bridge without damage.

(5) Projections from vessels. No vessel carrying a deck load which overhangs or projects over the side of said vessel, or whose rigging projects over the side of the vessel so as to endanger passing vessels, wharves or other property, will enter or pass through any of the narrow parts of the waterway.

(6) Meeting and passing. Vessels, on meeting or overtaking, shall give the proper signals and pass in accordance with Federal Pilot Rules. Rafts shall give to vessels the side demanded by proper signal. All vessels approaching dredges, or other plant engaged on improvements to a waterway, shall give the signal for passing and slow down sufficiently to stop if so ordered or if no answering signal is received. On receiving the answering signal, they shall then proceed to pass at a speed sufficiently slow to insure safe navigation.

(g) Rafts, logging. (1) Rafts will be permitted to navigate a waterway only if properly and securely assembled. The passage of "bag" or "sack" rafts, "dog" rafts, or of loose logs over any portion of a waterway, is prohibited. Each section of a raft will be secured within itself in such a manner as to prevent the sinking of any log, and so fastened or tied with chains or wire rope that it cannot be separated or bag out so as to materially change its shape. All dogs, chains and other means used in assembling rafts shall be in good condition and of ample size and strength to accomplish their purposes.

(2) No section of a raft will be permitted to be towed over any portion of a waterway unless the logs float sufficiently high in the water to make it evident that the section will not sink en route.

(3) Frequent inspections will be made by the person in charge of each raft to insure that all fastenings remain secure, and when any one is found to have loosened, it shall be repaired at once. Should any log or section be lost from a raft, the fact must be promptly reported to the District Engineer, giving as definitely as possible the exact point at which the loss occurred. In all cases the owner of the lost log or section will take steps immediately to remove the same from the waterway.

(4) The length and width of rafts shall not exceed such maximum dimensions as may be prescribed by the District Engineer.

(5) All rafts shall carry sufficient men to enable them to be managed properly, and to keep them from being an obstruction to other craft using the waterway. To permit safe passage in a narrow channel rafts will, if necessary, stop and tie up alongside the bank. Care must be exercised both in towing and mooring rafts to avoid the possibility of damage to aids to navigation maintained by the United States or under its authorization.

(6) When rafts are left for any reason with no one in attendance, they must be securely tied at each end and at as many intermediate points as may be necessary to keep the timbers from bagging into the stream, and must be moored so as to conform to the shape of the bank. Rafts moored to the bank shall have lights at 500-foot intervals along their entire length. Rafts must not be moored at prominent projections of the bank, or at critical sections.

(7) Logs may be stored in certain tributary streams provided a clear channel at least one-half the width of the channel be left clear for navigation along the tributary. Such storage spaces must be protected by booms and, if necessary to maintain an open channel, piling should also be used. Authority for placing these booms and piling must be obtained by written permit from the District Engineer.

(8) The building, assembling, or breaking up of a raft in a waterway will be permitted only upon special authority obtained from the District Engineer, and under such conditions as he may prescribe.

(h) Dumping of refuse or oil in waterway, obstructions. Attention is invited to the provisions of sections 13 and 20 of the River and Harbor Act of March 3, 1899 (30 Stat. 1152, 1154; 33 U.S.C. 407, 415), and of sections 2, 3, and 4 of the Oil Pollution Act of June 7, 1924 (43 Stat. 604, 605; 33 U.S.C. 432-434), which prohibit the depositing of any refuse matter in these waterways or along their banks where liable to be washed into the waters; authorize the immediate removal or destruction of any sunken vessel, craft, raft, or other similar obstruction, which stops or endangers navigation; and prohibit the discharge of oil from vessels into the coastal navigable waters of the United States.

(i) Damage. Masters and owners of vessels using the waterways are responsible for any damage caused by their operations to canal revetments, lock piers and walls, bridges, hurricane gate chambers, spillways, or approaches thereto, or other Government structures, and for displacing or damaging of buoys, stakes, spars, range lights or other aids to navigation. Should any part of a revetment, lock, bridge, hurricane gate chamber, spillway or approach thereto, be damaged, they shall report the fact, and furnish a clear statement of how the damage occurred, to the nearest Government lockmaster or bridge tender, and by mail to the District Engineer, U.S. Engineer Office, in local charge of the waterway in which the damage occurred. Should any aid to navigation be damaged, they shall report that fact immediately to the nearest Coast Guard Officer in Charge Marine Inspection.

(j) Trespass on property of the United States. Trespass on waterway property or injury to the banks, locks, bridges, piers, fences, trees, houses, shops or any other property of the United States pertaining to the waterway, is strictly prohibited. No business, trading or landing of freight or baggage will be allowed on or over Government piers, bridges, or lock walls.

(k) Copies of regulations. Copies of the regulations in this section will be furnished free of charge upon application to the nearest District Engineer.

**§207.173 Key West Harbor at U.S. Naval Base, Key West, Fla.; dummy minefield and swimming and diving training area.** (a) The area. An irregular area south of Key West Island the coordinates of which are as follows: A point on the shoreline of Key West Island at latitude 24°32'44", longitude 81°48'01"; latitude 24°32'02", longitude 81°47'43"; latitude 24°31'56", longitude 81°47'58"; latitude 24°32'15", longitude 81°48'14"; a point on the shoreline of Key West Island at latitude 24°32'42", longitude 81°48'10". Within this area are five spherical yellow buoys 34 inches in diameter each with a 2-foot by 2-foot plywood square painted with day glow and mounted on a 6-foot staff. Buoys numbered 1 through 4 are located on a bearing of 164° T from a point on the shoreline of Key West Island due south of Key West Light at the following intervals from shore respectively: 500 yards; 750 yards; 1,000 yards; and 1,500 yards. Buoy number 5 is located 300 yards 245° T from buoy number 2. All dummy mines are laid on the bottom.

(b) The regulations. (1) All craft shall reduce speed and proceed with caution when underway in this restricted area.

(2) All craft shall stay well clear of naval craft displaying the Four flag (a red flag with a diagonal white cross) and be particularly alert to observe and obey signals from such craft.

(3) Laying lobster pots in this area is prohibited.

(4) The regulations in this section shall be enforced by the Commander, U.S. Naval Base, Key West, Florida, and such agencies as he may designate.

**§207.173a Key West Harbor, at U.S. Naval Base, Key West, Fla.; naval restricted area.** (a) The Areas. (1) All waters within 100 yards of the U.S. Naval Station beginning at a point 100 yards due south of the south end of Whitehead Street at latitude 24°32'42.3"N., longitude 81°47'51"W., and extending westerly and northerly around the U.S. Naval Station to latitude 24°33'33"N., longitude 81°48'32.7"W.; and thence to the shore at latitude 24°33'32"N., longitude 81°48'29.5"W., the north end of the U.S. Coast Guard Base.

(2) All waters within 100 yards of the U.S. Naval Station Annex and the U.S. Naval Air Station Annex beginning at the shore at latitude 24°33'47.6"N., longitude 81°47'55.6"W.; thence westerly to latitude 24°33'48"N., longitude 81°48'00.9"W.; thence southerly to latitude 24°33'45.8"N., longitude 81°48'01"W.; thence westerly to latitude 24°33'47"N., longitude 81°48'12"W.; thence northerly to latitude 24°34'06.3"W.;N., longitude 81°48'10" and thence to latitude 24°33'57.6"N., longitude 81°47'20"W., 100 yards offshore of beacon No. 18.

(3) All waters within 100 yards of Fleming Key and within 100 yards of the fence across Fleming Key Cove.

(b) The regulations. (1) Entering or crossing any of the restricted areas described in paragraph (a) of this section is prohibited except as follows: Privately owned vessels properly registered and bearing identification in accordance with Federal and/or State laws and regulations, and at night showing lights required by Federal laws and U.S. Coast Guard regulations or, if no constant lights are required, then a bright white light showing all around the horizon, may transit the following portion of the restricted areas:

(i) The channel about 75 yards in width extending from the northwest corner of the U.S. Naval Station Annex eastward beneath the Fleming Key bridge along the north shore of the U.S. Naval Station Annex and the U.S. Naval Air Station Annex.

(ii) A channel 150 feet in width which will extend easterly from the main ship channel into Key West Bight, the northerly edge of which channel passes 25 feet south of the Navy Annex piers on the north side of the Bight. While legitimate access of privately owned vessels to facilities of Key West Bight is unimpeded, it is prohibited from mooring, anchoring, or fishing within 50 feet of any U.S. Navy owned pier or craft.

(2) Stopping or landing by other than government owned vessels and certain specifically authorized private craft in any of the restricted areas described in paragraph (a) of this section is prohibited.

(3) Vessels using the restricted channel areas described in subparagraph (1)(i) and (ii) of this paragraph shall proceed at speeds commensurate with minimum wake.

(4) The regulations in this section shall be enforced by the Commander, U.S. Naval Base, Key West, Fla., and such agencies as he may designate.

**§207.175 (Revoked)**

**§207.175a Carlson's Landing Dam navigation lock, Withlacoochee River, Fla.; use, administration and navigation.** (a) The owner of or agency controlling the lock shall not be required to operate the navigation lock except from 7 a.m. to 12 noon, and from 1 p.m. to 7 p.m., during the period of February 15 through October 15 each year; and from 8 a.m. to 12 noon, and from 1 p.m. to 6 p.m., during the remaining months of each year. During the above hours and periods the lock shall be opened upon demand for the passage of vessels.

(b) The owner of or agency controlling the lock shall place signs, of such size and description as

may be designated by the District Engineer, U.S. Army Engineer District, Jacksonville, Fla., at each side of the lock indicating the nature of the regulations in this section.

**§207.175b Weekley Bayou, an arm of Boggy Bayou, Fla., at Eglin Air Force Base; restricted area.** (a) The area. All waters of Weekley Bayou west of a line drawn between latitude 30°28′57″, Longitude 86°29′03″, and latitude 30°28′58″, longitude 86°29′06″, said line crossing the Bayou approximately 225 yards above its mouth.

(b) The regulations. (1) No vessel shall enter the area without the permission of the Commander, Eglin Air Force Base, Florida, or his authorized representative.

(2) The regulations in this section shall be enforced by the Commander, Eglin Air Force Base, Florida, or such agencies as he may designate.

**§207.175c Ben's Lake, a tributary of Choctawhatchee Bay, Fla., at Eglin Air Force Base; restricted area.** (a) The area. All waters of Ben's Lake including the channel connecting it with Choctawhatchee Bay.

(b) The regulations. (1) No vessel shall enter the area or navigate therein without the permission of the Commander, Eglin Air Force Base, Florida, or his authorized representative.

(2) These regulations shall be enforced by the Commander, Eglin Air Force Base, Florida, or such agencies as he may designate.

**§207.175d Alligator Bayou, a tributary of St. Andrew Bay, Florida; restricted area.** (a) The area. All waters of Alligator Bayou from a line connecting points of latitude 30°10′21″, longitude 85°45′07″ and latitude 30°10′16″, longitude 85°45′04″ to State Road 392.

(b) The regulation. (1) No vessel shall enter the area or navigate therein without permission of the Commanding Officer, Naval Ship Research and Development Laboratory, Panama City, Fla., or his authorized representative.

(2) The regulation of this section shall be enforced by the Commanding Officer, Naval Ship Research and Development Laboratory, Panama City, Fla., or such agencies as he may designate.

**§207.175e Gulf of Mexico and St Andrew Sound, south of East Bay, Florida, Tyndall Drone Launch Corridor, Tyndall Air Force Base, Florida, Restricted Area.** (a) The area. The waters of the Gulf of Mexico and St. Andrew Sound within an area described as follows, including Crooked Island: Beginning at a point on shore at latitude 30°01′30″, longitude 85°32′30″, thence to latitude 30°00′58″, longitude 85°33′38″, thence to latitude 29°56′38″, longitude 85°33′38″, thence to latitude 29°55′15″, longitude 85°31′21″, thence to a point on shore at latitude 30°00′58″, longitude 85°31′21″, thence northwest to the point of beginning. This area will be referred to as the "Tyndall Drone Launch Corridor."

(b) The regulations. (1) Military usage of areas is Monday through Friday between the hours of 7 a.m. and 5 p.m.

(2) Vessels are allowed to enter and remain in this area provided they have operational communication equipment capable of monitoring VHF Marine frequency Channel 16 (156.80 MHz). In the event the Marine radio equipment is not installed on the vessel, CB equipment with Channel 13 (27.115 MHz) will be used as an alternate means of communications. Warnings will be broadcast by the Air Force on Channel 16 (156.80 MHz) and Channel 13 (27.115 MHz) will be used as an alternate means of communications. Warnings will be broadcast by the Air Force on Channel 16 (156.80 MHz) and Channel 13 (27.115 MHz) using the following sequence.

(i) Announcement 90 minutes prior to drone launch.

(ii) Announcement 60 minutes prior to drone launch.

(iii) Announcement of drone launch or drone cancelled, and the expected time of the drone launch. Upon receipt of the drone warning on either Channel 16 (156.80 MHz) or Channel 13 (27.115 MHz), vessels will take the necessary action to vacate the drone launch corridor not later than 60 minutes prior to expected drone launch.

(3) Vessels are authorized direct movement without stopping through this area at any time unless warned by helicopter or patrol boat.

(4) The area will be patrolled by helicopter/vessels during periods of hazardous military activity. Verbal warnings or instructions issued by these craft will be strictly adhered to.

(5) The regulations in this section shall be enforced by the Commanding Officer, Tyndall Air Force Base, Florida, and such agencies as he may designate.

**§207.176 Pensacola Bay, Fla.; seaplane restricted area.** (a) The area. Beginning at latitude 30°22′28″, longitude 87°16′00″; thence to latitude 30°21′02″, longitude 87°14′20″; thence to latitude 30°20′02″, longitude 87°15′16″; thence to latitude 30°20′11″; longitude 87°17′58″; and thence to 272° true to the shore.

(b) The regulations. (1) This area is established as a naval seaplane landing area.

(2) Vessels and small craft, except crash boats, plane rearming boats, and similar craft ordered into the area on specific missions in connection with the servicing of planes or patrol of the area, are prohibited from entering or being in the area at any time.

(3) The regulations in this section shall be enforced by the Chief of Naval Air Basic Training, U.S. Naval Air Station, Pensacola, Fla., and such agencies as he may designate.

**§207.180 All waterways tributary to the Gulf of Mexico (except the Mississippi River, its tributaries, South and Southwest Passes and the Atchafalaya River) from St. Marks, Fla., to the Rio Grande; use, administration, and navigation.** (a) The regulations in this section shall apply to:

(1) Waterways. All navigable waters of the U.S. tributary to or connected by other waterways with the Gulf of Mexico between St. Marks, Fla., and the Rio Grande Tex. (both inclusive), and the Gulf Intracoastal Waterway; except the Mississippi River, its tributaries, South and Southwest Passes, and the Atchafalaya River above its junction with the Morgan City-Port Allen Route.

(2) Locks and floodgates. All locks, floodgates, and appurtenant structures in the waterways described in subparagraph (1) of this paragraph.

(3) Bridges, wharves, and other structures. All bridges, wharves, and other structures in or over these waterways.

(4) Vessels. The term "vessels" as used in this section includes all floating craft other than rafts.

(5) Rafts. The term "raft" as used in this section includes any and all types of assemblages of floating logs or timber fastened together for support or conveyance.

(b) Authority of District Engineers: The use, administration, and navigation of the waterways and structures to which this section applies shall be under the direction of the officers of the Corps of Engineers, U.S. Army, in charge of the respective districts, and their authorized assistants. The location of these Engineer Districts, and the limits of their jurisdiction, are as follows:

(1) U.S. District Engineer, Mobile, Ala. The St. Marks River, Fla., to and including the Pearl River, Mississippi and Louisiana; and the Gulf Intracoastal Waterway from Apalachee Bay, Fla., to mile 36.4 east of Harvey Lock.

(2) U.S. District Engineer, New Orleans, La. From Pearl River, Mississippi and Louisiana, to Sabine River, Louisiana and Texas; and the Gulf Intracoastal Waterway from mile 36.4 east of Harvey Lock, to mile 266 west of Harvey Lock.

(3) U.S. District Engineer, Galveston, Tex. The Sabine River, Louisiana and Texas, to the Rio Grande, Tex.; and the Gulf Intracoastal Waterway from mile 266 west of Harvey Lock, to Brownsville, Tex.

(c) Commercial statistics: Owners, agents, masters, or clerks of vessels using the waterways to which this section applies shall submit a report on vessel movements and the cargo carried. The report is required by section 11 of the River and Harbor Act of September 22, 1922 (42 Stat. 1043; 33 U.S.C. 555). The required information may be submitted on ENG Forms 3925 and 3925B. These forms will be furnished free of charge to the operators by any of the U.S. Engineer Districts listed in paragraph (b) of this section. If the operators choose not to submit the required information on these forms, they should contact the District Engineers to determine the information required.

(d) Locks and floodgates:

(1) The term "lock" as used in this section shall include locks, floodgates, and appurtenant structures, and the area designated as the lock area including the lock approach channels.

(2) Authority of lockmasters: The term "lockmaster" as used in this section means the official in charge of operating a lock or floodgate. The lockmaster is responsible for the immediate management and control of the lock and lock area and for the enforcement of all laws, rules, and regulations for the use of the lock. He is authorized to give all necessary and appropriate orders and instructions to every person in the lock area, whether navigating the lock or not; and no one shall cause any movement of any vessel within the lock area unless instructed to do so by the lockmaster or his duly authorized assistants. The lockmaster may refuse passage through the lock to any vessel which, in his judgment, fails to comply with the regulations of this section.

(3) Sound signals: Vessels desiring passage through a lock shall notify the lockmaster by three long and distinct blasts of a horn, whistle, or calls through a megaphone, when within a reasonable distance from the lock. When the lock is ready for entrance, the lockmaster shall reply with three long blasts of a horn, whistle, or calls through a megaphone. When the lock is not ready for entrance, the lockmaster shall reply by four or more short, distinct blasts of a horn, whistle, or calls through a megaphone (danger signal). Permission to leave the lock shall be indicated by the lockmaster by one long blast.

(4) Visual signals: Signal lights and discs shall be displayed at all locks as follows:

(i) From sunset to sunrise: One green light shall indicate the lock is open to approaching navigation; one red light shall indicate the lock is closed to approaching navigation.

(ii) From sunrise to sunset: Large discs, identical in color and number to the light signals prescribed in subdivision (i) of this subparagraph will be displayed from a mast on or near the lock wall.

(5) Radiophone: Locks will monitor continuously VHF-Channel 16 ("Safety and Calling" Channel) and/or AM-2738 kHz for initial communication with vessels. Upon arrival at a lock, a vessel equipped with a radiophone will immediately advise the lock by radio of its arrival so that the vessel may be placed on proper turn. Information transmitted or received in these communications shall in no way affect the requirements for use of sound signals or display of visual signals, as provided in subparagraphs (3) and (4) of this paragraph.

(6) Precedence at locks: The order of precedence for locking is:

(i) U.S. Government vessels, passenger vessels, commercial vessels, rafts, and pleasure craft.

(ii) The vessel arriving first at a lock will be locked through first. When vessels approach simultaneously from opposite directions, the vessel approaching at the same elevation as the water in the lock chamber will be locked through first. In order to achieve the most efficient utilization of the lock,

the lockmaster is authorized to depart from the normal order of locking precedence, stated in subdivision (i) of this subparagraph, as in his judgment is warranted.

(iii) The lockage of pleasure boats, houseboats, or like craft may be expedited by locking them through with commercial craft (other than vessels carrying dangerous cargoes, as described in 46 CFR Part 146). If, after the arrival of such craft, no combined lockage can be made within reasonable time, not to exceed three other lockages, then separate lockage shall be made.

(7) Entrance to and exits from locks: No vessel or tow shall enter or exit from a lock before being signaled to do so. While awaiting turn, vessels or tows must not obstruct navigation and must remain at a safe distance from the lock, taking position to the rear of any vessel or tows that precede them; and rearranging the tow for locking in sections, if necessary. Masters and pilots of vessels or tows shall enter or exit from a lock with reasonable promptness after receiving the proper signal. Appropriate action will be taken to insure that the lock approaches are not obstructed by sections of a tow either awaiting lockage or already locked through. Masters of vessels shall provide sufficient men to assist in the locking operation when deemed necessary by the lockmaster. Care shall be taken to insure prompt and safe passage of the vessel without damage to the structure.

(8) Lockage and passage of vessels: Vessels or tows shall enter and exit from locks under sufficient control to prevent damage to the lock, gates, guide walls, fenders, or other parts of the structure. Vessels shall be equipped with and use suitable fenders and adequate lines to protect the lock and to insure safe mooring during the locking operation. Vessels shall not meet or pass anywhere between the gate walls or fender system or in the approaches to locks.

(9) Vessels prohibited from locks: The following vessels shall not be permitted to enter locks or approach channels:

(i) Vessels in a sinking condition.

(ii) Vessels leaking or spilling cargo.

(iii) Vessels not having a draft of at least three (3) inches less than the depth over the sills or breast walls.

(iv) Vessels having projection or cargo loaded in such a manner that is liable to damage the structure.

(v) Vessels having chains, links, or drags either hanging over the sides or ends or dragging on the bottom for steering or other purposes.

(vi) Vessels containing flammable or dangerous cargo must have the hatch covers in place and securely fastened.

(10) Number of lockages: Tows locking in sections will generally be allowed only two consecutive lockages if other vessels are waiting for lockage unless otherwise decided by the lockmaster. If other tows are waiting above and below a lock, lockages will be made both ways alternately whenever practicable.

(11) Mooring in locks:

(i) When in a lock, vessels and tows shall be moored where directed by the lockmaster by bow, stern, and spring lines to the snubbing posts or hooks provided for that purpose, and lines shall not be let go until the signal is given for the vessel to exit. Tying to the lock ladders is prohibited.

(ii) Mooring near the approaches to locks is prohibited except when the vessels or tows are awaiting lockage.

(12) Lock operating personnel: Vessels and tows using the locks may be required to furnish personnel to assist in locking through; however, the operation of the structure is the responsibility of the lockmaster, and personnel assisting in the lockage of the vessels and tows will follow the direction of the appropriate official on duty at the lock. No gates, valves or other accessories or controls will be operated unless under his direction.

(13) Waterway traffic data: To meet requirements for current data on waterway traffic and the trend of such traffic, all vessels transiting locks shall furnish such information as prescribed by the District Engineer. ENG Form 3102 for submitting this data can be obtained at any Federally operated lock.

(14) Lockage of rafts: Rafts shall be locked through as directed by the lockmaster. No raft will be locked that is not constructed in accordance with the requirements stated in paragraph (f) of this section. The person in charge of a raft desiring lockage shall register with the lockmaster immediately upon arriving at the lock and receive instructions for locking.

(15) (Revoked).

(e) Waterways:

(1) A clear channel shall at all times be left open to permit free and unobstructed navigation by all types of vessels and tows normally using the various waterways covered by the regulations of this section.

(2) Fairway: The District Engineer may specify the width of the fairway required in the various waterways under his charge.

(3) Anchoring or mooring:

(i) Vessels or tows shall not anchor or moor in any of the land cuts or other narrow parts of the waterway, except in an emergency, or with permission of the District Engineer. Whenever it becomes necessary for a vessel or tow to stop in any such portions of the waterway, it shall be securely fastened to one bank and as close to the bank as possible. This shall be done only at such a place and under such conditions as will not obstruct or prevent the passage of other vessels or tows. Stoppages shall be only for such periods as may be necessary.

(ii) When tied up individually, all vessels and tows shall be moored by bow and stern lines. Tows shall be secured at sufficiently frequent intervals

to insure their not being drawn away from the bank by winds, currents, or the suction of passing vessels. Lines shall be shortened so that the various barges in a tow will be as close together as possible.

(iii) Lights shall be displayed in accordance with provisions of the Federal Rules of the Road.

(iv) Whenever any vessel or tow is moored to the bank (subdivision (i) of this subparagraph) at least one crew member shall always remain on board to see that proper signals are displayed and that the vessel or tow is properly moored at all times.

(v) No vessel, regardless of size, shall anchor in a dredged channel or narrow portion of a waterway for the purpose of fishing if navigation is obstructed thereby.

(4) Speed: Speeding in narrow sections is prohibited. Official signs indicating limiting speeds shall be obeyed. Vessels shall reduce speed sufficiently to prevent damage when passing other vessels or structures in or along the waterway.

(5) Size, assembly, and handling of tows:

(i) On waterways 150 feet wide or less, tows which are longer than 1,180 feet, including the towing vessel, but excluding the length of the hawser, or wider than one-half the bottom width of the channel or 55 feet, whichever is less, will not be allowed, except when the District Engineer has given special permission or the waterway has been exempted from these restrictions by the District Engineer. Before entering any narrow section of the Gulf Intracoastal Waterway, tows in excess of one-half the channel width, or 55 feet, will be required to stand by until tows which are less than one-half the channel width or 55 feet wide have cleared the channel. When passing is necessary in narrow channels, overwidth tows shall yield to the maximum. Separate permission must be received from the District Engineer for each overlength or overwidth movement. In addition, the following exceptions are allowed:

(ii) Algiers Canal between the Mississippi River and Bayou Barataria, La., and on Harvey Canal, Gulf Intracoastal Waterway, mile 0 to mile 6 WHL, tows 74 feet in width will be allowed. Tows in excess of 55 feet wide desiring to move over Algiers Canal or Harvey Canal will obtain clearance from the lockmaster at Algiers Lock or Harvey Lock, respectively, before entering the canal. Overwidth tows will report clearing Algiers or Harvey Canal to the respective lockmaster and will rearrange tows to conform to prescribed dimensions immediately upon leaving the canal. The lockmaster will withhold permission for additional tows over 55 feet wide until all previously authorized tows moving in the opposite direction have cleared the waterway.

(iii) Gulf Intracoastal Waterway-Between mile 6.2 EHL (Inner Harbor Navigation Canal Lock) and mile 33.6 EHL tows of 78 feet in width will be allowed.

(iv) Gulf Intracoastal Waterway-Between mile 33.6 EHL and the Mobile Bay Ship Channel, tows of 108 feet in width will be allowed if under 750 feet in length including the towboat but excluding the length of the hawser.

(v) Gulf Intracoastal Waterway-Mobile Bay Ship Channel to St. Marks, Fla., for tows made up of empty barges on the off or shallow side, a width of 75 feet will be allowed.

(vi) All vessels pulling tows not equipped with rudders in restricted channels and land cuts shall use two towlines, or a bridle on one towline, shortened as much as safety of the towing vessel permits, so as to have maximum control at all times. The various parts of a tow shall be securely assembled with the individual units connected by lines as short as practicable. In open water, the towlines and fastenings between barges may be lengthened so as to accommodate the wave surge. In the case of lengthy or cumbersome tows, or tows in restricted channels, the District Engineer may require that tows be broken up, and may require the installation of a rudder or other approved steering device on the tow in order to avoid obstructing navigation or damaging the property of others. Pushing barges with towing vessel astern, towing barges with towing vessel alongside, or pushing and pulling barges with units of the tow made up both ahead and astern of the towing vessel are permissible provided that adequate power is employed to keep the tows under full control at all times. No tow shall be drawn by a vessel that has insufficient power or crew to permit ready maneuverability and safe handling.

(vii) Vessels or tows shall not navigate through a drawbridge until the movable span is fully opened.

(6) Projections from vessels: Vessels or tows carrying a deck load which overhangs or projects over the side, or whose rigging projects over the side, so as to endanger passing vessels, wharves, or other property, shall not enter or pass through any of the narrow parts of the waterway without prior approval of the District Engineer.

(7) Meeting and passing: Passing vessels shall give the proper signals and pass in accordance with the Federal Rules of the Road. At certain intersections where strong currents may be encountered, sailing directions may be issued through navigation bulletins or signs posted on each side of the intersection.

(f) Rafts: The navigation regulations in this paragraph shall apply fully to the movement of rafts.

(1) Rafts will be permitted to navigate a waterway only if properly and securely assembled. Each raft shall be so secured as to prevent the loss or sinking of logs.

(2) All rafts shall carry sufficient men to enable them to be managed properly. It will be the responsibility of the owner to remove logs from the waterway that have broken loose from the raft.

(3) Building, assembling, or breaking up of a raft within a waterway may be permitted: however, the work must be done in an area that will not restrict the use of the waterway by other users. The work area must be cleared of loose logs so that they will not enter the waterway and become a hazard to navigation.

(g) Damage: Should any damage be done to a revetment, lock, floodgates, bridge, or other federally owned or operated structure, the master of the vessel shall report the accident to the nearest lockmaster or bridgetender as soon as possible after the accident. Damage to aids to navigation and to nonfederally owned bridges must be reported to the Commander, Eighth Coast Guard District, New Orleans, La.

(h) Marine accidents: Masters, mates, pilots, owners, or other persons using the waterways covered by this section shall report to the District Engineer at the earliest possible date any accident on the waterway which causes any vessel to become an obstruction to navigation. The information to be furnished the District Engineer shall include the name of the vessel, its location, and the name and address of the owner. The owner of a sunken vessel shall properly mark the vessel as soon as practicable after sinking.

(i) Trespass on U.S. property:

(1) Trespass on or injury to waterway property of the United States is prohibited. No business, trading, or landing of freight, will be allowed on Government property without permission of the District Engineer.

(2) The District Engineer may establish policy pertaining to mooring, exchanging crews, loading and unloading supplies, and making emergency repairs in the vicinity of locks so long as navigation is not impeded thereby.

(j) Liability: The regulations of this section will not affect the liability of the owners and operators of vessels for any damage caused by their operations to the waterway or to the structures therein.

**§207.184 Sabine River at Orange, Texas; restricted area in vicinity of the Texas Group, Atlantic Reserve Fleet.** (a) The area. The berthing area of the Texas Group, Atlantic Reserve Fleet and the waters adjacent thereto from the mean high tide shoreline to a line drawn parallel to, and 100 feet channelward from lines connecting the pier heads of Piers 1 through 12; and from a line drawn parallel to, and 200 feet upstream from, Pier 1 to a line drawn parallel to, and 100 feet downstream from, Pier 12.

(b) The regulations. (1) No vessel or other craft except vessels of the United States Government or vessels duly authorized by the Commander, Texas Group, Atlantic Reserve Fleet, shall navigate, anchor, or moor in the restricted area.

(2) The regulations of this section shall be enforced by the Commander, Texas Group, Atlantic Reserve Fleet, and such agencies as he may designate.

**§207.185 Taylors Bayou, Tex., Beaumont Navigation District Lock; use, administration and navigation.** (a) Between March 15 and September 15 each year, pleasure boats, houseboats, and other craft not employed for commercial purposes, will be locked through only at 6:00 and 11:45 a.m., and 6:30 p.m., except in cases of emergency; but whenever a lockage is made for a commercial boat, other craft may likewise pass through if there is room in the lock. At all other times lockages shall be made in accordance with §207.180.

(b) The lock tender or one in charge of the lock shall be the judge as to whether the boat presenting itself for lockage is a commercial or pleasure boat.

**§207.187 Gulf Intracoastal Waterway, Tex.; special floodgate, lock and navigation regulations.** (a) Application. The regulations in this section shall apply to the operation of the Brazos River Floodgates and the Colorado River Locks at Mile 400.8 and Mile 441.5, respectively, west of Harvey Lock, La., on the Gulf Intracoastal Waterway, and navigation of the tributary Colorado River Channel in the vicinity of said locks.

(b) Definitions. The term "current" means the velocity of flow of water in the river. It is expressed in statute miles per hour. The term "head differential" means the difference measured in feet between the water level in the river and that in the waterway when the floodgates or lock gates are closed. The term "Lockmaster" means the official in charge of the floodgates or locks.

(c) Operation of floodgates and locks-(1) Unlimited passage. The floodgates and locks shall be opened for the passage of single vessels and towboats with single or multiple barges when the current in the river is less than 1.5 miles per hour and the head differential is less than 0.7 foot. When the head differential is less than 0.7 foot, the Colorado River Locks shall normally be operated as floodgates, using only the riverside gate of each lock.

(2) Limited passage. When the current in either river exceeds 1.5 miles per hour or the head differential at the Brazos River Floodgates is between the limits of 0.7 foot and 1.8 feet, both inclusive, passage shall be afforded only for single vessels or towboats with single barges. When two barges are rigidly assembled abreast of each other and the combined width of both together is 55 feet or less, they shall be considered as one barge. Each section of an integrated barge shall be considered as one barge except, when it is necessary to attach a rake section to a single intermediate section to facilitate passage, the two sections shall be considered as one barge. It shall be the responsibility of the master, pilot or other person in charge of a vessel to determine whether a safe passage can be effected, giving due consideration to the vessel's power and maneuverability, and the prevailing current velocity, head differential, weather and visibility. If conditions are not favorable, passage shall

be delayed until conditions improve and a safe crossing is assured.

(3) Gate closures. The Brazos River Floodgates shall be closed to navigation when the head differential exceeds 1.8 feet. The Colorado River Locks shall be closed to navigation when the current in the river exceeds a critical velocity as determined by the District Engineer, U.S. Army Engineer District, Galveston, Tex. The Brazos River Floodgates or the Colorado River Locks shall be closed to navigation when in the opinion of said District Engineer it is required for the protection of life and property, or it is to the advantage of the Government to permit uninterrupted emergency or maintenance operations, including dredging.

(4) Mooring facilities. Mooring facilities located on both banks of the Gulf Intracoastal Waterway on the approaches to the floodgates and locks are for the mooring of vessels when the floodgates or locks are closed to navigation or tows are limited to single barges. Vessels awaiting passage shall be moored parallel to the bank and as close to the bank as possible. Barges shall be moored fore and aft with two lines, each to a separate mooring facility. Beaching of vessels in lieu of mooring them is prohibited. The mooring facilities are numbered and vessels making fast to them shall notify the Lockmaster giving the number of each facility being used.

(5) Information signs. (Revoked)

(6) Communication-(i) Radio. The floodgates and locks are equipped with short wave radio equipment transmitting and receiving on 2738 kilocycles. Call letters for the floodgates are WUI 411 and for the locks are WUI 412.

(ii) Telephone. The floodgates and locks are equipped with telephone facilities. The floodgates may be reached by phoning Freeport, Tex., Area Code 713, phone 233-1251; the locks may be reached by phoning Bay City, Tex., Area Code 713, phone 863-7842.

(7) Arrival posts. Arrival posts 10 feet high and 10 inches in diameter have been established on the approaches to the locks and floodgates. They are painted with alternate horizontal bands of red and white 3 inches wide. Arrival at the floodgates or locks shall be determined as provided in subparagraph (d)(4) of §207.180.

(d) Navigation of the Colorado River Channel-(1) Traffic signals. (i) Light and sound signals directed both upstream and downstream on the Colorado River are mounted on top of a galvanized skeleton steel tower 85 feet high located on the northeast point of land at the Gulf Intracoastal Waterway crossing of the river. They will be operated from the control house of the East Lock of the Colorado River Locks to direct the interchange of traffic in the Colorado River and the Gulf Intracoastal waterway.

(ii) Vessels navigating the Colorado River and desiring passage either upstream or downstream through the crossing, or into the crossing and through a lock into the Gulf Intracoastal Waterway, shall give notice to the Lockmaster by two long and distinct blasts of a whistle or horn when within a distance of not more than one-half mile nor less than one-fourth mile from the Gulf Intracoastal Waterway crossing. When the locks and the crossing are clear of vessels, the Lockmaster shall reply by two long and distinct blasts of a whistle or horn and display a green light from the signal tower indicating that the vessel in the river may proceed across the crossing or into the main stem of the Gulf Intracoastal Waterway either eastbound or westbound. When there are vessels in the river crossing or in the locks, the Lockmaster shall reply by four or more short blasts of a whistle or horn (danger signal) and display a red light from the signal tower indicating the vessel in the river shall wait at least a quarter of a mile from the crossing for clearance. When the locks and crossing are clear of vessels, the lockmaster shall indicate to the waiting vessel by two long and distinct blasts of a whistle or horn and display of a green light from the signal tower indicating that the vessel may proceed across the crossing or into the main stem of the Gulf Intracoastal Waterway either eastbound or westbound. During periods when the red light may be obscured by fog, mist, or rain, an audible signal consisting of a long blast followed by a short blast of a whistle or horn, repeated every 30 seconds, shall be sounded from the signal tower as an adjunct to the red light.

(2) Signs. Large signs with silver reflective background and stop sign red letters are erected one-fourth mile upstream and downstream from the Gulf Intracoastal Waterway on the Colorado River. The legend states "DO NOT PROCEED BEYOND THIS POINT WHEN SIGNAL TOWER LIGHT IS RED." These signs must be obeyed.

Note.-The foregoing regulations are supplementary to the regulations in §207.180.

**§207.188 Corpus Christi Bay, Tex.; seaplane restricted area, U.S. Naval Air Station, Corpus Christi.** (a) The area. The waters of Corpus Christi Bay within the area described as follows: Beginning at a point on the south shore of Corpus Christi Bay at the "North Gate" of the U.S. Naval Air Station at longitude 97°17′15″; thence to latitude 27°44′30″, longitude 97°20′00″; thence due north to latitude 27°46′30″; thence to latitude 27°44′12″, longitude 97°16′31″; thence to latitude 27°43′04″, longitude 97°13′12″; thence to a point on the easterly shore of Demit Island at latitude 27°41′20″; thence along the south shore of Corpus Christi Bay to point of beginning.

(b) The regulations. (1) No vessel or watercraft of any type shall enter or remain in the area at any time, day or night, except as provided in this paragraph.

(2) Clearance for watercraft operating in the area on set schedules and on prescribed routes may be granted upon written application to the enforcing agency.

(3) Changes in schedules and routes may be made upon written application to the enforcing agency.

(4) Off schedule operations of craft or operation over unprescribed routes may be authorized, in cases of necessity, upon special application in each case. These applications shall be made in writing to the enforcing agency, except as provided in subparagraph (5) of this paragraph.

(5) Commercial fishermen, geophysical exploration crews, and personnel of oil companies holding leases within the area will not be required to operate on set schedules or over prescribed routes but, in order to enter the area, either day or night, they shall have proper identification and the approval of the enforcing agency.

(6) The regulations in this section shall be enforced by the Chief of Naval Air Advanced Training, United States Naval Air Station, Corpus Christi, Texas, and such agencies as he may designate.

**§207.200 Mississippi River below mouth of Ohio River, including South and Southwest Passes; use, administration, and navigation.** (a) Mississippi River bank protection works provided by United States. Except in case of great emergency, no vessel or craft shall anchor over revetted banks of the river, and no floating plant other than launches and similar small craft shall land against banks protected by revetment except at regular commercial landings. In all cases, every precaution to avoid damage to the revetment works shall be exercised. The construction of log rafts along mattressed or paved banks or the tying up and landing of log rafts against such banks shall be performed in such a manner as to cause no damage to the mattress work or bank paving. Generally, mattress work extends out into the river 600 feet from the low water line. Information as to the location of revetted areas may be obtained from, and will be published from time to time by, the District Engineers, Corps of Engineers, New Orleans, Louisiana, Vicksburg, Mississippi River Commission, Vicksburg, Mississippi.

(b) Mississippi River below Baton Rouge, La., including South and Southwest Passes-(1) Supervision. The use, administration, and navigation of the waterways to which this paragraph applies shall be under the supervision of the District Engineer, Corps of Engineers, New Orleans, Louisiana.

(2) Speed; high-water precautions. When passing another vessel (in motion, anchored, or tied up), a wharf or other structure, work under construction, plant engaged in river and harbor improvement, levees withstanding flood waters, buildings partially or wholly submerged by high water, or any other structure liable to damage by collision, suction or wave action, vessels shall give as much leeway as circumstances permit and reduce their speed sufficiently to preclude causing damage to the vessel or structure being passed. Since this subparagraph pertains directly to the manner in which vessels are operated, masters of vessels shall be held responsible for strict observance and full compliance therewith. During high river stages, floods, or other emergencies, the District Engineer may prescribe by navigation bulletins or other means the limiting speed in land miles per hour deemed necessary for the public safety for the entire section or any part of the waterways covered by this paragraph, and such limiting speed shall be strictly observed.

(3) Towing. Towing in any formation by a vessel with insufficient power to permit ready maneuverability and safe handling is prohibited.

(4) Cable and pipeline crossings. Any cable or pipeline crossing or extending into the waterways shall be marked by large signs with 12-inch black letters on a white background readable from the waterway side, placed on each side of the river near the point where the cable or pipeline enters the water, and at a sufficient height to be readable above any obstructions normally to be expected at the locality such as weeds or moored vessels.

(5) Marine accidents. Masters, mates, pilots, owners, or other persons using the waterway to which this paragraph applies shall notify the District Engineer by the most expeditious means available of all marine accidents, such as fire, collision, sinking, or stranding, where there is possible obstruction of the channel or interference with navigation or where damage to Government property is involved, furnishing a clear statement as to the name, address, and ownership of the vessel or vessels involved, the time and place, and the action taken. In all cases, the owner of the sunken vessel shall take immediate steps properly to mark the wreck.

(c) Movement of vessels in vicinity of Algiers Point, New Orleans Harbor-(1) Control lights. When the Mississippi River reaches 10 feet on the Carrolton Gage on a rising stage, and until the gage reads 12 feet on a falling stage, the movement of all tugs with tows and all ships, whether under their own power or in tow, and excluding tugs or towboats without tows or river craft of comparable size and maneuverability operating under their own power, in the vicinity of Algiers Point shall be governed by red and green lights designated and located as follows: Governor Nicholls Light located on the left descending bank on the wharf shed at the upstream end of Esplanade Avenue Wharf, New Orleans, approximately 94.3 miles above Head of Passes; and Gretna Light located on the right descending bank on top of the levee at the foot of Ocean Avenue, Gretna, approximately 96.6 miles above Head of Passes. Governor Nicholls Light has lights visible from both upstream and downstream, and Gretna Light has

lights visible from upstream, all indicating by proper color the direction of traffic around Algiers Point. From downstream, Gretna Light always shows green. All lights oscillate through 60 degrees, sweeping the entire width of the river every five seconds. A green light displayed ahead of a vessel (in the direction of travel) indicates that Algiers Point is clear and the vessel may proceed. A red light displayed ahead of a vessel (in the direction of travel) indicates that Algiers Point is not clear and the vessel shall not proceed. Absence of lights shall be considered a danger signal and no attempt shall be made to navigate through the restricted area.

(2) Ascending vessels. Ascending vessels shall not proceed farther up the river than a line connecting the upper end of Morgans Wharf (on right descending bank) with the lower end of Desire Street Wharf (on left descending bank) when a red light is displayed. Vessels awaiting a change of signal shall keep clear of descending vessels.

(3) Descending vessels. (i) Descending vessels shall not proceed farther down the river than a line connecting the lower end of Julia Street Wharf (on left descending bank) with Diana Street (on west descending bank) when a red light is displayed. Vessels shall round to and be headed upstream before they reach that line, if the signal remains against the vessel. Vessels awaiting a change of signal shall keep clear of ascending vessels.

(ii) Vessels destined to a wharf above the lower end of Julia Street Wharf shall signal the Gretna towerman three long blasts and one short blast of a whistle or horn to indicate that the vessel is not bound below the Julia Street Wharf.

(iii) The master, pilot, or authorized representative of any vessel scheduled to depart from a wharf between Governor Nicholls Light and Louisiana Avenue, bound downstream around Algiers Point, shall communicate with the Governor Nicholls Light towerman by telephone to determine whether the channel at Algiers Point is clear before departure. When the point is clear, vessels shall then proceeds promptly so that other traffic will not be unnecessarily delayed.

Note: Telephone numbers of both signal towers will be published in navigation bulletins in advance of each operating period.

(4) Minor changes. The District Engineer is authorized to waive operation or suspension of the lights whenever prospective river stages make it appear that the operation or suspension will be required for only a brief period of time or when river stages will rise or fall below the critical stage which is established for operation or suspension by only a few tenths on the Carrollton Gage.

(5) Underpowered vessels. When the Carrollton Gage reads 12 feet or higher, any vessel which is considered by the master or pilot as being underpowered or a poor handler shall not navigate around Algiers Point without the assistance of a tug or tugs.

(6) Towing. When the Carrollton Gage reads 12 feet or higher, towing on a hawser in a downstream direction between Julia Street and Desire Street is prohibited except by special permission of the District Engineer.

(d) Navigation of South and Southwest Passes. (1) No vessel, except small craft and towboats and tugs without tows, shall enter either South Pass or Southwest Pass from the Gulf until after any descending vessel which has approached within two and one-half (2½) miles of the outer end of the jetties and visible to the ascending vessel shall have passed to sea.

(2) No vessel having a speed of less than nine knots shall enter South Pass from the Gulf when the stage of the Mississippi River exceeds 15 feet on the Carrollton Gage at New Orleans. This subparagraph does not apply when Southwest Pass is closed to navigation.

(3) No vessel, except small craft and towboats and tugs without tows, ascending South Pass shall pass Franks Crossing Light until after a descending vessel shall have passed Depot Point Light.

(4) No vessel except small craft and towboats and tugs without tows, shall enter the channel at the head of South Pass until after an ascending vessel which has reached Franks Crossing Light shall have passed through into the river.

(5) When navigating South Pass during periods of darkness no tow shall consist of more than one towed vessel other than small craft, and during daylight hours no tow shall consist of more than two towed vessels other than small craft. Tows may be in any formation. When towing on a hawser, the hawser shall be as short as practicable to provide full control at all times.

(6) When towing in Southwest Pass during periods of darkness no tow shall consist of more than two towed vessels other than small craft, and during daylight hours no tow shall consist of more than three towed vessels other than small craft.

(e) Mooring on Mississippi River between Miles 314.5 AHP and 340.0 AHP. (1) No vessel or craft shall moor along either bank of the Mississippi River between Mile 314.5 AHP and Mile 340.0 AHP except in case of an emergency, pursuant to an approved navigation permit, or as authorized by the District Engineer. Vessels may be moored any place outside the navigation channel in this reach in case of an emergency and then for only the minimum time required to terminate the emergency. When so moored, all vessels shall be securely tied with bow and stern lines of sufficient strength and fastenings to withstand currents, winds, wave action, suction from passing vessels or any other forces which might cause the vessels to break their moorings. When vessels are so moored, a guard shall be on board at all times to insure that proper signals are displayed and that the vessels are securely and adequately moored.

(2) Vessels may be moored any time at facilities constructed in accordance with an approved

navigation permit or as authorized by the District Engineer. When so moored, each vessel shall have sufficient fastenings to prevent the vessels from breaking loose by wind, current, wave action, suction from passing vessels or any other forces which might cause the vessels to break their mooring. Number of vessels in one fleet and the width of the fleet of vessels tied abreast shall not extend into the fairway or be greater than allowed under the permit.

(3) Mariners should report immediately by radio or fastest available means to the lockmaster at Old River Lock or to any Government patrol or survey boat in the vicinity any emergency mooring or vessels drifting uncontrolled within the area described in subparagraph (1) of this paragraph. It is the responsibility and duty of the master of a towing vessel releasing or mooring a vessel in this reach of the Mississippi River to report such action immediately.

**§207.810 Channel leading to San Juan Harbor, P.R.; use, administration, and navigation.** (a) Steamers passing dredge engaged in improving the channel shall not have a speed greater than 4 miles an hour, and the propelling machinery shall be stopped when crossing the lines to the dredge anchors.

(b) Vessels using the channel shall pass the dredge on the side designated from the dredge by the signals prescribed in paragraph (c) of this section.

(c) Dredge shall display the red flag by day and four white lights hung in a vertical line by night to indicate the passing side.

(d) Vessels shall not anchor on the ranges of stakes or other marks placed for the guidance of the dredge, nor in such a manner as to obstruct the channel for passing vessels.

(e) Vessels shall not run over or disturb stake, lanterns, or other marks placed for the guidance of the dredge.

(f) Dredges working in the prosecution of the work shall not obstruct the channel unnecessarily.

(g) The dredge will slack lines running across the channel from the dredge on the passing side, for passing vessels, when notified by signal, with whistle or horn.

(h) The position of anchors of the dredge shall be marked by buoys plainly visible to passing vessels.

**§207.812 San Juan Harbor, Puerto Rico; seaplane restricted area.** (a) The area. (1) Beginning at a point on the north edge of the Graving Dock Channel, bearing 207° from Isla Grande Light; thence to latitude 18°27′08″, longitude 66°06′38.5″; thence to latitude 18°27′08″, longitude 66°08′02.5″; thence to latitude 18°26′49.6″, longitude 66°07′54″; thence 90° to the eastern edge of the Army Terminal Channel; thence southerly along the eastern edge of the Army Terminal Channel to latitude 18°26′09.2″; thence to latitude 18°26′38″, longitude 66°05′30″; thence to latitude 18°27′06.9″, longitude 66°05′57″; thence to latitude 18°27′07.1″, longitude 66°06′05.7″; thence to 227° to a point on the north edge of the Graving Dock Channel; thence northwesterly along the north edge of the Graving Dock Channel to the point of beginning. The following described portions of the area are exempted:

(i) That part of the Graving Dock Channel within the area.

(ii) That part of the Army Terminal Channel within the area.

(iii) That part of the seaplane landing area east of the Army Terminal Channel and south of the Graving Dock Channel.

(iv) The channel from the Graving Dock Channel near lighted buoy 2 to the Army Terminal, Pueblo Viejo Bay.

(2) The area will be used by seaplanes for take-offs, landings, taxiing, and mooring.

(3) For protracted or regularly scheduled night seaplane operations the actual take-off and landing lane will be marked by special seadrome buoys which will show fixed lights either yellow or green. Buoys for marking the take-off and landing lane will be of the type seadrome buoy regularly used by the Navy, a small black and yellow striped rubber buoy equipped to show either yellow or green lights for night operations. No buoys will be used in the area which are not approved by the enforcing agencies, or which may be confused with the regular aids to navigation system of the harbor.

(b) The regulations. (1) No vessel shall lie to or anchor in or otherwise obstruct the area.

(2) All vessels passing through the area shall be alert for the approach of aircraft. Aircraft engaged in taking off or landing shall have the right of way over all vessels in the area. All vessels in the area shall proceed immediately to leave the area when warned by aircraft employing the "buzzing" method which consists of low flight by an airplane and repeated varying of the propeller speed, or when warned by a guard boat in the area.

(3) The regulations in this section shall be enforced by the Commander, Greater Antilles Section, U.S. Coast Guard, and such agencies as he may designate.

**§207.815 Vieques Passage and Atlantic Ocean, off east coast of Puerto Rico and coast of Vieques Island; naval restricted areas.** (a) The restricted areas. (1) A strip 1,500 yards wide, off the naval reservation shoreline along the east coast of Puerto Rico extending from Point Figuera south to Point Puerca, and thence west to Point Cascajo and the mouth of the Daguao River.

(2) A strip 1,500 yards wide, off the naval reservation shoreline along the west end of Vieques Island extending from Caballo Point on the north shore, west around the breakwater to Point Arenas, and thence south and east to a point on the shoreline one mile east of the site of the abandoned central at Playa Grande.

(3) A strip 1,500 yards wide, off the naval reservation shoreline along the south coast of Vieques Island extending from the entrance to Port Mosquito east to Conejo Point.

(4) An area inclosed by an arc with a radius of 3,000 yards centered on Cabras Island Lighthouse and extending from Point Puerca to Point Cascajo.

(b) The regulations. No vessel shall enter or remain within the restricted areas at any time unless on official business, except that fishing vessels are permitted to anchor in Playa Blanca, passing through the restricted area described in paragraph (a)(1) of this section to and from anchorage on as near a north-south course as sailing conditions permit. Under no conditions will fishing be permitted in the restricted areas.

**§207.817 Caribbean Sea, at St. Croix, V.I.; restricted areas.** (a) The areas-(1) Area "A". A triangular area bounded by the following coordinates:

17°44'42"N., 64°54'18"W.
17°43'06"N., 64°54'18"W.
17°44'30"N., 64°53'30"W.

(2) Area "B". A rectangular area bounded by the following coordinates:

17°41'42"N., 64°54'00"W.
17°41'42"N., 64°54'18"W.
17°41'18"N., 64°54'00"W.
17°41'18"N., 64°54'18"W.

(b) The regulations. (1) Anchoring in the restricted areas is prohibited with the exception of U.S. Government owned vessels and private vessels that have been specifically authorized to do so by the Commanding Officer, Atlantic Fleet Range Support Facility.

(2) The regulations in this paragraph shall be enforced by the Commanding Officer, Atlantic Fleet Range Support Facility, Roosevelt Roads, P.R., and such agencies as he may designate.

**§207.900 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 Commerce:

(1) Revoked.

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

(3) Revoked.

(4) Mobile Reserve Fleet, Tensaw River near Bay Minette, Alabama.

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

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

(7) Revoked.

(8) Olympia Reserve Fleet, Budd Inlet at Olympia, Washington.

(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 209-Administrative Procedure:**

**§209.135 Shipping safety fairways and anchorage areas, Gulf of Mexico.** (a) Purpose. Fairways and anchorage areas as described in this section are established to control the erection of structures therein to provide safe approaches through oil fields in the Gulf of Mexico to entrances to the major ports along the Gulf Coast.

(b) Permits. Department of the Army permits are required pursuant to law (30 Stat. 1151; 33 U.S.C. 403) and (67 Stat. 462; 43 U.S.C. 1333 (f) for work or structures in the Gulf of Mexico in coastal waters and the waters covering the outer Continental Shelf. The Department of the Army will grant no permits for the erection of structures in the area designated as fairways, since structures located therein would constitute obstructions to navigation. The Department of the Army will grant permits for the erection of structures within an area designated as an anchorage area, but the number of structures will be limited by spacing, as follows: The center of a structure to be erected shall be not less than two (2) nautical miles from the center of any existing structure. In a drilling or production complex, associated structures shall be as close together as practicable having due consideration for the safety factors involved. A complex of associated structures, when connected by walkways, shall be considered one structure for the purposes of spacing. A vessel fixed in place by moorings and used in conjunction with the associated structures of a drilling or production complex, shall be considered an attendant vessel and its extent shall include its moorings. When a drilling or production complex includes an attendant vessel and the complex extends more than five hundred (500) yards from the center of the complex, a structure to be erected shall be not closer than two (2) nautical miles from the near outer limit of the complex. An underwater completion installation in an anchorage area shall be considered a structure and shall be marked with a lighted buoy as approved by the United States Coast Guard.

(c) Modification of the areas. The fairways and anchorage areas are subject to modification but only after due notification and consideration of the views of interested parties, and advance publication of any adverse determination.

**NOTE: Where the areas have already been charted, coordinates have been omitted and reference made to the chart(s) showing the fairways and anchorages.**

(d) The areas.

(1) Brazos Santiago Safety Fairway. See charts 11300 (1117) and 11301 (1288).

(2) Brazos Santiago Anchorages. See charts 11300 (1117) and 11301 (1288).

(3) Port Mansfield Safety Fairway. See chart 11300 (1117).

(4) Aransas Pass Safety Fairway. See charts 11300 (1117), 11313 (1285), and 11307 (1286).

(5) Aransas Pass Anchorage Areas. See charts 11300 (1117), 11313 (1285), and 11307 (1286).

(6) Matagorda Entrance Safety Fairway. See charts 11300 (1117) and 11316 (1284).

(7) Matagorda Entrance Anchorage Areas. See charts 11300 (1117) and 11316 (1284).

(8) Freeport Harbor Safety Fairway. See charts 11300 (1117) and 11321 (1283).

(9) Freeport Harbor Anchorage Areas. See charts 11300 (1117) and 11321 (1283).

(10) Galveston Entrance Safety Fairways. See charts 11340 (1116) and 11323 (1282).

(11) Galveston Entrance Anchorage Areas. See charts 11340 (1116) and 11323 (1282).

(12) Sabine Pass Safety Fairway. See charts 11340 (1116) and 11341 (1279).

(13) Sabine Pass Anchorage Area. See charts 11340 (1116) and 11341 (1279).

(14) Coastwise Safety Fairway. (i) Brazos Santiago to Aransas Pass. See charts 11300 (1117), 11301 (1288), 11307 (1286).

(ii) Aransas Pass to Calcasieu Pass. See charts 11300 (1117), 11340 (1116), 11313 (1285), 11316 (1284), 11323 (1282), 11332 (1280), 11341 (1279).

(15) Calcasieu Pass Safety Fairway. See charts 11340 (1116), 11344 (1278), and 11341 (1279).

(16) Calcasieu Pass Anchorage Area. See charts 11340 (1116), 11344 (1278), and 11341 (1279).

(17) Mermentau Pass Safety Fairway. See charts 11340 (1116) and 11344 (1278).

(18) Freshwater Bayou Safety Fairway. See charts 11340 (1116) and 11349 (1277).

(19) Southwest Pass Safety Fairway. See charts 11340 (1116) and 11349 (1277).

(20) Atchafalaya Pass Safety Fairway. See charts 11340 (1116) and 11351 (1276).

(21) Bayou Grand Caillou Safety Fairway. See charts 11340 (1116) and 11356 (1275).

(22) Cat Island Pass Safety Fairway. See charts 11340 (1116), and 11357 (1274).

(23) Belle Pass Safety Fairway. See charts 11340 (1116) and 11357 (1274).

(24) Barataria Pass Safety Fairway. See charts 11340 (1116) and 11358 (1273).

(25) Grand Bayou Pass Safety Fairway. See charts 11340 (1116) and 11358 (1273).

(26) Empire to the Gulf Safety Fairway. See charts 11340 (1116) and 11358 (1273).

(27) Gulf Safety Fairway. Aransas Pass Safety Fairway to Southwest Pass Safety Fairway. See charts 11300 (1117) and 11340 (1116).

(28) Southwest Pass (Mississippi River) Safety Fairway. (i) Southwest Pass (Mississippi River) to Gulf Safety Fairway. See charts 11340 (1116) and 11361 (1272).

(ii) Southwest Pass (Mississippi River) to Sea Safety Fairway. See charts 11340 (1116), 11360 (1115), and 11361 (1272).

(iii) Southwest Pass (Mississippi River) to South Pass (Mississippi River) Safety Fairway. See charts 11360 (1115) and 11361 (1272).

(29) Southwest Pass (Mississippi River) Anchorage. See charts 11360 (1115) and 11361 (1272).

(30) South Pass (Mississippi River) Safety Fairways. (i) South Pass to Sea Safety Fairway. See charts 11360 (1115) and 11361 (1272).

(ii) South Pass (Mississippi River) to Mississippi River-Gulf Outlet Channel Safety Fairway. See charts 11360 (1115) and 11361 (1272).

(31) South Pass (Mississippi River) Anchorage. See charts 11360 (1115) and 11361 (1272).

(32) Mississippi River-Gulf Outlet Safety Fairway. (i) See charts 11360 (1115) and 11363 (1270).

(ii) Mississippi River-Gulf Outlet Channel to Mobile Ship Channel Safety Fairway. See chart 11360 (1115).

(33) Mississippi River-Gulf Outlet Anchorage. See charts 11360 (1115) and 11363 (1270).

(34) Gulfport Safety Fairway. See charts 11360 (1115) and 11373 (1267).

(35) Biloxi Safety Fairway. See charts 11360 (1115) and 11373 (1267).

(36) Ship Island Pass to Horn Island Pass Safety Fairway. See charts 11360 (1115) and 11373 (1267).

(37) Pascagoula Safety Fairway. See charts 11360 (1115) and 11373 (1267).

(38) Horn Island Pass to Mobile Ship Channel Safety Fairway. See charts 11360 (1115), 11373 (1267), and 11376 (1266).

(39) Mobile Safety Fairway. (i) Mobile Ship Channel. See charts 11360 (1115) and 11376 (1266).

(ii) Mobile Ship Channel to Sea Safety Fairway. See charts 11360 (1115) and 11376 (1266).

(iii) Mobile to Pensacola Safety Fairway. See charts 11360 (1115), 11340 (1116), and 11382 (1265).

(40) Mobile Anchorage. See chart 11360 (1115).

(41) Pensacola Safety Fairway. See charts 11360 (1115) and 11382 (1265).

(42) Pensacola Anchorage. See charts 11360 (1115), and 11382 (1265).

(43) Panama City Safety Fairway. See charts 11360 (1115) and 11389 (1263).

(44) Port St. Joe Safety Fairway. See charts 11360 (1115) and 11389 (1263).

(45) Tampa Safety Fairways. See chart 11400 (1114); also partially shown on charts 11420 (1113), 11424 (1256), and 11412 (1257).

(46) Charlotte Safety Fairway. See charts 11420 (1113) and 11426 (1255).

# 3. GULF OF MEXICO

The **Gulf of Mexico** coast of the United States, from Key West, Fla., to the Rio Grande, is low and mostly sandy, presenting no marked natural features to the mariner approaching from seaward; shoal water generally extends well offshore. The principal points and harbor entrances are marked by lights, which are the chief guides for approaching or standing along the coast.

From the S shore of the Florida mainland, the **Florida Keys** and **Florida Reefs** extend for about 134 miles in the SW curve to Sand Key Light, and about 58 miles in a W direction to Loggerhead Key. These keys and reefs are of sand, shell, and coral formation. The reefs have frequent shoal patches. The keys are generally low and covered with mangrove. Together, they form the N boundary of the **Straits of Florida.** Toward the W end are several openings between the keys offering passage from the straits into the Gulf.

The SW extremity of the Florida mainland is part of the Everglades National Park and Big Cypress Swamp. Much of these areas are under water throughout the year and are nearly all covered during the rainy summer season. Fronting the swampy areas are the Ten Thousand Islands, a group of low mangrove-covered islands divided by tidal channels. N of the Ten Thousand Islands the coast is low, sandy, and generally backed by pine forests and **Hammocks.** These hammocks are a jungle of tropical trees, mostly hardwood, which appear as an impenetrable green wall.

From Cape Romano to Anclote Keys the coast becomes a barrier beach of low islands separated by inlets, most of which are small and cannot be distinguished from offshore. Between Anclote Keys and St. James Island, the W side of Apalachee Bay, the coast is low and marshy for 1 to 2 miles inland then backed by pine forests. The shoreline is broken by a number of unimportant rivers and creeks.

W of St. James Island to the South Pass of the Mississippi River the coast is mostly a barrier beach of low, wooded, sand islands. The general drift of these islands is to the W which causes an encroachment upon the channels between them. Hurricanes and heavy gales will sometimes change the shape of these islands and in some cases they have washed away leaving just shoals.

The boundary between Florida and Alabama follows the Perdido River. The Alabama-Mississippi boundary follows a marked line cutting across the E end of Petit Bois Island, through Grande Batture Islands. Pearl River, from its most E junction with Lake Borgne, forms the boundary between Mississippi and Louisiana.

Westward of the Delta to Galveston Entrance the coast is a wide fringe of flat and generally treeless coastal marsh containing close growths of sedge, grass, and rushes with several deep indentations or bays separated from the Gulf by chains of long narrow islands and many shallow salt water lakes and lagoons. The islands and marshes are fringed with barrier beaches, mostly of fine sand, which rise to a crest with groves of trees on the inner slopes. Sand and shell ridges, sometimes several feet above the general level, are found throughout the marshes. These ridges, called **Chenieres** because of the oak groves usually found growing on them, are former barrier beaches; good examples are Grande Chenier and Pecan Island. In addition to the cheniere, three other marsh features are defined. Small solitary hills are called either **Islands** or **Mounds** depending on their height above the level of the surrounding marsh. Islands are greater than 25 feet while mounds are less. A **Bayou** is a drainage stream for a swamp area or an auxiliary outlet for a river. They flow either to the Gulf of Mexico or a large lake, rarely into a river or other bayou. The depth of water is nearly always sufficient for river-craft navigation. The current, except after a heavy rainfall, is very sluggish, but often may be reversed by a change in the direction of the wind. The highest land is found immediately adjacent to the bayous in the form of natural levees; as a rule, the larger the bayou the higher its levee.

Sabine Pass, Lake, and River form the boundary between Louisiana and Texas.

From Galveston Entrance to the mouth of the Rio Grande the coast is a barrier beach of long narrow islands and peninsulas, which are generally low and sandy, with but few distinguishing marks, enclosing a chain of shallow bays or lagoons, some of considerable size. The passes between the islands, except where improvements have been made by constructing jetties and dredging, are narrow and cannot be distinguished from offshore.

**Dumping Grounds.**-Dumping grounds and **prohibited dumping grounds** are located off Key West, at the entrances to the Mississippi River, and off the Louisiana and Texas coasts. (See Dumping Ground Regulations in Part 205, chapter 2, for limits and regulations.)

**Aids to navigation.**-Lights, radiobeacons, and buoys are the principal guides to mark the approaches to the important harbors. Many of the light stations have fog signals and radiobeacons, particularly those in the vicinity of the larger ports. Many of the coastal and harbor buoys are equipped with radar reflectors, which greatly increase the range at which the buoys may be de-

tected on the radarscope. Most of the critical dangers are marked. (See the Light List for a complete description of navigational aids.)

**Loran A** and **Loran C** stations provide the mariner with good navigation coverage in the Gulf of Mexico.

**Radar** is an important aid to navigation in this area, particularly in detecting other traffic, offshore oil platforms, and in the prevention of collisions during frequent periods of low visibility. The coast is generally low and does not present a good radar target, but many of the coastal buoys are equipped with radar reflectors.

**Boundary Lines of Inland Waters.**-At all buoyed entrances from seaward to bays, sounds, rivers, or other estuaries for which specific lines are not described, **Inland Pilot Rules** apply shoreward of the outermost buoy or other aid to navigation of any system of aids; **International Pilot Rules** apply outside the aids. (Specific lines are described in Part 82, chapter 2.)

**Control over movement of vessels.**-(See Part 124, chapter 2, for regulations requiring advance notice of vessel's time of arrival to Captain of the Port.)

**Harbor entrances.**-The entrances to most of the harbors along the Gulf Coast are obstructed by shifting sandbars. The more important entrances have been improved by dredging and in some cases by 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 harbors is on a rising tide.

The tidal currents have considerable velocity in most of the harbor entrances and their direction is affected by the force and direction of the wind. In S gales the sea breaks on some of the bars.

**Shipping Safety Fairways.**-A system of shipping safety fairways has been established along the Gulf Coast to provide safe lanes for shipping that are free of oil well structures. Vessels should approach the harbor entrances and proceed coastwise between the ports within these fairways, but should exercise due caution at all times as the lanes are unmarked. (See 209.135, chapter 2, for references to the charts showing the limits of the fairways, and the regulations governing them.)

**Anchorages.**-**Fairway anchorages** have been established off the entrances to some of the ports; these areas are generally free of oil well structures. (See 209.135, chapter 2, for references to the charts showing the limits of the anchorages, and regulations governing them.) Other anchorage areas have been established along the Gulf Coast, bays, sounds, and rivers. (See Part 110, chapter 2, for limits and regulations.)

**Tropical waters.**-The most remarkable feature is the exceeding clearness of the sea water, enabling the bottom to be seen from aloft at considerable depths and at some distance. The navigation of the banks is consequently conducted almost entirely by the eye, but care must be taken not to run with the sun ahead of the vessel as that prevents the banks from being seen.

The charts indicate clearly the positions of the many shoal heads; but considerable experience is required in identifying the patches by the color of the water. Small clouds, moving slowly and known to the pilots as flyers, are apt to deceive the inexperienced, their reflection on the surface of the sea over the clear white sandy bottom having every appearance of rocky shoals. It is prudent to avoid a dark spot.

**Bank Blink** is a phenomenon in tropical waters described as a bright reflected light hanging over the clear white sandbanks, serving to point them out from a considerable distance. From experience, it has been found to be untrustworthy, however, and should not be depended on in place of a lookout aloft. Soundings, the reckoning, and especially the latitude, should be unremittingly checked.

**Dangers.**-**Danger zones** and **Restricted areas,** extending as much as 100 miles offshore, are located in the Gulf of Mexico from Key West to the Rio Grande. (See Parts 204 and 207, chapter 2, for limits and regulations.)

**Fish havens,** some marked by privately maintained buoys, are numerous along the outside coast of the Gulf of Mexico. Navigators should be cautious about passing over fish havens or anchoring in their vicinity.

**Wrecks.**-Numerous wrecks, submerged and showing above water, in the bays, sounds, rivers, and along the outer coast of the Gulf of Mexico are obstructions to navigation. A careful check should be made of the chart to insure that dangerous wrecks are not along the routes selected.

**Oil well structures.**-Numerous submerged wells, and oil well structures (platforms), including appurtenances thereto, such as mooring piles, anchor and mooring buoys, pipes, and stakes, exist in the Gulf of Mexico off the coasts of Mississippi, Louisiana, and Texas. The heaviest concentration of these obstructions, however, is found between the Mississippi River Delta and Galveston Bay, extending as much as 70 miles offshore.

In general, the oil well structures (platforms) in the Gulf are marked at night as follows:

Structures outside the 5-fathom curve show quick flashing white lights visible from all directions at a distance of at least 5 miles; more than one light may be displayed. Fog signals are sounded from the structures when visibility is less than 5 miles; signal consists of a horn sounding one 2-second blast every 20 seconds.

Structures between the 2-fathom and 5-fathom curves show quick flashing white lights visible from all directions at a distance of at least 3 miles. Fog signals are sounded from the structures when visibility is less than 3 miles.

Structures along the coast in less than 2 fathoms and within the bays and sounds show either quick

flashing white or red lights visible from all directions at a distance of at least 1 mile. Normally these structures are not equipped with fog signals.

Structures on or adjacent to the edges of navigable channels and fairways, regardless of location, may be required to display lights and fog signals for the safety of navigation.

Associated structures within 100 yards of the main structures, regardless of location, are not normally lighted, but are marked with red or white retro-reflective material. Mariners are cautioned that uncharted submerged pipelines and cables may exist in the vicinity of these structures, or between such structures and the shore.

During construction of a well or during drilling operations and until such time as the platform is capable of supporting the required aids, fixed white lights on the attending vessel or drilling rig may be shown in lieu of the required quick flashing white lights on the structure. The attending vessel's foghorn may also be used as a substitute.

Submerged wells may or may not be marked depending on their location and depth of water over them.

All obstruction lights and fog signals used to mark the various structures are operated as privately maintained aids to navigation. The detailed regulations for the marking of offshore structures are contained in Title 33, Code of Federal Regulations, Part 67.

Information concerning the establishment, change, or discontinuance of offshore oil well structures and their appurtenances are published in Notice to Mariners with the exception of those inside the outer shoreline.

All structures in the Gulf of Mexico are shown on the latest issues of the 1:80,000 and/or larger scale nautical charts covering the area. A warning note in lieu of the individual obstructions is shown on charts 11352 (1050) and 11345 (1051). Charts 11360 (1115), 11340 (1116), and 11300 (1117) show oil well structures only when offshore of the indicated purple limits of the 1:80,000 scale charts.

Mariners are advised to use the Shipping Safety Fairways which have been established in the Gulf of Mexico. These fairways provide shipping lanes free of oil drilling structures. Although the use of these fairways is not mandatory, mariners should take advantage of the safer passageways made available.

A list of offshore oil well structures and submerged wells in the Gulf of Mexico that have been completed and their existence known is published annually as a Special Local Notice to Mariners by the Eighth Coast Guard District. Mariners desiring to receive issues of this publication should write to the District Commander, Eighth Coast Guard District, Customhouse, New Orleans, La. 70130, requesting to be placed on their mailing list.

Information concerning seismographic operations is not published in Notice to Mariners unless such operations will create a menace to navigation in waters used by general navigation. Where seismographic operations are being conducted, casings (pipes), buoys, stakes, and detectors are installed. Pipes are marked with flags by day and fixed red lights by night; buoys are colored international orange and white horizontal bands; and stakes are marked with flags.

**Drawbridges.**-General and/or special regulations and opening signals for the drawbridges within the area of this Coast Pilot are given in 117.240, 117.245, and 117.462 through 117.560, chapter 2. Where these regulations apply, reference to them is made in the Coast Pilot under the name of the bridge or the waterway over which the bridge crosses. The special regulations, which are prescribed for a number of specific bridges, allow certain drawbridges to be unattended during specified times and dates. Such bridges may not be required to open at all or may open only during specified periods, and normally a specified minimum advance notice must be given to the authorized representative of the bridge owner to have the bridge opened; the exact procedure for contacting this representative must generally be posted on signs at the bridge. (See 117.1 and 117.1a, chapter 2, for additional information of a very general nature that applies to all drawbridges.)

**Routes.**-On the E side of the Gulf of Mexico, for a distance of possibly 100 miles outside the 100-fathom curve, SE currents prevail and velocities as high as 2.5 knots have been reported. The Gulf Stream investigations indicated that the strongest current into the Straits of Florida is found near the 1,000-fathom curve W of Dry Tortugas, and that velocities of 1.5 to 2 knots are frequent in that locality. Approaching Dry Tortugas from the Gulf should, therefore, be regarded as a difficult run, as a vessel will overrun her log, and observations are the principal guide; currents may be expected at all times, but variations occur both in direction and velocity, due to the season of the year and the winds. Approaching the passage W of Rebecca Shoal from N, a number of vessels have stranded on New Ground, indicating an E set.

**Junction point** for deep-draft vessels bound to or from Gulf Coast ports is **Straits of Florida** (24°25'N., 83°00'W.), which is 14 miles SSW of Dry Tortugas Light.

From the Straits of Florida to Cape Hatteras vessels follow the Gulf Stream, pass about 14 miles S of Rebecca Shoal Light, then follow Florida Reefs about 8 miles off and pass Fowey Rocks Light at a distance of 10 to 12 miles and Jupiter Inlet Light 15 miles. The velocity of the current varies greatly in different localities and is also subject to sudden changes, due to wind, differences in barometric pressure, and the like, so that no fixed hourly rate of drift can be given. Frequently high velocities will be carried between

certain points and suddenly dropping off between others. The position should, therefore, be checked whenever possible by bearings. The ship speed plus supposed rate of current should not be assumed to fix the position. The greatest velocity will be found between Carysfort Reef and Jupiter Inlet, ranging from 2 to 4.5 knots.

During the winter months when northers are frequent, it is well for westbound vessels to keep a little N of the 295° course from Dry Tortugas to Heald Bank Lighted Whistle Buoy, but go S of it in passing. In either direction, verify position as often as possible, because of the varying conditions of the current. For 300 miles before reaching Heald Bank, westbound craft frequently overrun, especially during the winter months, and eastbound vessels overrun the last 300 miles before reaching Dry Tortugas. Depend upon soundings westbound, but upon observations eastbound.

Along the course from Dry Tortugas to Galveston, for 200 miles after leaving Dry Tortugas, a SE current of about 0.5 knot may be expected. For the next 100 miles the current generally sets E with a velocity of 0.5 knot. For the next 200 miles the set is about NNE, and the velocity is 0.2 knot. For nearly 200 miles before reaching Galveston the set is approximately WNW and the velocity 0.2 knot.

Winds and storms frequently modify normal conditions, and their effects must be taken into account.

**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.

**Navigation regulations.**-Regulations governing the use, administration, and navigation of the waterways covered by this Coast Pilot are given in 207.160, 207.180, and 207.200, chapter 2.

**Special regulations** governing the use, administration, and navigation of floodgates and locks of the Intracoastal Waterway are given in 207.187, chapter 2.

**Bends or Curves.**-In the Intracoastal and adjoining waterways there are 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 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 or a river enter the waterway.

Cross currents are especially strong along the Intracoastal Waterway in San Carlos Bay, Rigolets-New Orleans Cut, Chef Menteur Pass, Vermilion River Cutoff, and Brazos and Colorado Rivers.

**Spoil banks.**-Nature quickly covers her scars. This is true of the spoil banks made by dredging. When awash, these banks are often covered by grass, bushes, and sometimes fairly large trees.

**Water hyacinth** is a floating freshwater plant which infests numerous streams tributary to the South Atlantic and Gulf Coasts. It has bright green leaves and a purple flower. It propagates from seeds and suckers, spreads quickly in most localities, and may cause complete suspension of navigation if not removed. The hyacinths form in mats or jams and float around driven by the wind or current. In open water these mats often resemble small islands. At times some of the bays and tributaries may be changed in appearance due to hyacinth jams. Where the water is apt to be brackish, an attempt can be made to force a boat through the mat. In doing so, however, care should be taken that any logs that might be floating in the weeds are not struck with force enough to damage the hull. Snakes may also be found on the hyacinth mats. The work of removing this growth is undertaken by the various Corps of Engineers districts and the State of Florida by the processes of spraying, cutting, and the use of booms.

**Mangrove.**-Three distinct types of mangrove are found in the S section of this area. Yellow mangrove grows to a height of about 4 feet and is found principally on the sand flats in front of the fast land. Red mangrove grows to a height of 10 to 15 feet and is rooted in water most of the time. Black mangrove grows on sand ridges and higher ground which cover only at very high water or storm tides. The black mangrove sometimes grows to a height of 50 to 60 feet.

**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 advisory notice of a tropical disturbance small boats should seek shelter in a small winding stream whose banks are lined with trees, preferably cedar or mangrove. 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 as they generally have shallow roots and are more apt to be blown down.

**Tides.**-Periodic tides in the Gulf of Mexico usually are small and may, therefore, be greatly modified and sometimes obliterated by fluctuations in the water surface due to winds or other meteorological conditions.

At Key West the mean range of tide is less than 1.5 feet. Extreme variations in the level from 1.5 feet below the plane of reference to 4 feet above may occur in this locality.

Along the W coast of the peninsula of Florida from Cape Sable to Apalachee Bay, the mean range varies from 1 to 4 feet. Extreme tides from 3 feet below to 6 feet above the plane of reference have been observed on this coast.

Along the N shore of the Gulf of Mexico from St. George Sound to the Rio Grande the tide is generally diurnal and the mean range is less than 2 feet, but fluctuations due to the wind from 3.5 feet below to 4 feet above the plane of reference are not uncommon. During the severe storms that occasionally visit this region, high waters from 10 to 12 feet above the plane of reference have been reported at Galveston, Texas, and 12.7 feet has been observed at Port O'Connor, Texas.

The periodic or astronomical tide, small at the mouth of the Mississippi River, gradually diminishes as it ascends the river until it finally becomes completely masked by the larger fluctuations resulting from meteorological conditions. At New Orleans the diurnal range of the tide during low-river stages averages about 0.8 foot. There is no periodic tide at high-river stages. There is, however, a large fluctuation in the level due to the condition of the river. The mean annual fluctuation at New Orleans is about 14 feet, the water being highest in the spring months and lowest during the autumn and early part of the winter. An extreme fluctuation of 21 feet in the river level at this city has been reported. (See the Tide Tables for more detailed information on tides in the Gulf of Mexico.)

**Currents.**-Under normal conditions, at all seasons of the year, the great volume of water passing N through Yucatan Channel into the Gulf of Mexico spreads out in various directions. Surface flows set: W across Campeche Bank, the Gulf of Campeche, and the Sigsbee Deep; NW toward Galveston and Port Arthur; NNW toward the Mississippi Passes; and E into the Straits of Florida.

A straight line drawn from Buenavista Key, Western Cuba, to the Mississippi Passes forms an approximate boundary between movements having different directions. W of this line the drift is generally N or W, while E of it the drift is E or SE toward the Straits of Florida.

There are N flows along the W side of the Gulf between Tampico and Corpus Christi in the vicinity of the 100-fathom and 1,000-fathom curves, N of the Sigsbee Deep between the 2,000-fathom and the 100-fathom curves, and along the W coast of Florida.

In general, the surface circulation is the same at all seasons. There is, however, some seasonal change in velocity, the flow being generally stronger in spring and summer than in the autumn and winter.

The current near the Florida Keys is variable and uncertain.

Tidal currents are generally weak in the open Gulf, but they are strong at times near shore, in the vicinities of shoals, and in the entrances to harbors. (See the Tidal Current Tables for more detailed information.)

The **Gulf Stream** is the most famous of the principal ocean currents. The name was first used by Benjamin Franklin in 1769. In general, as the swift current of the Gulf Stream issues into the sea through Straits of Florida, its waters are characterized by a deep blue color, high salinity, high temperature in the upper stratum, and absence of phosphorescence. Except near shoals where waves may stir up bottom sediments, Gulf Stream water is very clear, enabling visual penetration to unusually great depths. At its junction with coastal seawater, the edges may frequently be recognized in moderate weather by ripples, as well as by the difference in color. Northward, in the cooler regions, the evaporation from its surface, when the temperature of the air is lower than that of the water, is apparent as "sea smoke." In addition, the stream may carry with it some **Gulf weed** (Sargassum), which is olive brown, branched seaweed with berrylike air vessels. Surface debris, such as logs and other material, tends to drift toward the E edge of the stream but not toward the W edge.

The upstream extent of the Gulf Stream can be traced to the Yucatan Strait where a well-established current enters the Gulf of Mexico. The position of the strong current between Yucatan Strait and the Straits of Florida is quite variable, ranging from close inshore off northwestern Cuba to a loop penetrating over 300 miles N into the Gulf. The flow in this region is sometimes referred to as the **Loop Current,** and occasionally may take the form of one or more large eddies detached from the direct flow.

After entering the Straits of Florida between Cuba and the Florida Keys, the current becomes much more stable. The major variations of the current from off Key West to off Little Bahama Bank appears to be a meandering of the axis of the current within the narrow confines of the Straits. The current within the Straits and slightly to the N is frequently referred to as the **Florida Current.**

Shortly after emerging from the Straits of Florida, the stream is joined by the **Antilles Current,** which flows NW along the open ocean side of the West Indies. The Antilles Current, like the Gulf Stream, carries warm, highly saline waters of clear indigo blue. The union of the two currents gives rise to a broad and deep current possessing

about the same characteristics as the Florida Current except that the velocity is somewhat reduced and somewhat greater lateral meandering occurs. As it flows N, then NE, paralleling the general trend of the 100-fathom contour as far as Cape Hatteras, the lateral meandering does not generally exceed one stream width, or about 50 miles.

Beyond Cape Hatteras the current is forced E into much deeper water under the combined effects of the deflecting force of the earth's rotation and convergence of the bottom contours at Cape Hatteras. As it moves into progressively deeper water, the stream is subject to increased meandering, following a wavelike course, the limits of which have a N-S extent on the order of 300 miles between 60°W and 55°W. The wavelike features of the stream paths propagate to the E at speeds on the order of 5 miles per day, and occasionally throw off detached current rings or eddies which may give the impression of alternating bands of strong currents and ultimately leads to loss of identity of the Gulf Stream as a coherent flow. These current bands are frequently accompanied by bands of high and low temperature, but it is not generally possible to judge the direction of flow from the temperature of the surface water.

Eastward of the Grand Banks of Newfoundland, the whole surface is slowly driven E and NE by the prevailing W winds to the coastal waters of northwestern Europe. For distinction, this broad and variable wind-driven surface movement is sometimes referred to as the **North Atlantic Drift** or **Gulf Stream Drift.**

On its W or inner side, the Gulf Stream is separated from the coastal waters by a zone of rapidly falling temperature, to which the term "cold wall" has been applied. The abrupt change in the temperature of the waters separated by the cold wall is frequently very striking and is a definite indication of the edge of the stream. It is most clearly marked N of Cape Hatteras but extends, more or less well defined, from the Straits of Florida to the Grand Banks of Newfoundland. In the vicinity of the Grand Banks, the cold wall represents the dividing line between the warm current of the Gulf Stream and the cold waters of the **Labrador Current,** which according to observations, turns sharply between parallels 42°N and 43°N and meridians 51°W and 52°W, and flows E, parallel to the Gulf Stream.

Throughout the whole stretch from the Florida Keys to past Cape Hatteras the stream flows with considerable velocity. Characteristic average surface speed is on the order of 2.5 knots, increasing to about 4 knots off Cape Florida where the cross sectional area of the channel is least. These values are for the axis of the stream where the current is a maximum, the speed of the stream decreasing gradually from the axis as the edges of the stream are approached. The speed of the current varies with an annual cycle, tending to be greatest in July, and least in November throughout this region. Both the speed and position of the axis of the stream fluctuate also from day to day, hence description of both position and speed are averages.

Crossing the stream at Jupiter or Fowey Rocks, an average allowance of 2.5 knots in a N direction should be made for the current.

Crossing the stream from Habana, a fair allowance for the average current between 100-fathom curves is 1 knot in an ENE direction.

A vessel bound from Cape Hatteras to Habana, or the Gulf ports, crosses the stream off Cape Hatteras. A fair allowance to make in crossing the stream is 1 to 1.5 knots in a NE direction for a distance of 40 miles from the 100-fathom curve.

Earlier systematic observations on the Gulf Stream dealt with the temperature of the water rather than its motion and the axis was taken to be along the line of highest temperature obtained. Later the axis was taken to mark the line of greatest velocity. Ordinarily it is assumed that the two axes coincide but this is by no means certain. The thermometer, although it indicates the limits of the stream in a general way, is therefore only an approximate guide to the velocity of the currents, nor is it to be assumed that the N set will be lost when the thermometer shows a region of cold sea water.

The lateral boundaries of the current within the Straits are fairly well fixed, but as the stream leaves the Straits its E boundary becomes somewhat vague. On the W side the limits can be defined approximately since the waters of the stream differ in color, temperature, salinity, and flow from the inshore coastal waters. On the E, however, the Antilles Current combines with the Gulf Stream so that its waters here merge gradually with the waters of the open Atlantic. Observations of the National Ocean Survey indicate that, in general, the average position of the inner edge of the Gulf Stream as far as Cape Hatteras lies inside the 50-fathom curve.

At the W end of the Straits of Florida the limits of the Gulf Stream are not well defined. Between Fowey Rocks and Jupiter Inlet the inner edge lies very close to the shoreline.

Along the Florida Reefs between Alligator Reef and Dry Tortugas the distance of the N edge of the Gulf Stream from the edge of the reefs gradually increases toward the W. Off Alligator Reef it is quite close inshore, while off Rebecca Shoal and Dry Tortugas it is possibly 15 to 20 miles S of the 100-fathom curve. Between the reefs and the N edge of the Gulf Stream the currents are ordinarily tidal and are subject at all times to considerable modification by local winds and barometric conditions. This neutral zone varies in both length and breadth; it may extend along the reefs a greater or less distance than stated, and its width varies as the N edge of the Gulf Stream approaches or recedes from the reefs.

The approximate position of the axis of the Gulf Stream for various regions is shown on the following National Ocean Survey charts: 11013 (1002), Florida; 411 (1007), South Carolina to Cuba; 11460 (1112), Cape Canaveral to Key West; 11420 (1113), Alligator Reef to Habana. Chart 11009 (1001) shows the axis and the position of the inner edge of the Gulf Stream from Cape Hatteras to Straits of Florida.

**Wind-driven currents** are very complicated. Their velocities and directions depend upon a number of factors such as the velocity, direction, and duration of the wind, the proximity of the coast, and the direction of the coastline. Generally in the Northern Hemisphere the wind-driven current sets somewhat to the right of the wind but in coastal waters there are many exceptions to this general rule, the current often setting to the left of the wind, due to the tendency of the current to follow the direction of the coastline or to other local conditions.

The velocity of the wind current relative to that of the wind also varies with the locality. Wind-current information is given in the Tidal Current Tables.

**Weather.**-Climatological tables for coastal localities and meteorological tables for the coastal ocean area covered in this volume follow the appendix. The tables for the ocean area were compiled from observations made by ships in passage. Also listed in the appendix are National Weather Service offices and radio stations which transmit weather information.

**Storm warning display locations** are listed on NOS charts and shown on the Marine Weather Services Charts published by the National Weather Service. The Marine Weather Services Charts also show radio stations that transmit marine weather broadcasts and additional information of interest to mariners. These charts are for sale by the National Ocean Survey, Distribution Division (C44), 6501 Lafayette Avenue, Riverdale, Md. 20840, and its authorized sales agents.

**Climate.**-The Gulf Coast of the United States arcs NW from Key West, near 24°N., to the Florida Panhandle, and then roughly follows the 30th parallel to the vicinity of Houston where it begins a SW arc extending to the Mexican border a short distance S of Brownsville near 26°N. The climate of the Gulf Coast varies from humid and subtropical over southern Florida and southern Texas to a more variable but warm marine climate along the N portions of the coast. Coastal terrain ranges from flat to gently rolling. In general, the weather patterns are essentially those which prevail in a transition zone between a tropical and a temperate area. Extended periods of stable humidity and temperature frequently occur.

The Gulf of Mexico is the source of warm moist air which generally flows N during the warmer months conditioning the coastal climate. Over the Florida Peninsula, the warm Gulf Stream brings a rather even climate throughout most of the year, with mild winters and without summer extremes. Strong air masses of continental origin periodically reach the area, particularly in winter.

**Pressure.**-The general circulation of air near the surface of the Gulf and along the Gulf Coast follows the sweep of the W extension of the Bermuda high pressure cell during the spring and summer months. The July mean pressure chart shows broad parallel isobars running generally from SE to NW over the entire Gulf. By autumn higher pressures over the North American continent modify the pattern and the isobars tend to lie more along an E-W axis over the Gulf.

Average pressures continue to be higher over North America through the winter, but by spring the W extension of the Bermuda High again emerges as the dominant control of the pressure pattern over the Gulf. This High has greater constancy than the continental high pressure so that in late spring and summer it maintains a rather steady flow of warm moist air which, to a large degree, controls the climate over the Gulf during these seasons of the year. Accordingly, spells of good weather tend to be longer during these seasons than during the late fall, winter, and early spring.

Another pressure variation is obvious at these latitudes. There is a twice-daily ebb and flow of barometric pressure, with an early morning and evening minima and late morning and night maxima. This regular diurnal pattern is masked at times by the larger pressure changes associated with storms of continental origin and tropical cyclones that reach the area. However, during the more settled weather of the summer and early fall, and during periods of steady weather conditions at other times of the year, the occurrence of a diurnal pressure change is so characteristic that an interruption of the pattern is generally considered to be an indication of a change in the weather and possibly the approach of a tropical cyclone.

**Winds.**-Near the Gulf Coast winds are more variable than over the open waters of the Gulf since the coastal winds fall more directly under the influence of the moving cyclonic storms that are characteristic of the continent. In coastal areas about 30 to 40 percent of midwinter winds are from the Northern quadrant and 40 to 50 percent of the summer winds are from the Southern directions. On the Florida coast, wind speeds average 9 knots in March, which is generally the month with highest velocities. At most locations the wind drops to below 7 knots in August. Along the Alabama and Louisiana coast wind speeds average 8 or 9 knots in August. On the Texas coast wind speeds average 12 knots in April, dropping to 9 knots in August.

Along the Gulf Coast, land and sea breezes prevail, although over the open waters offshore little difference between daytime and nighttime winds is noticed. Winds over the NW portion of

the Gulf, on the whole, blow slightly more from a S direction throughout the year than over the E portions. In combination with the change in direction of the coastline, this leads to more persistent onshore winds throughout the year over the W portion of the Gulf. As a result both thunderstorms and fog are more evenly distributed throughout the year on the NW coast than they are farther E.

**Northers.**-Some 30 to 40 polar air masses penetrate from the North American continent to the Gulf of Mexico each winter. During the year some 15 or 20 of these bring strong forcible N winds to the Gulf, and are called northers. Occasionally, local usage has corrupted the term norther to apply to any wind shift to northerly, if accompanied by a temperature drop. The wind itself is of prime importance to sailing vessels and to vessels of small tonnage, and sometimes to large vessels. Seamen usually have in mind a wind of at least 20 knots when speaking of northers, and winds from 25 up to 50 knots or more may occur in severe northers of the Gulf. From 1 to 6 northers are likely to be severe over the Gulf during individual years. Northers ordinarily occur from November to March. Severe northers usually occur from December to February, but occasionally later. January or February, sometimes March, will be the month having the most northers for individual years. Northers generally last about a day and a half, but severe storms may endure for 3 or 4 days.

**Precipitation.**-Along the Gulf Coast precipitation tends to fall periodically during the late autumn, winter, and spring months, and is generally associated with extra-tropical cyclones. In summer and early autumn scattered shower and thunderstorm activity is high. The gentle coastal slopes do not, however, give rise to persistent areas of concentrated thunderstorm activity day after day. In general the greatest rainfall occurs in summer and early autumn with some of the heaviest falls associated with tropical cyclones during the months of August, September, and October.

New Orleans has some of the heaviest rainfall amounts along the coast. The wettest month is usually July with an average of 6.72 inches. The heaviest monthly rainfall of record at that location was 25.11 inches in October, 1937.

**Temperature.**-Average temperatures at coastal locations vary with latitude and exposure, and in winter depend, in addition, on the frequency and intensity of northers. The mean annual temperatures range from 68.2°F. at Mobile, which is the northernmost coastal point included in the area, to 76.8°F. at Key West, which is the southernmost point. Throughout the year the mean monthly temperatures at Key West closely follow the temperatures of the surrounding water areas, since this small key is away from the mainland and is, in fact, the only Gulf Coast land station in the area which has a full subtropical marine exposure and climate.

A further indication of differences between the ocean exposure of Key West and a relatively continental location such as Brownsville is seen in the extreme temperature ranges at the two stations. At Key West, the lowest temperature of record is 46°F. and the highest 95°F., while at Brownsville the lowest temperature of record is 19°F. and the highest is 104°F.

At New Orleans the average temperature is 68.6°F. The coldest month, January, averages 54.6°F. and the warmest, August, 81.9°F., a difference of 27.3°F. The lowest monthly temperature since 1905 is 42.2°F. and the warmest 87.1°F. The extremes of temperatures at New Orleans are 102°F. in June and 14°F. in January.

**Cloudiness.**-Along the Gulf Coast cloudiness averages between 5- and 6-tenths sky cover with relatively small seasonal variation. October is generally the clearest month and December through March the cloudiest. The nature of the cloudiness varies with the season. In winter the Gulf Coast has occasional gray, overcast days but in summer these are rare. Much of the summer cloudiness consists of convective cumulus clouds or high, relatively transparent clouds.

**Fog.**-Warm, moist Gulf air blowing slowly over chilled land surfaces brings about the formation of fog at the ground. From November through April fog is encountered occasionally at points throughout the Gulf Coast region. It is most frequent in the vicinity of harbor entrances and over land areas extending into the Gulf, such as Cape San Blas. Fog forms with S winds and dissipates during N winds.

Fog is relatively infrequent at most Florida coastal points, with the exception of Tampa in the winter. There is a greater frequency along the Alabama and Louisiana coasts and the Texas coastal bend, with lesser amounts on the southwest Texas coast. Fog is generally at a maximum in winter with little heavy fog in summer.

**Tropical cyclones.**-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). Although relatively small in area coverage, this storm can attain awesome strength, with winds near its center reaching 175 knots or more. 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 E coast of the U.S.), includes the area covered by this Coast Pilot. In this region, tropical cyclones with winds of 34-63 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 predominantly oceanic, they merit the special attention of all mariners, whether professional or amateur.

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 affect an area covering tens of thousands of square miles.

In the North Atlantic, tropical cyclones form over a wide range of ocean between the Cape Verde Islands and the Windward Islands, over the W part of the Caribbean Sea, and the Gulf of Mexico. While some may initially move N, especially those that form SE of Bermuda, the majority take a W to NW course. Of these, some curve gradually N, either E of or above the larger islands of the West Indies, then turn NE or E for varying distances from the Atlantic Coast of the United States. Others pass over or to the S of the larger islands and enter the Gulf of Mexico, then curve N or NE and strike some part of the east Gulf Coast. Others may continue W and strike the west Gulf Coast.

The most common path is curved, the storms moving generally in a W direction at first, turning later to the NW, and finally to the NE. A considerable number, however, remain in low latitudes and do not turn appreciably to the N. Freak movements are not uncommon, and there have been storms that described loops, hairpin-curved paths, and other irregular patterns. Movement toward the SE 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 S 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 while during August there is an increase in number and intensity, and the area of formation extends E 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 N or NE in the middle of higher latitudes.

**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 appears only to alter somewhat the normal daily cycle (two maxima and two minima 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, mist-like 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 squall lines, and 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 an inch and a half or two 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 the 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 10 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. 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 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 2 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 danger 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 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 N and E.

**Coastal effects.**-The high winds of a hurricane inflict widespread damage when such a storm leaves the ocean and crosses land. Aids to navigation may be blown out of position or destroyed. Craft in harbors, unless they are properly secured, drag anchor or are blown against obstructions. Ashore, trees are blown over, houses are damaged, power lines are blown down, etc. The greatest damage usually occurs in the dangerous semicircle a short distance from the center, where the strongest winds occur. As the storm continues on across land, its fury subsides faster than it would if it had remained over water.

Along the coast, particularly, greater damage may be inflicted by water than by the wind. There are at least four sources of water damage. First, the unusually high seas generated by the storm winds pound against shore installations and craft in their way. Second, the continued blowing of the wind toward land causes the water level to increase perhaps 3 to 10 feet above its normal level. This **Storm tide,** which may begin when the storm center is 500 miles or even farther from the shore, gradually increases until the storm passes. The highest storm tides are caused by a slow-moving hurricane of larger diameter, because both of these effects result in greater duration of wind in the same direction. The effect is greatest in a partly enclosed body of water, such as the Gulf of Mexico, where the concave coastline does not readily permit the escape of water. It is least on small islands, which present little obstruction to the flow of water. Third, the furious winds which blow around the wall of the eye often create a ridge of water called a **Storm surge,** which strikes the coast and often inflicts heavy damage. The effect is similar to that of a **Tsunami (seismic sea wave)** caused by an earthquake in the ocean floor. Both of these waves are popularly called **Tidal waves.** Storm surges of 20 feet or more have occurred. About 3 or 4 feet of this is due to the decrease of atmosphere pressure, and the rest to winds. Like the damage caused by wind, that due to high seas, the storm tide, and the storm surge is greatest in the dangerous semicircle, near the center. The fourth source of water damage is the heavy rain that accompanies a tropical cyclone. This causes floods that add to the damage caused in other ways.

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 blown out of position or have been 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.

**Principal ports.**-The principal deep-draft commercial ports within the area of this Coast Pilot are: Port St. Joe, Panama City, Pensacola, Tampa, Mobile, Pascagoula, New Orleans, Baton Rouge, Lake Charles, Orange, Freeport, Port Lavaca-Point Comfort, Port Arthur, Beaumont, Galveston, Texas City, Houston, Corpus Christi, Port Brownsville, and Port Isabel.

Other ports are Key West, Port Boca Grande, Sarasota, St. Petersburg, St. Marks, and Carrabelle.

**Pilotage,** with a few minor exceptions, 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.

Arrangements for pilots are generally made in advance by the ships' agents. Pilots serving the larger ports maintain a 24-hour radio watch, while those at the smaller ports maintain a radio watch only when vessels are expected. 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.)

**Harbormasters** where appointed are mentioned in the text. They usually have charge of the anchorage and berthage of vessels.

**Supplies.**-General supplies, including fuel oil, diesel oil and fuel, gasoline, water, and marine supplies are available at the principal ports. Similar items but in more limited quantities can be obtained at many places mentioned under descriptions of the different ports.

**Repairs-salvage.**-Hull and engines of medium to large vessels can be repaired at Tampa, Mobile, New Orleans, Port Arthur, Beaumont, Orange, Galveston, and Houston. Smaller vessels can be handled at numerous other ports. Extensive above-the-waterline hull and engine repairs can be made at Pensacola, Pascagoula, and Lake Charles. Minor repairs can be made at Freeport and Port Brownsville. Marine railways are available, and repairs to smaller craft can be made at many other places on the Gulf Coast, as listed under the descriptions of the different ports.

Deep-sea salvage equipment is available at Key West, Tampa, Mobile, New Orleans, Port Arthur, Beaumont, and Galveston.

**Small-craft facilities.**-There are numerous places where fuel, supplies, repairs, slips for dockage, and launching ramps are available for small craft. For the various towns and isolated places, the Coast Pilot includes generalized information about marine facilities; details are given in the series of small-craft charts published for many places.

**Sailing vessels and power-driven vessels of less than 65 feet in length, navigating narrow channels, shall not hamper the safe passage of larger steam vessels which can navigate only inside that channel. (Public Law 89-764).**

**Standard time.**-Port St. Joe, Fla., and the areas E of it observe eastern standard time (e.s.t.), which is 5 hours slow of Greenwich mean time. Example: when it is 1000 at Greenwich, it is 0500 at Tampa, Fla. The area from Port St. Joe to the Rio Grande uses central standard time (c.s.t.), which is 6 hours slow of Greenwich mean time. Example: when it is 1000 at Greenwich, it is 0400 at Corpus Christi, Texas.

**Daylight saving time.**-In all States covered by this Coast Pilot clocks are advanced one hour on the last Sunday in April and are set back to standard time on the last Sunday in October. Puerto Rico and the U.S. Virgin Islands do not observe daylight saving time.

**Legal public holidays.**-New Year's Day, January 1; 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, fourth Monday in October; 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 areas in every case.

In addition, the following holidays are also observed in the area covered by this Coast Pilot:

Three Kings' Day, January 6: Puerto Rico and Virgin Islands.

Battle of New Orleans, January 8: Louisiana.

De Hostos' Birthday, January 11: Puerto Rico.

Robert E. Lee's Birthday, January 19: Florida and Louisiana. (Third Friday in January in Mississippi and Alabama.)

Arbor Day, Third Friday in January: Florida.

Franklin D. Roosevelt's Birthday, January 30: Virgin Islands.

Lincoln's Birthday, February 12: Virgin Islands.

Washington's Birthday, February 22: Louisiana and Virgin Islands.

Texas Independence Day, March 2: Texas.

Emancipation Day, March 22: Puerto Rico.

Mardi Gras (Shrove Tuesday): Alabama, Florida, and Louisiana.

Transfer Day, March 31: Virgin Islands.

Holy Thursday: Virgin Islands.

Good Friday: Florida, Louisiana, Puerto Rico, and Virgin Islands.

Easter Monday: Virgin Islands.

Pascua Florida Day, April 2: Florida.

Thomas Jefferson's Birthday, April 13: Alabama.

Jose de Diego's Birthday, April 16: Puerto Rico

San Jacinto Day, April 21: Texas.

Whit Monday: Virgin Islands.

Confederate Memorial Day, April 26: Florida. (Last Monday in April in Alabama and Mississippi.)

Memorial Day, May 30: Louisiana and Virgin Islands.

Confederate Memorial Day, June 3: Louisiana.

Jefferson Davis' Birthday, June 3: Florida and Texas, (First Monday in June in Alabama and Mississippi.)

Organic Act Day, June: Virgin Islands.

Munoz Rivera's Birthday, July 17: Puerto Rico.

Constitution Day, July 25: Puerto Rico.

Supplication Day, July 25: Virgin Islands.

Dr. Jose C. Barbosa's Birthday, July 27: Puerto Rico.

Huey P. Long's Birthday, August 30: Louisiana.

Columbus Day, October 12: Louisiana, Puerto Rico and Virgin Islands.

Thanksgiving Day, October 25: Virgin Islands.

Liberty Day, November 1: Virgin Islands.

Veterans Day, November 11: Mississippi, Louisiana, Puerto Rico, and Virgin Islands.

Discovery Day, November 19: Puerto Rico.

Second Christmas Day, December 26: Virgin Islands.

# 4. KEY WEST TO TAMPA BAY

This chapter describes the W coast of Florida from Key West to Tampa Bay, and the ports of Key West, Naples, Fort Myers, Port Boca Grande, Venice, and Sarasota, and many of the smaller ports and landings. Also described are the Ten Thousand Islands, Big Marco Pass, Gordon Pass, Estero Island, Estero Pass, San Carlos Bay, Caloosahatchee River, Sanibel Island, Charlotte Harbor, Peace River, Myakka River, Gasparilla Sound, Gasparilla Island, New Pass, Venice Inlet, Big Sarasota Pass, Lido Key, Longboat Key, Longboat Pass, and Anna Maria Key.

The section of the Intracoastal Waterway from Caloosahatchee River, Fla., to Tampa Bay passing through the waters described in this chapter and places along its route is discussed in chapter 12.

**Chart 11420 (1113).**-The coast, for nearly 115 miles, from Key West to San Carlos Bay is low, sandy, and generally wooded. Innumerable small islands and keys, interlaced by many small rivers and bayous, make up Everglades National Park and the Ten Thousand Islands. From San Carlos Bay N to Tampa Bay the coast is made up of nearly straight sandy beaches of the barrier islands.

The **Florida Keys** comprise a chain of low islands along the SW coast of the Florida Peninsula extending W in a wide arc to the Dry Tortugas. The keys are mostly of coral formation and are generally covered with dense mangrove, though some have stands of pine and a few have coconut groves.

On the straits side of the keys, and at an average distance of 5 miles, are the **Florida Reefs,** a dangerous line of shoals which extend along the entire length of the chain. The reefs are particularly hazardous because they do not break in smooth weather and few of them are exposed. The water shoals abruptly between the reefs and along their outer edges.

When approaching the reefs from seaward, their proximity usually is indicated by a change in color of the water from deep blue to light green or by the bank blink, described in chapter 3. However, too much reliance should not be placed on such indications. Lights and daybeacons facilitate navigation along the reefs in clear weather, but soundings should be resorted to in thick weather. Depths of 50 fathoms indicate a distance of 2 to 3 miles from the reefs, and great caution should be used in approaching closer. Fogs are infrequent in this area.

The water always becomes milky following windy weather. The usual color is bluish green on the reefs, while the rock patches are dark, shading through brown to yellow as they approach the surface. Sand patches are bright green. Grass patches at depths of 10 to 15 feet have the appearance of rocks. With the sun astern, the line marking deep water and the edges of reefs is surprisingly clear from a position aloft.

**Dumping grounds** have been established in the Straits of Florida about 40 miles SSE of Key West. (See 205.80 (a) and (b)(6), chapter 2, for limits and regulations.)

**Prohibited dumping grounds** have been established in the Straits of Florida S of Key West Harbor, within the Main Ship Channel and in the approaches and entrance to the channel. (See 205.80 (a) and (c)(2), chapter 2, for limits and regulations.)

**Boundary lines of inland waters.**-The lines established for the Key West area are described in 82.55, and 82.60, chapter 2.

**Charts 11447 (576), 11441 (584), 11445 (854).-Key West Harbor** is 145 miles SW of Miami Harbor. The harbor proper lies in front of the city of Key West, protected on the E side by the island and on the other sides by submerged reefs and sand flats. The harbor is entered through breaks in the reef by four principal channels with depths of about 12 to 34 feet, and several minor channels.

**Key West,** on the island of the same name near the W end of the Florida Keys, is a winter resort and the site of a large naval base. Commercial fishing is one of the leading industries. Petroleum products are delivered by tanker to the naval base. Fruit, seafood, and petroleum products are the primary imports handled by the commercial wharves. These products arrive by small coastal freighters, coastal tankers, and fishing boats.

**Prominent features.**-Easy to identify when standing along the keys is the 300-foot-high radio tower at the U.S. Naval Base N of Fort Taylor, the hotel cupola, and the naval hospital cupola. Numerous tanks, lookout towers, and masts are prominent but difficult to identify. Also conspicuous are three white radar domes on Boca Chica Key, and the white dome of the National Weather Service station at Key West International Airport. From S, a six-story apartment complex on the S shore just W of the airport is prominent; it is lighted by yellow lights at night.

**Sand Key Light** (24°27.2'N., 81°52.7'W.), 109 feet above the water, is shown from a 120-foot brown square pyramidal skeleton tower, enclosing a stair cylinder and square dwelling on pile foundation on **Sand Key.**

**Channels.-Main Ship Channel** is the only deep-draft approach to Key West. Federal project depth is 34 feet from the Straits of Florida to a turning

basin off the U.S. Naval Station and inside the station basin, thence 30 feet to an upper turning basin off Key West Bight, and then 12 feet to and including a turning basin in the bight. (See Notice to Mariners and latest editions of the charts for controlling depths.) The channel from the entrance to the upper turning basin is marked by lighted ranges and other aids to navigation. Spoil areas are W of the channel.

**Northwest Channel** is a medium-draft passage between Key West Harbor and the Gulf of Mexico. In January 1974, the reported controlling depth was about 15 feet. Vessels can pass directly across the reefs from the Gulf to the Straits of Florida by way of Northwest Channel and Main Ship Channel. The Gulf end of the channel is shifting W.

The jetties on either side of the Gulf entrance to Northwest Channel are 0.3 to 0.5 mile from the centerline of the channel, and only the outer part of the E jetty shows above low water. The channel is marked by lighted ranges and lighted and unlighted buoys. The inner range is hard to identify until within about a mile of the front light. The steel pilings and platform of a former Coast Guard lighthouse are about 0.3 mile SW of the S end of the W jetty.

**Smith Shoal** (chart 11439 (1252)), about 4.5 miles N of the N entrance to Northwest Channel, is covered 11 feet and marked on its NE end by **Smith Shoal Light** (24°43.2′N., 81°55.0′W.). The light also marks the N approach to the channel and is shown 47 feet above the water from a small black house on a white, hexagonal, pyramidal skeleton tower on piles. A relatively flat-topped coral head, covered by a least depth of 11 feet, is about 3.3 miles WSW of the light.

**Southwest Channel,** a convenient approach to Key West from SW, has been swept to a depth of 23 feet, and is marked by buoys. In 1961, this depth was confirmed for midchannel. A general course following the aids leads to the outer anchorage and Main Ship Channel. Strangers should not attempt passage at night.

**West Channel,** a passage leading W from Key West between the keys and outer reefs, is deep and fairly well marked. It is used by small boats bound toward the Dry Tortugas.

**Calda Channel** leads N from Man of War Harbor to the open waters of the Gulf. The channel is narrow and crooked, but is well marked by daybeacons and a light at the N end. The controlling midchannel depth was 5 feet in 1963. The channel should be used only with local knowledge and during good visibility.

**Garrison Bight Channel,** well marked, leads around the N end of Fleming Key, thence S to a dredged section that leads along the N side of Trumbo Point into a turning basin just inside the entrance of Garrison Bight. In April 1972, the reported controlling depth was 8 feet. An overhead power cable crosses the entrance and the N part of the bight; clearances are 50 feet at the entrance and 34 feet elsewhere. A privately dredged channel leads from the turning basin to a basin in the SW part of the bight. In 1972, the privately dredged channel had a reported controlling depth of 5 feet. A causeway bridge, with a 44-foot span and a clearance of 19 feet, crosses the SW part of the bight.

Garrison Bight can also be reached via an unmarked channel that leads from Man of War Harbor E between Fleming Key and the N shore of Key West to a junction with the dredged section of Garrison Bight Channel at Trumbo Point. A depth of about 6 feet can be carried to the junction. The channel is crossed by a 42-foot fixed span highway bridge with a clearance of 18 feet which connects Fleming Key with Key West. Garrison Bight has excellent small-craft facilities; these are described later in the chapter.

The Intracoastal Waterway from Miami to Key West joins Garrison Bight Channel off the N end of Fleming Key.

**Measured course.**-S of Sand Key is a measured course 6,510 feet long on course **089°38′-269°38′**. The W front range marker is 140 yards N of Sand Key Light; and the E front marker is 50 yards N of **Rock Key,** to the E of the light. The rear markers are about 600 yards N of the front markers. All are slatted white daymarks with vertical black trim.

**Anchorages.**-The best anchorage is N of the city in **Man of War Harbor** where depths are 14 to 26 feet. This, the usual quarantine anchorage, is protected against heavy seas by **Frankfort Bank** and **Pearl Bank,** coral banks, on the W and **Fleming Key** on the E. Small craft usually anchor in **Key West Bight** or at the Municipal Marina or Key West Yacht Club in **Garrison Bight** on the N side of the city.

Vessels can anchor W of the city in depths of 20 to 26 feet, taking care, however, to avoid the reefs which rise abruptly in some places along the edges of the channels. The outer anchorage, SW of **Fort Taylor,** is favored by deep-draft vessels. It is somewhat exposed, but has depths of 22 to 36 feet and is safe for vessels with good ground tackle. The anchorage area at Key West is one of the best for large vessels S of Chesapeake Bay.

A **naval explosives anchorage area** has been established about 2.5 miles SW of Key West. (See 110.189a, chapter 2, for limits and regulations.)

**Dangers.**-A **naval restricted area** is off the S side of Key West near its SW end. (See 207.173, chapter 2, for limits and regulations.)

The waters near the naval facilities at Key West are **restricted.** (See 207.173a, chapter 2, for limits and regulations.)

A **naval operational training area,** aerial gunnery range, and bombing and strafing target **danger zones** are in the Straits of Florida and the Gulf of Mexico in the vicinity of Key West. (See 204.95, chapter 2, for limits and regulations.)

**Caution.**-Craft approaching Key West, Boca Chica, and Safe Harbor from the E through Hawk

Channel should be mindful that submerged rocks and reefs extend up to 0.6 mile off the keys and give little or no indication of their presence under certain conditions.

Fishermen operating out of the Florida Keys, particularly Key West, routinely use stakes to mark otherwise unmarked channels that they use as short cuts or for safe passage in rough weather. When the channels change or fall into disuse, these stakes are not removed. Visitors to the keys should not rely on them as channel markers without local knowledge.

**Tides.**-The mean range of tide is 1.3 feet at Key West, and 2.5 feet at the Northwest Channel jetties. (See the Tide Tables for daily predictions.)

**Currents.**-In the S approaches to Key West within the 10-fathom curve currents are weak and variable. In the main channel W of Fort Taylor, the flood (N) and the ebb (S) currents at strength average 1.0 knot and 1.7 knots, respectively. In the upper turning basin, the flood sets NE and the ebb SW with averages at strength of 0.8 and 1.1 knots, respectively. In Northwest Channel about 2.5 and 5.5 miles from Key West, the tidal currents average 1.3 knots and 0.6 knot, respectively. (See the Tidal Current Tables for daily predictions.) However, both the time and velocity of the tidal current are influenced by winds.

**Weather.**-Because of the nearness of the Gulf Stream in the Straits of Florida, about 12 miles S and SE, and the tempering effects of the Gulf of Mexico to the W and N, Key West has a notably mild, tropical-maritime climate in which the average temperatures during the winter are only about 14°F. lower than in summer. Cold fronts are strongly modified by the warm water as they move in from N quadrants in winter. There is no known record of frost, ice, sleet, or snow in Key West. Prevailing E tradewinds and sea breezes suppress the usual summertime heating. Diurnal variations throughout the year average only about 10°F.

Precipitation is characterized by dry and wet seasons. The period of December through April receives abundant sunshine and slightly less than 25 percent of the annual rainfall. This rainfall usually occurs in advance of cold fronts in a few heavy showers, or occasionally 5 to 8 light showers per month. June through October is normally the wet season, receiving approximately 53 percent of the yearly total in numerous showers and thunderstorms. Early morning is the favored time for diurnal showers. E waves during this season occasionally bring excessive rainfall, while infrequent hurricanes may be accompanied by unusually heavy amounts. Humidity remains relatively high during the entire year.

The National Weather Service maintains an office at the Key West International Airport. **Barometers** can be compared and weather information obtained by telephone. (See appendix for address.)

(See page T-1 for **Key West climatological table**.)

**Pilotage** is compulsory for all foreign and U.S. vessels under register in foreign trade if drawing over 6 feet. Pilotage is optional for U.S. coastwise vessels that have on board a pilot licensed by the Federal government. Vessels are boarded day or night at Key West Entrance Lighted Whistle Buoy (24°27.7'N., 81°48.1'W.). Various boats are used by the pilot to meet vessels. Pilots may be arranged for through the Key West Pilots; telephone (305-296-5512), or through the Key West marine operator on VHF-FM channels 16 (156.80 MHz) and 26 (157.30 MHz), or through the ships' agents. The marine operator telephone number at Key West is (305-294-6655). The pilots request a 24-hour notice of time of arrival. Fishermen at Key West are available as pilots for Hawk Channel.

**Towage.**-There is no commercial tug service for vessels. Key West is the regular station for a large 3,800 hp salvage tug. General equipment is available for heavy salvage work.

**Quarantine, immigration,** and **agricultural quarantine** officials are stationed in Key West. (See appendix for addresses.) Vessels subject to such inspections generally make arrangements in advance through the ships' agents; officials usually board vessels at their berths.

Key West is a **customs port of entry.**

**Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See U.S. Public Health Service, chapter 1.) The quarantine anchorage is in Man of War Harbor if size and draft of vessel permit. Larger vessels anchor in the outer harbor. The U.S. Public Health Service maintains a **contract physician's office** in Key West. (See appendix for address.) In addition to the county and naval hospitals, a private hospital and a public clinic are available.

**Coast Guard.**-The **Captain of the Port** maintains an office at the Coast Guard Base. The marine inspection office at Miami maintains a **vessel documentation office** at Key West. (See appendix for address.)

**Harbor regulations.**-The harbormaster has direct supervision of the port, of anchoring and mooring all vessels, and collection of port dues. A **speed limit** of 5 m.p.h. is enforced in the Main Ship Channel between Lighted Buoy 12 and the inner harbor. The harbormaster can be contacted through City Hall.

**Wharves.**-Municipal Wharf (24°33'35"N., 81°48'28"W.), also known as Mallory Wharf, is 870 feet long and has a deck height of about 7 feet. The N half is owned by an oil company, and the S half is owned and operated by the city of Key West as a general cargo facility. In 1972, depths of about 20 feet were reported along the N half and 23 feet along the S half. Water and electrical shore power connections are available at the wharf.

Pier D-3 (24°34.0'N., 81°48.0'W.), S side has two 375-foot berths with roll-on/roll-off ramps at the end of each berth. In 1974, 24 feet was reported alongside the inner berth and 26 feet reported

alongside the outer berth. Covered storage space of 6,000 square feet and 45,000 square feet of open storage is available. Water is available at the pier. The pier is operated by the Key West Port and Transit Authority. The only other deepwater wharves are those of the U.S. Navy. Commercial fish wharves are in Key West Bight and Safe Harbor. Charter boats and yachts use Garrison Bight.

**Supplies.**-Gasoline, diesel fuel, provisions, and marine supplies can be obtained in Key West.

**Repairs.**-There are no commercial drydocks or major repair facilities for deep-draft vessels in Key West; the nearest such facilities are at Tampa and Jacksonville, Fla. There are several repair yards at Key West; two inside Key West Bight and one to the W of the bight. The largest marine railway, at the yard just W of Key West Bight, can handle vessels up to 160 feet or 300 tons for hull and engine repairs. A 25-ton mobile hoist is available. Large vessels can obtain above-the-waterline repairs. Radio and electronic repairs can be made.

**Small-craft facilities.**-Berths, electricity, water, ice, and some marine supplies are available at Key West. Gasoline and diesel fuel are available at the Municipal Wharf and in Garrison Bight; diesel fuel is available in Key West Bight. Hull, engine, electrical, and electronic repairs can be made. Small craft moor in Key West Bight, and in Garrison Bight at the Municipal Marina, or at the Key West Yacht Club, which are at the SW and E ends of the bight, respectively. A causeway across the SW part of Garrison Bight has a small-craft opening. The highway bridge over the opening has a 44-foot fixed span with a clearance of 19 feet at the center. An overhead power cable crossing the N part of Garrison Bight and the entrance has a clearance of 50 feet over the entrance channel and 34 feet elsewhere. Anchorage in 6 to 8 feet is available at the Municipal Marina and Key West Yacht Club. Anchoring or mooring elsewhere in Garrison Bight, except in an emergency or as a shelter during bad weather, is not permitted. Public launching ramps are in Garrison Bight and at the foot of Simonton Street.

**Communications.**-There are no rail connections at Key West. Movement of freight in and out of the port is by vessel or truck. The Overseas Highway (U.S. Route 1) connects the city with Miami and points N, and there is air service to Miami. Bus service is available to mainland points.

**Safe Harbor,** 4 miles E of Key West, is a medium-draft harbor on the S side of Stock Island. A powerplant and a desalination plant on the E side of the harbor are conspicuous. A privately dredged channel leads from Hawk Channel into the harbor. A light marks the approach; a buoy and private daybeacons mark the channel. In January 1974, the controlling depth in the entrance channel was reported to be 18 feet, with greater depths inside the harbor.

Piers with dolphins on the E side of the harbor near the entrance are used by barges to unload petroleum products for the power and desalination plants. Depths of 18 feet are reported alongside the piers.

The piers on the E and W sides of the harbor are used by cold storage and seafood packing plants; numerous shrimp boats tie up alongside the finger piers.

A shipyard on the W side at the head of the harbor, N of the fish piers, has a 90-ton marine lift that can handle craft up to 85 feet for hull and engine repairs. A floating drydock is at a repair facility on the outer end of the northernmost of the two longest piers on the W side of the harbor. The drydock can handle craft up to 80 feet or 300 tons, and with a draft of 12 feet for hull and engine repairs.

A large marina on the E side of the harbor, N of the powerplant, has berths with electricity, a launching ramp, and marine supplies. Gasoline, diesel fuel, ice, and water are available at the fish piers and at the marina.

A boatyard and marina at the SE end of Stock Island, E of the harbor, has a 12-ton mobile hoist that can handle craft up to 50 feet. The yard also builds craft up to 45 feet.

**Cow Key Channel,** between Stock Island and Key West, is a narrow channel privately marked by daybeacons to the fixed highway bridges about 0.8 mile above the entrance. In 1963, the midchannel controlling depth was 2 feet. Shallow-draft boats can pass through the highway bridges between the keys. The bridges have 16-foot spans with a clearance of 8 feet. A drive-in movie screen E of the channel and three radio antennas on the E side of the channel are prominent. N of the highway bridges the channel is unmarked and difficult to follow. A small marina just S of the bridges has gasoline, water, ice, and some marine supplies. Scuba tanks can be filled at a diving facility on the E side of the channel at the bridges. About 0.5 mile N of the bridges, on Stock Island, a marina has gasoline. Boats up to 25 feet can be hauled on trailers for engine repairs.

**Charts 11439 (1252), 11434 (1351).**-The area from Key West for 63 miles W to Dry Tortugas is a continuation of the keys with their intervening reefs and shoals. The keys are low, small in extent, and, except for the Dry Tortugas, generally covered with dense growths of mangrove.

About 5 miles S of the main chain of keys and reefs is a line of reefs, shoals, and generally broken ground which rises abruptly from the deep water of the Straits of Florida. Buoys, lights, and daybeacons mark the outer reefs. Deep-draft vessels standing along the keys should avoid this broken ground and also the areas with depths less than 10 fathoms, S and W of Rebecca Shoal and the Dry Tortugas.

Currents are variable along the edge of the reefs; being influenced by winds, by differences of barometric pressure in the Gulf and the Straits of

Florida, and by the tides. At times there are strong tidal currents through the passages between the keys.

Between Key West Harbor and Boca Grande Channel there is an extensive shoal area in which are several small scattered keys. The white sand beaches of the southernmost keys are easily discernible from seaward.

A **danger zone** in a Navy restricted area surrounds Woman Key and Ballast Key. (See 204.90, chapter 2, for limits and regulations.)

**Boca Grande Channel,** between **Boca Grande Key** and the Marquesas Keys, is about 15 miles W from Key West. The channel has a controlling depth of about 11 feet from the Straits of Florida to the Gulf of Mexico and is marked by daybeacons and a buoy, but is seldom used except by local boats of 6 feet or less draft. The channels through Key West Harbor are deeper and better marked, and offer a shorter passage from the Gulf to the Straits of Florida. Good anchorage is available 1 mile NE of Boca Grande Key for boats drawing less than 5 feet.

**Currents.**-In Boca Grande Channel the average velocity of the current is 1.2 knots; the flood current sets N and the ebb S. The velocity of the current is considerably influenced by the winds.

The **Marquesas Keys,** on the W side of Boca Grande Channel, are 4 miles in extent and surrounded by a large shoal area. The northernmost key is the largest and has a strip of sandy beach free of mangrove.

**Mooney Harbor,** a good anchorage for drafts of 4 feet or less, is inside the Marquesas Keys. The anchorage is entered between **Gull Keys** and **Mooney Harbor Key** from a S-by-E direction, passing well to E of the coral heads a mile S of the opening. **Ellis Rock,** 4 miles NW of the Marquesas Keys, is covered 7 feet and surrounded by depths of 21 to 39 feet; the rock is marked by a light.

**Danger zones** of bombing and strafing target areas, centered on targets, are in the vicinity of Marquesas Keys. (See 204.95, chapter 2, for limits and regulations.)

A large shoal, the W part of which is known as **The Quicksands,** extends 18 miles W from the Marquesas Keys. The shoal is about 4.5 miles wide between the 18-foot curves and has a least depth of 2 feet over its E part. A strong E to W current was observed in the area of the Quicksands in 1975.

**Halfmoon Shoal,** covered 8 feet, is off the W end of The Quicksands. A wreck covered 6 feet and marked by a daybeacon is on the W edge of the shoal.

**New Ground,** a shoal with a least depth of 4 feet at its W end, is about 6 miles long. It extends in an E-W direction about 3.5 miles N of The Quicksands. A lighted bell buoy is off the W end. The water shoals abruptly on the N side of New Ground, and vessels should stay in depths greater than 13 fathoms to ensure clearing the shoal.

Between New Ground and The Quicksands is a natural channel about 2 miles wide with depths greater than 30 feet. The route should be used with caution because of the general irregularity of the bottom inside the 10-fathom curve.

A channel, sometimes used, lies W of Halfmoon Shoal, but is not recommended. SW of Halfmoon Shoal depths of 20 to 22 feet rise abruptly from depths of about 40 feet.

**Isaac Shoal,** 5 miles W of Halfmoon Shoal and 2 miles SE of Rebecca Shoal, is covered 14 feet. The shoal rises from depths of 30 to 60 feet.

**Rebecca Shoal,** 43 miles W of Key West, is a small coral bank covered 11 feet. **Rebecca Shoal Light** (24°34.7'N., 82°35.2'W.), 66 feet above the water, is shown from a small white house and square skeleton tower on a brown pile foundation on the S edge of the shoal. A red sector from 254° to 302° in the light covers Isaac Shoal, Halfmoon Shoal, and The Quicksands. Several 18-foot spots are reported within a mile SE and W of the light.

**Currents.**-Between Halfmoon Shoal and Rebecca Shoal at Isaac Shoal the current floods N with an average velocity at strength of about 1.0 knot and ebbs S with an average velocity of about 0.8 knot. The velocity of the current is considerably influenced by the wind.

The current S of New Ground Shoal has an average velocity of 0.7 knot with the flood setting NE and the ebb SW. The velocity and direction of the current are influenced considerably by the wind.

**Chart 11434 (1351).-Rebecca Shoal Channel,** immediately W of Rebecca Shoal Light, frequently is used by vessels bound from the Straits of Florida to points on the W coast of Florida. Vessels bound for Mobile and points W pass to the W of Dry Tortugas.

So far as known, Rebecca Shoal Channel is clear, but possibly there are undiscovered spots with lesser depths than those now charted. Deep-draft vessels should use the passage with great caution, and should continue about 15 miles past the lighted bell buoy marking the 28-foot shoal S of The Quicksands before turning N. The passage is well lighted.

**Chart 11438 (585).**-The **Dry Tortugas** are a group of small keys and reefs 63 miles W from Key West. The group is about 11 miles long, in a NE-SW direction, and 6 miles wide. **Pulaski Shoal,** at the NE end of the group, is 12 miles NW of Rebecca Shoal. **Pulaski Shoal Light** (24°41.6'N., 82°46.4'W.), 49 feet above the water, is shown from a small black house on a hexagonal pyramidal skeleton tower on piles on the E side of the shoal.

The keys are low and irregular, and have a thin growth of mangrove. In general, they rise abruptly from deep water and have fairly good channels between them. They are continually changing in size and shape.

**Garden Key** is the site of historic **Fort Jefferson National Monument,** a hexagonal-shaped structure with walls 425 feet long rising from a surrounding moat. The fortress, once a military prison, is now a government reservation administered by the National Park Service. An abandoned lighthouse, 67 feet high, is behind the SE bastion. A fixed white light, visible at least 8 miles, is displayed at night from the tower by the National Park Service. Garden Key and the surrounding waters of the Dry Tortugas are subject to rules and regulations prescribed by the Secretary of the Interior. Commercial fishing is prohibited within these waters.

The S and N of the three wharves on the E side of the key are in ruins. The center wharf, off the SE front of the fort, is in good condition, with 16 to 22 feet alongside. No fuel, provisions, or water are available.

Small craft should not try to make Dry Tortugas from Key West, because of the rough nature of the sea around Rebecca Shoal.

**Loggerhead Key,** the other of the two principal keys in the Dry Tortugas, is 2.5 miles W of Garden Key. **Dry Tortugas Light** (24°38.0'N., 82°55.2'W.), 151 feet above the water, is shown from a 157-foot conical tower, lower half white and upper half black, near the center of Loggerhead Key. A radiobeacon is at the light station.

Fort Jefferson and Dry Tortugas Light are good landmarks and can be seen at a distance of 10 to 12 miles on a clear day. Fort Jefferson has the appearance of a bare rocky island, and is an excellent radar target at distances greater than 12 miles.

**Bush Key,** just E of Garden Key, is a refuge for noddy and sooty terns. These birds come in early April and leave in September.

When approaching the Dry Tortugas from E or SE, soundings give little warning of danger, as depths of 10 to 15 fathoms are found close to the reefs in many places. The water shoals more gradually in the approaches from NW or SW, but an approaching vessel should stay in depths greater than 15 fathoms if uncertain of her position.

Southeast and Southwest Channels are the principal approaches; both are marked and the shoals can be identified on a clear day by the difference in color of the water. Northwest Channel is unmarked.

**Southeast Channel** skirts the reefs S of **East Key** and **Middle Key,** and passes between the 25-foot shoal S of **Hospital Key** and **Iowa Rock** off **Bush Key Shoal.** Iowa Rock is marked by a lighted buoy. The reefs S of Middle Key can be cleared by keeping S of a line through the abandoned lighthouse on Fort Jefferson and Dry Tortugas Light. The channel has depths of 20 feet or more, but it should be used with caution by vessels drawing more than 18 feet.

In Southeast Channel, 1 mile E of Garden Key, the current floods N and ebbs S with an average velocity of 0.6 knot.

**Southwest Channel** leads between the reefs W and SW of Garden Key and those off Loggerhead Key. The least depth found along the marked channel is 31 feet, but the same caution is advised as with Southeast Channel. A lighted whistle buoy marks the entrance to Southwest Channel.

Among the reefs and keys are numerous places where vessels can anchor and find shelter from seas from various quarters. A good anchorage, although somewhat open to the N, is N and NW of Garden Key. The holding ground is good, and the depths range from 8 to 10 fathoms.

Excellent anchorage for small craft is found in the deep water of Bird Key Harbor, reached through the narrow channel encircling Garden Key, which is well marked. The entrance to **Bird Key Harbor** is narrow, and care is required to avoid the shoals on either side. The main entrance channel is marked by daybeacons.

In emergencies, the best shelter is SW of Garden Key and the channel encircling it, where protection is afforded from NW winds. However, the holding ground is poor, as boats drag anchor along the silty bottom.

(See 110.190, chapter 2, for anchorage regulations and limits for Tortugas Harbor.)

**Tides and currents.**-The mean range of tide at Garden Key is 1.2 feet. In Southwest Channel, 1 mile S of Loggerhead Key, the current floods N and ebbs SW at an average velocity at strength of 0.5 knot. In Southeast Channel the current floods N and the ebb S at an average velocity at strength of 0.6 knot.

**Pilots** are not available at the Dry Tortugas, but fishermen at Key West will pilot vessels between the two places.

**Chart 11434 (1351)..**-For 10 miles W from the Dry Tortugas the bottom is broken and irregular, and consists of coral rock with patches of sand and broken shell. **Tortugas Bank,** the shoalest part of this area, is 7 miles W of Loggerhead Key and has a least known depth of 37 feet. Depths less than 10 fathoms are found for a distance of 2.5 miles in all directions. Between Tortugas Bank and the Dry Tortugas the depths range from 7¼ to 19 fathoms. Deep-draft vessels should avoid Tortugas Bank, especially in heavy weather.

**Chart 11420 (1113).**-From Cape Sable to San Carlos Bay the W coast of Florida is low, sandy, and generally wooded, and has few distinguishing features. Back of the coast is an extensive swampy region, thinly settled, known as **The Everglades.** Off the coast the water is generally shoal, and the 10-fathom curve roughly approaches a line drawn NNW from Key West to Tampa Bay. This part of the coast is seldom approached by deep-draft vessels.

Moderate-draft vessels bound up the coast from Key West can lay a straight course from Northwest Channel to Sanibel Island Light at the

entrance to San Carlos Bay, a distance of 118 miles from Key West. This course is well clear of all dangers, and the light on Sanibel Island is a good landmark day or night. Because of frequent northers during the winter, this track is not recommended for small craft, and the route across Florida Bay is to be preferred.

**Chart 11442 (1251).-Moser Channel,** 36 miles E of Key West, affords passage between the keys from the Gulf of Mexico to Hawk Channel for vessels of 7 to 8 feet in draft. The highway bridge over Moser Channel has a swing span with a clearance of 23 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

The tidal current at the Moser Channel bridge floods NNW with an average velocity of 1.4 knots and ebbs SE with an average velocity of 1.8 knots. Wind effects modify considerably the current velocities and directions.

**Charts 11462 (1249), 11452 (1250).-Florida Bay,** a triangular-shaped body of water between the Florida Keys and the S coast of the mainland, extends in a general E-W direction from Shell and Bogie Keys to Cape Sable. Depths are shallow and irregular; the bottom is mostly mud. From April to October the waters of the bay are clear and the shoals plainly discernible, but during the winter the water frequently turns milky and renders the shoals indistinguishable.

In the E part of the bay are small keys and numerous mudflats which bare, or nearly bare, at low water. The W part of the bay has depths ranging from 7 to 13 feet, and the bottom is covered with loggerhead sponges and turtle grass.

**Chart 11433 (598-SC).-Flamingo,** on the mainland about 9 miles E of East Cape (25°06.9'N., 81°05.2'W.), is a tourist center in **Everglades National Park,** at the entrance of **Flamingo Canal.** A privately dredged channel leads from the 7-foot contour of Florida Bay to the canal entrance. In 1961, the channel had a reported controlling depth of 4½ feet. The channel is marked by lights and daybeacons. A standpipe and microwave tower are prominent on the E side of the entrance to the canal. A highway bridge, about 0.5 mile above the mouth of the canal, has a reported 45-foot fixed span and a clearance of 10 feet. A marina on the W side of the canal at Flamingo has berths with electricity, gasoline, diesel fuel, water, ice, limited marine supplies, and a launching ramp. A marine lift, owned by the National Park Service and available in emergencies only through the marina manager, can handle craft up to 40 feet or 50 tons.

**Storm warning signals are displayed.** (See chart.)

**Charts 11452 (1250), 11431 (1253), 11429 (1254).-Cape Sable,** the low and wooded SW tip of the Florida Mainland, has three points known as **East Cape,Middle Cape,** and **Northwest Cape.** These are relatively steep-to and are partially cleared.

**Boundary lines of inland waters.**-The lines from Marquesas Keys to Cape Sable are described in 82.60, chapter 2.

Small vessels can find anchorage 1.5 miles SE of East Cape in 7 to 8 feet of water. The even marl bottom is good holding ground, but the anchorage is reported to be unsheltered from winds. A drainage canal opening into Florida Bay 1 mile E of East Cape offers good protection for any boat that can enter. A depth of 2 to 3 feet can be carried into the canal at low water by approaching from due S. Fishing and pleasure craft frequent this area, but local knowledge is necessary.

From Northwest Cape the coasts trends N for 20 miles, then NW for about 30 miles to Cape Romano. Along this stretch of coast are the **Ten Thousand Islands,** innumerable small islands and keys interlaced by a network of small rivers and bayous leading to the interior. The islands and keys are generally lumps of mud, low and densely wooded, and almost impossible for a stranger to identify. Small in size, they are mostly awash at high water and fringed with oyster reefs. The only landmark along this section of the coast is the light at the entrance to Little Shark River, but Shark River Island, Shark Point, and Highland Point can be identified by their slightly higher growths of timber. The water is shallow for a distance of 10 miles from the coast, depths of 7 feet being found as much as 3 miles offshore. With local knowledge, drafts of 3 to 6 feet can be carried into many of the rivers.

The rivers and inland lakes to the N of Northwest Cape are frequented mostly by fishing parties, particularly during the winter season. Strangers are advised to hire guides at Flamingo Visitors Center, Marco, or Everglades City. The rivers afford good anchorage for craft able to cross the bars off the entrances.

**Charts 11433 (598-SC), 11432 (599-SC).**-Small craft can traverse the system of tidal bays, creeks, and canals from Flamingo Visitors Center to the Gulf of Mexico, 6 miles N of Northwest Cape. The route through Flamingo Canal, Coot Bay, Tarpon Creek, Whitewater Bay, Cormorant Pass, Oyster Bay, and Little Shark River is marked by daybeacons. The controlling depth is about 3½ feet.

The route from Flamingo to Daybeacon 48, near the W end of Cormorant Pass, is part of the Wilderness Waterway.

**Wilderness Waterway** (see also chart 11430 (642-SC)) is a 100-mile inside passage winding through the mangrove wilderness of Everglades National Park from Flamingo on Florida Bay to Everglades City on the Gulf of Mexico. From Daybeacon 48, near the W end of Cormorant Pass, the waterway leads N through Shark Cutoff and then through various creeks, rivers, and open bays

to Everglades City. The passage above Cormorant Pass is marked by the National Park Service. The National Park Service advises that boats with cabins or high windshields or boats over 18 feet in length should not attempt the entire passage, because of the narrow creeks and overhanging branches along some portions of the waterway.

Maps of the waterway and other information are contained in a booklet entitled, "A Guide to the Wilderness Waterway of the Everglades National Park", published by the University of Miami Press, Drawer 9088, Coral Gables, Fla. 33124.

**Ponce de Leon Bay** is a nearly rectangular bight 7 miles N of Northwest Cape. **Shark Point,** on the N side of the bight, and **Shark River Island** , on the S side, are heavily wooded to the water's edge, and stand out in bold relief against the tree line at the head of the bight. The N part of the bight is shallow, but fair anchorage is available for vessels drawing up to 6 feet off Shark River Island. The anchorage is sheltered from winds E of N or S, and the shoal on the NW affords considerable protection from that direction. Several narrow streams empty into the head of the bight. Boats drawing up to 5 feet can continue into the southernmost of these streams.

The area for some 10 miles E and SE of Ponce de Leon Bay is a complicated network of tidal channels around thousands of mangrove islands. These channels lead or enlarge into Oyster, Whitewater, and Tarpon Bays, from which, in turn, shallow rivers lead back into The Everglades. Generally, a depth of 5 feet can be carried through the various passes into Oyster and Tarpon Bays by giving a good berth to the points, which often have tidal bars projecting out from them.

**Oyster Bay** is about 2 miles inland from the SE corner of Ponce de Leon Bay. At the S end of Oyster Bay is the entrance to **Joe River,** a tidal channel extending some 10 miles in a SE direction to the S end of Whitewater Bay. A depth of 4 feet can be carried through Oyster Bay and Joe River by avoiding occasional bars.

Numerous channels lead E from Oyster Bay through a belt of mangrove about 2 miles wide into **Whitewater Bay.** The latter has numerous low mangrove islands, and its salt water is from 2 to 6 feet deep. NE winds often cause drops in the water level of a half foot. At the S end of Whitewater Bay, **Tarpon Creek** leads into **Coot Bay,** which is about 1 mile in diameter and 3 feet deep. Boats going to and from Whitewater and Coot Bays can use Joe River, which is the southernmost passage, is easy to follow, and is deep enough for all boats that can navigate the bays.

**Little Shark River,** which empties into the Gulf on the S side of **Shark River Island** about 6 miles N of Northwest Cape, is a good channel to Oyster Bay for vessels drawing 4 feet or less. The river also provides anchorage of limited extent but is well protected. An entrance light and daybeacons as far as Oyster Bay mark the channel. Little Shark River trends ENE from Oyster Bay to a junction with Shark River about 7 miles above the entrance light.

**Shark River** is the channel emptying into the middle of the E side of Ponce de Leon Bay. Some 8 miles NE, the channel joins Harney River and enlarges into **Tarpon Bay.** A depth of about 5 feet can be carried through Shark River and Tarpon Bay. Shallow rivers lead N and E from Tarpon Bay into the Everglades.

**Harney River,** emptying into the Gulf about 11 miles N of Northwest Cape, is a good passage to Tarpon Bay. Numerous bars at the entrance limit the depth to 2½ feet.

**Broad River** and **Rodgers River** enter the Gulf about 16 miles N of Northwest Cape. In 1972, it was reported that about 2½ feet could be taken over the bar 1.5 miles SW of the entrance to Broad River. Vessels of that draft can anchor just outside the mouths of the rivers and be protected from the sea by the bars outside. These rivers extend back into The Everglades for about 15 miles. About 6 miles from the coast they connect with a chain of shallow bays and creeks that extend N along the coast for some 60 miles. Small craft drawing up to 1½ feet can traverse these inside passages from Broad River to Naples. However, the charts do not cover this area completely; local knowledge is required to navigate N of Everglades City to Marco.

**Chart 11430 (642-SC).-Lostmans River** is entered through **First Bay,** which is about 19 miles N of Northwest Cape. Local boatmen use the N entrance to the river. A depth of about 3 feet can be carried some 10 miles back into this river, which drains a large area of shallow bays. **Lostmans River Ranger Patrol Station,** a periodically manned outpost of the National Park Service, is on the N side of the entrance to the river. The radio tower is prominent.

**Charts 11431 (1253), 11430 (642-SC).-Seminole Point** (25°36.9'N., 81°16.3'W.), 24 miles N from Northwest Cape, is fairly prominent when standing up the coast at a distance of 2 to 3 miles off. The point is the SW end of **Plover Key,** and is the most W land seen until Pavilion Key is picked up to the NW.

**Charts 11429 (1254), 11430 (642-SC).-Pavilion Key** (25°41.4'N., 81°21.2'W.), 30 miles N of Northwest Cape, is the first prominent land seen after leaving Seminole Point. Anchorage is available for drafts of 4 to 5 feet off the E point of the S end of Pavilion Key. The anchorage is exposed to SW winds. The approach to the anchorage passes close W of Dog Key, 0.3 mile SE of Pavilion Key.

**Chatham River** and **Huston River** empty into the Gulf 3 miles E of Pavilion Key. These rivers offer a connection to the system of shallow bays which parallel the coast. A draft of about 2 feet can be

taken up these rivers, but local knowledge is necessary to avoid the numerous bars.

**Jewel Key** (25°47.1'N., 81°25.1'W.), 6 miles NNW from Pavilion Key, marks the entrance to **Chokoloskee Pass,** the approach to the town of Chokoloskee. Jewel Key is a small flat island.

**Chokoloskee** is a year-round community on an island, about 0.5 mile in diameter, near the SE end of Chokoloskee Bay about 3 miles ENE of Jewel Key. The island is joined to the mainland near Everglades City by a long causeway which has a bridge opening off the mouth of Halfway Creek. The 23-foot fixed span has a clearance of 5 feet. Two channels, privately marked by stakes, lead from the Gulf through **Rabbit Key Pass** and Chokoloskee Pass to the facilities at Chokoloskee. In July 1972, 3 feet was reported in the channel through Rabbit Key Pass and with local knowledge 5 feet in the channel through Chokoloskee Pass. At low water, during periods of N winds, it was reported that very little water remains in these channels and the bay dries out for the most part. At these times local knowledge is essential. There is no marked channel across the bay from the island to the entrance to Barron River, but with local knowledge craft drawing up to 3 feet can make it ordinarily. A channel leads from the vicinity of Jewel Key through **Sandfly Pass** and thence into a privately dredged channel, marked by privately maintained daybeacons, across the bay to the National Park Service Basin, at the NW end of the causeway. In 1972, the channel was reported to have a controlling depth of 6 feet, with 6 feet reported in the basin.

The island has four marinas. One is at the N end on the E side of the causeway, one on the E side of the island, and two on the W side of the island. Two marinas have boatyards that can build craft up to 36 feet. Two marinas have protected basins. All have berths with electricity. Gasoline, diesel fuel, water, ice, marine supplies, wet and dry storage, and launching ramps are available. The largest marine railway can handle craft up to 40 feet for hull and engine repairs. Several of the marinas have 3-ton lifts available.

**Indian Key,** on the W side of the entrance to the pass, is wooded and, except for its shape, resembles the neighboring keys. Good anchorage is available in Indian Key Pass about 700 yards NE of Indian Key in depths of 8 to 13 feet, and about 1 mile NE of the key in 12 to 15 feet, gravel bottom. The anchorage is well protected from all winds, is suitable for drafts up to 7 feet, and is easily entered day or night.

**Indian Key Pass** (25°48.0'N., 81°28.0'W.), 38 miles N of Northwest Cape, is the approach to Everglades City. A dredged channel leads from the Gulf of Mexico through Indian Key Pass, across Chokoloskee Bay, and up the **Barron River** to a turning basin about 1.3 miles above the mouth of the river. In June 1971, the centerline controlling depth was 6½ feet. The channel is well marked by lights and daybeacons. An overhead power cable with a clearance of 65 feet crosses the river about 0.3 miles above the mouth.

A privately dredged channel, marked by daybeacons, leads SE from the channel at the mouth of the Barron River to a turning basin and the protected basin of the National Park Service. The channel was reported to have a controlling depth of 6 feet in 1972. A visitors center of The Everglades National Park is at the basin.

**Indian Key Pass Light 1** (25°48.0'N., 81°28.1'W.), 32 feet above the water and shown from a white triangular structure on piles on the S end of the bank extending off the S end of the key, marks the entrance to the pass. The mean range of tide is 3.4 feet at Indian Key.

**Everglades City,** about 0.5 miles above the mouth of the Barron River, is the tourist center for **The Everglades National Park.** It is also a center for sport and some commercial fishing in **The Everglades** and the offshore waters of the Gulf. It is 3 miles by road, on State Route 29, from the Tamiami Trail (U.S. Route 41), the main highway across The Everglades from Miami to Tampa.

The town has several fish packing plants. Small-craft facilities at Everglades City can provide berths with electricity, gasoline, diesel fuel, water, ice, marine supplies, dry open and covered storage, and hull, engine, and electronic repairs. A fixed marine hoist that can handle boats up to 28 feet is available at the marina just below the bridge near the head of navigation on the Barron River. This facility is accessible to boats drawing a reported 3 feet. A mile-long section along the bulkheaded E side of the river is used for berthing. Several launching ramps are available along the waterfront.

Local fishing guides will act as pilots for The Everglades and adjacent waters of the Gulf.

The mean range of **tide** is 2.0 feet at Everglades City.

**Storm warning signals are displayed.** (See charts.)

**West Pass,** 2.8 miles NW from Indian Key, extends generally NE for 3 miles from the N side of **Tiger Key** to **West Pass Bay.** A draft of 2 feet can be taken to West Pass Bay, thence E into Chokoloskee Bay and SE to Barron River and Everglades City. West Pass is unmarked.

**Fakahatchee Pass,** 4 miles NW from Indian Key, extends NE for 3 miles from the W side of **Round Key** to **Fakahatchee Bay. Fakahatchee** is a small settlement on an island on the S side of the bay on which there are several seasonal cottages. No supplies are available.

**Cape Romano** is the S end of a large island 78 miles N from Key West. Here the coast changes its trend from NW by W to NNW.

N of Cape Romano deep water approaches the coast much more closely than it does S of the cape, and the coast is quite regular in outline although broken by many small inlets. The 12-foot

curve is less than 0.5 mile offshore except at the entrances to some of the passes. The mouths of the passes are usually small and difficult to recognize unless close to shore. These passes are subject to change, developing and filling in rapidly, making local knowldege mandatory. There are several prominent apartments and hotels along the beach on the W side of Marco Island. Readily identifiable are the light at Big Marco Pass, and the pier, buildings, and water tank at Naples.

**Cape Romano Shoals,** extending 10 miles S from the cape, are a series of irregular patches that bare in places near the shore and have depths of 1 to 20 feet over them farther off. A lighted bell buoy marks the S end of the shoals. There is a strong current around the shoals, particularly on the seaward side and during spring tides. The mean range of **tide** at Cape Romano is 2.6 feet. The flood current sets S and the ebb N. In 1971, it was reported that the character of Cape Romano Shoals appeared to be changing and that in some areas lesser depths than those charted may exist. It was further reported that breakers were observed, and that shoaling to as much as 10 feet less than the charted depths was found in about 25°50′00″ N., 81°42′18″W., and 25°46′21″N., 81°42′55″W. Mariners are advised to exercise caution in this area.

A privately marked fish haven, with a minimum depth of 15 feet, is 6.1 miles WNW from Cape Romano.

**Gullivan Bay** is between Cape Romano and the islands to the E. At the head of the bay is **Coon Key,** which marks the S approach to Goodland, Big Marco River, and also the route W to Caxambas Bay. On the approach from SE, **Coon Key Light** (25°52.9′N., 81°37.9′W.), 22 feet above the water and shown from a white triangular pyramidal slatted structure on piles, can be seen from 5 miles off. As Coon Key is neared, the land behind becomes visible, but the key stands well above everything in the vicinity. When nearly up to the key, the entrance to Big Marco River is seen to E as a narrow gap between the more distant keys. The mean range of **tide** is 2.6 feet at Coon Key.

**Caxambas Pass,** 4 miles NW of Cape Romano, was closed by a sandbar across the entrance in 1964. However, it was reported in 1965 that local fishermen and party boats used the pass at or near high water through a narrow twisting channel which is unmarked. Small craft should use extreme caution in the vicinity of the pass because of an unmarked row of piles mostly submerged; these are the remains of an old jetty which extends from the S point of the entrance.

**Big Marco Pass,** 8 miles N from Cape Romano, was considered unsafe for navigation due to shoaling in 1973, and the aids to navigation were removed. The channel over the bar is subject to continual change. Shoals extend a mile seaward on either side of the channel, and these are usually indicated by breakers or discolored water. Fish havens covered by 20 to 23 feet and marked by private unlighted buoys are located about 1.7 to 2.7 miles S of the former entrance to Big Marco Pass. **Capri Pass,** about 0.5 mile N of Big Marco Pass, is used by boatmen to gain entrance to inland waters that were formerly entered through Big Marco Pass. In 1974, shoaling to an unknown extent was reported in the pass. Local knowledge is advised. The aids marking Capri Pass are continuously being moved and/or discontinued to mark the best water.

**Big Marco River** trends E and then S for about 11 miles from Big Marco Pass to Gullivan Bay, and affords a through passage behind Cape Romano. The controlling midchannel depth is about 4 feet, except for reported shoaling to an unknown extent immediately NW of, and, in 1974, SE of the fixed highway bridge, about 2.5 miles above Big Marco Pass and about 6.5 miles from Gullivan Bay; boats with more than 2-foot draft are urged to exercise caution in this area. The channel, though narrow and crooked, is well marked by daybeacons. The approach from Gullivan Bay is over a shoal with a depth of 4 feet and is marked by Coon Key Light. This approach is protected from all directions except SE to SW, and any sea from those directions is reduced by the wide expanse of gradually shoaling water. Local knowledge of conditions is necessary to carry the best water through the channel.

The highway bridge over Big Marco River, 3 miles N of Coon Key, has a swing span with a clearance of 8 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) The overhead power cable above the bridge has a clearance of 57 feet. In 1973, a fixed highway bridge with a design clearance of 55 feet was under construction adjacent to the swing bridge. A fixed highway bridge with a clearance of 55 feet crosses the river about 2.5 miles E of Big Marco Pass. An overhead power cable with a clearance of 65 feet at the center span and 55 feet reported elsewhere is close W of the bridge.

**Marco Island,** a large island situated between Caxambas Bay, Big Marco Pass, and Big Marco River, has for the most part been developed as a residential year-round community. Canals have been dredged and the marshland backfilled to provide for waterfront homesites. In April 1972, numerous homes and apartments had been built, and construction was continuing.

**Collier City,** at the S end of the island, has been for the most part abandoned and the property taken over by the Marco Island developers.

**Goodland** is a small fishing village and winter resort on Big Marco River at the E end of Marco Island. Several fish wharves are at the village. Small-craft facilities here can provide gasoline, water, ice, marine supplies, dry storage, and engine and hull repairs for small trailered craft. Local fishing guides are available and will act as pilots for the waters.

**Marco** is a small settlement at the N end of Marco Island on the S side of Big Marco River 1 mile from the light in Big Marco Pass. The town is known locally as **Old Marco Village.** It has several marinas. Berths with electricity, gasoline, diesel fuel, water, ice, marine supplies, and launching ramps are available. Mobile hoists up to 16 tons are available for handling craft for hull and engine repairs. Local fishing guides act as pilots for the adjacent waters.

A **special anchorage area** for small craft is on the S side of the river at Marco. (See 110.1 and 110.74, chapter 2, for limits and regulations.)

State Routes 92 and 951 connect all parts of Marco Island with the Tamiami Trail about 11 miles inland.

**Collier Bay** enters Big Marco River from the S of Old Marco Village. In April 1972, it was reported that 5 feet could be taken through the entrance.

**Isles of Capri** is a year-round community on three interconnected islands at the head of Big Marco Pass opposite Old Marco Village and is connected by State Route 951 with the Tamiami Trail. Marinas are on the S side of Johnson Bay. Berths with electricity, gasoline, water, ice, and marine supplies are available. A marine railway that can handle craft up to 25 feet for hull, engine, and electronic repairs is available. Local-fishing guides act as pilots for the adjacent waters of the Gulf, the bay, and channels. In April 1972, it was reported that 2 feet could be carried through Johnson Bay from the marinas at Isles of Capri to the inside passage to Naples with local knowledge.

**Routes.**-Approaching Big Marco River from Gullivan Bay, a course of **325°** from a position 0.3 mile NE of Coon Key Light leads between the N end of Coon Key and Big Marco River Daybeacon 2. Then follow the daybeacons. After passing through the draw of the highway bridge, head NNE for 100 yards before heading N along the main channel. From the light in Big Marco Pass, follow the channels buoys to the lighted buoy off the pass, but be guided by breakers and discolored water.

An inside passage extends about 11 miles N from Marco to Naples through creeks, bays, and dredged landcuts. The waterway is well marked by lights and daybeacons. In February 1970, the controlling centerline depth was 4 feet.

**Hurricane Pass** 1.5 miles N from Big Marco Pass, was reported closed in April 1972. In 1969, a submerged pile was reported in the approach to Hurricane Pass in 25°59′42″N., 81°45′02″W.

**Little Marco Pass** 3 miles N of Big Marco Pass, had a reported depth of 4 feet over the bar in 1967. The pass is unmarked and is little used.

**Gordon Pass,** 16.5 miles N of Cape Romano, is the entrance to Naples Bay and also the N entrance to the inside passage and numerous waterways that traverse the area known as the Ten Thousand Islands, which extends along the lower Gulf Coast from Naples to Cape Sable, including Everglades National Park. A dredged channel leads from the Gulf of Mexico through Gordon Pass, thence N to the highway bridge at Naples about 2.5 miles above Gordon Pass. In 1973, the midchannel controlling depth was 6 feet through the entrance channel, thence 10 feet on the centerline to just below the highway bridge at Naples. **Gordon Pass Lighted Buoy 1** (26°05.5′N., 81°48.7′W.), marks the entrance. The channel is marked by lights and daybeacons.

**Naples** 2.5 miles N of Gordon Pass, is a large year-round tourist center on Naples Bay and the outer Gulf Coast. It has a sizable fishing industry, an airport, and a modern hospital. It is on the Tamiami Trail and served by the freight service of the Seaboard Coast Line Railroad. Canals have been dredged and the former marshland backfilled to form waterfront homesites in the areas of **Port Royal** at the S end of the city, **Royal Harbor** on the E side of Naples Bay, and **The Moorings** at the N end of the city.

A tall water tank, a microwave tower just N of the water tank, and numerous hotels and apartment houses are prominent in Naples from offshore. The kiosk of the 1,000-foot municipal fishing pier is prominent inshore.

There are several boatyards and marinas on Naples Bay. A large municipal yacht basin is in **Crayton Cove.** The small-craft facilities can provide berths with electricity, gasoline, diesel fuel, water, ice, marine supplies, launching ramps, dry open and covered storage, and hull, engine, and electronic repairs. The largest marine railway in the area can handle craft up to 70 feet or 70 tons; mobile lifts up to 50 tons are also available. There is a **dockmaster** at the municipal yacht basin who assigns berths and enforces the regulations.

Few craft go above U.S. Route 41 (Tamiami Trail) highway bridge at the head of the harbor, which has a 29-foot fixed span with a clearance of 6 feet. Taxi and interstate bus lines and railroad serve the city.

**Storm warning signals are displayed.** (See the charts.)

**Doctors Pass,** locally known as **Mooring Pass,** about 5 miles N of Gordon Pass, has been privately dredged. The entrance is protected by two stone jetties. In May 1972, the controlling depth through the unmarked entrance channel was reported to be 3 feet with deeper depths in the various basins. Large apartment buildings on either side of the entrance are prominent. Many large homes are N and S of the pass and around the shores of **Mooring Bay , Bowline Bay,Compass Cove,** and **Hurricane Harbor** inside the entrance.

**Charts 11429 (1254), 11426 (1255), 11430 (642-SC).-Clam Pass** about 5 miles N of Naples, is shoal and used only by outboards in good weather.

**Charts 11426 (1255), 11427 (856-SC).-Wiggins Pass** 4 miles N of Clam Pass, is shoal and used

only by small craft entering **Cocohatchee River** and the chain of lagoons and inland waterways that lead N to the passes in Estero Bay. Fuel and various services are available at several small marinas and fish camps along these waterways.

A highway leads along the coastal beach from **Bonita Beach** on **Little Hickory Island** and crosses Big Hickory Pass on a bridge with a 40-foot fixed span with a clearance of 10 feet. In May 1972, there was reported to be 1½ feet in Big Hickory Pass and 3 to 10 feet in the lagoons and waterways.

A microwave tower, about 7 miles inshore between Wiggins Pass and Big Hickory Pass, is reported to be prominent. The tower, 715 feet high, is marked at the top by a red aircraft light.

There are several marinas and fishing camps on the N and S sides of the bridge over Big Hickory Pass. Berths with electricity, gasoline, water, ice, provisions, marine supplies, a launching ramp, and hull and engine repairs are available at these facilities. Stakes mark the channels leading N through Estero Bay to Big Hickory Pass, New Pass, and Big Carlos Pass.

The highway continues N from Big Hickory Pass over causeways on the islets in the S end of Estero Bay with bridges over New Pass, the pass just N of Big Hickory Island, and Big Carlos Pass. The bridge over New Pass has a clearance of 30 feet, and the one over the entrance to the lagoon on the E side of **Black Island** has a 30-foot fixed span with a clearance of 10 feet. An overhead power cable with a clearance of 36 feet crosses the entrance to the lagoon just W of the bridge.

In May 1972, there was reported to be a depth of 4 feet in **New Pass** and in the channel leading S to the marinas and fish camps near Big Hickory Pass. Stakes mark the channel.

**Charts 11427 (856-SC), 11426 (1255).-San Carlos Bay,** 41 miles NNW from Cape Romano, is largely filled with shoals on which the depths vary between 1 and 6 feet, and is of importance chiefly as the approach to Caloosahatchee River. The bay and adjacent waters are frequented mostly by small vessels and yachts, and are popular with tourists and fishermen during the winter.

**Sanibel Island Light** (26°27.2'N., 82°00.9'W.), 98 feet above the water, is shown from a 102-foot brown square pyramidal skeleton tower enclosing a stair cylinder on **Point Ybel**, the E end of **Sanibel Island.**

**Caloosa Lighted Bell Buoy 2** (26°24.3'N., 81°57.5'W.), about 4 miles SE of Sanibel Island Light, marks the entrance to San Carlos Bay.

**Boundary lines of inland waters.**-The lines established for San Carlos Bay and tributaries are described in 82.65, chapter 2.

**Channels.**-A dredged channel leads from the Gulf of Mexico through San Carlos Bay to Punta Rassa and the mouth of the Caloosahatchee River. In 1965, the controlling depth was 12 feet from the Gulf to Punta Rassa. Lights, daybeacons, and buoys mark the channel.

**Estero Pass** opens into the E end of San Carlos Bay, 2.5 miles from Sanibel Island Light. Small vessels can find secure anchorage just inside the pass. A dredged channel, marked by lights, daybeacons, and buoys, leads from San Carlos Bay through Estero and Matanzas Passes to the upper shrimp terminals on San Carlos Island. In July-August 1972, the controlling depth in the dredged channel was 9½ feet.

The highway bridge that connects Fort Myers Beach, on **Estero Island** with **San Carlos Island,** and with the Tamiami Trail, on the mainland, has a swing span with a clearance of 8 feet. (See 117.432a, chapter 2, for drawbridge regulations and opening signals.)

There are extensive small-craft facilities in the vicinity of the bridge, which connects the N end of Estero Island with San Carlos Island. Berths with electricity, gasoline, diesel fuel, water, ice, marine supplies, launching ramps, and hull, engine, and electronic repairs are available. A boatyard in the cove just E of the bridge has a marine railway that can handle craft up to 55 feet. Another boatyard, 0.3 mile E of the bridge, repairs shrimp boats.

A marina at the NW end of the bridge connecting San Carlos Island with the mainland has berths with electricity, gasoline, water, ice, and marine supplies. The marina has a 40-foot marine railway and a 35-ton mobile hoist for handling craft for hull and engine repairs. A channel, privately marked by poles, leads E from the vicinity of Light 9 to the marina. In 1972, the channel had a reported controlling depth of 4 feet, but local knowledge was recommended.

A channel, privately marked by daybeacons, leads SE between San Carlos Island and Estero Island, through Matanzas Pass to Big Carlos Pass. In May 1972, the reported midchannel controlling depth was 3½ feet; caution should be observed in navigating this channel. Drafts up to 4 feet can be carried through Big Carlos Pass with local knowledge. In May 1972, shoaling was reported to have developed across much of the pass; the SE side of the entrance should reportedly be favored. There are no navigational aids across the shoal waters outside the pass.

A highway bridge with a 50-foot bascule span crossing Big Carlos Pass from Carlos Point to Black Island has a clearance of 23 feet at the center. (See 117.240 and 117.245 (a) through (e) and (i)(2a), chapter 2, for drawbridge regulations and opening signals.)

A marina on Carlos Point just N of the bridge has berths, gasoline, diesel fuel, water, and ice. In May 1972, there was reported to be 5 feet in the approach and at the berths.

About a mile NW of the bridge, a 2,100-foot privately dredged cut, 150 feet wide with several canals branching off from it, leads to a basin 500 feet long and 200 feet wide. In May 1972, there were reported depths of 20 feet in the cut and 15 feet in the basin. A marina in the basin has berths

with electricity, gasoline, water, and a launching ramp. Diesel fuel can be obtained by truck on short notice.

**Fort Myers Beach,** on Estero Island, is a winter resort with numerous small-craft facilities. A good highway leads to Fort Myers and connects with the highway leading to Sanibel Island toll bridge. Small-craft facilities were covered previously.

**Storm warning signals are displayed.** (See charts.)

The U.S. Public Health Service maintains a **contract physician's office** in Fort Myers Beach. (See appendix for address.)

**Punta Rassa,** on the E side of San Carlos Bay and 2 miles N of Sanibel Island Light, has a small settlement on the point, and a marina where berths with electricity, gasoline, water, marine supplies, open and covered dry storage, and launching ramps are available. The marina has a 3½-ton forklift that can handle craft up to 23 feet for hull and engine repairs and storage. In May 1972, the reported controlling depth in the approach to the marina was 3 feet with 4 to 6 feet alongside.

**Storm warning signals are displayed.** (See charts.)

**Sanibel Island Causeway** and toll bridge crossing San Carlos Bay from Punta Rassa to Sanibel Island has three bridges over the channels. Bridge "A," the easternmost, over the main channel has a bascule span with a clearance of 26 feet at the center. Bridge "B" about the middle of the causeway has a 48-foot fixed span with a clearance of 9 feet. Bridge "C" over Sanibel Island Channel at the W end has a fixed span with a clearance of 26 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

**Sanibel Island Channel** along the NE side of Sanibel Island from Point Ybel to Pine Island Sound, in July 1966, had a midchannel controlling depth of 9 feet. The channel is marked by a light and daybeacons.

A marina in the basin about a mile W of Point Ybel has berths with electricity, gasoline, diesel fuel, water, ice, marine supplies, and a launching ramp. Engine repairs can be made. In May 1972, there was reported to be 5 feet in the approach channel and 3 to 4 feet in the basin.

**Anchorages.**-Vessels with drafts too deep to enter San Carlos Bay can obtain good anchorage in depths of 15 to 25 feet, sticky bottom, 3 to 4 miles SE of Sanibel Island Light. With N winds there is good anchorage in depths of 16 to 24 feet under the lee of the S end of Sanibel Island, with the light bearing anywhere between NE and N by W. The anchorage off Punta Rassa is good, but the tidal currents have considerable velocity at times. There is good anchorage along the NE shore of Sanibel Island W of the light; the currents have considerable velocity, but spots of good holding ground can be found. Excellent anchorage is available off St. James City in depths of 12 to 18 feet, good holding ground; the tidal currents have less velocity at this anchorage than at any of the others in San Carlos Bay. Fishing craft find storm anchorage in Tarpon Bay.

**Tides and currents.**-The diurnal range of tide is 2.6 feet at Point Ybel and about 2.4 feet in Pine Island Sound. The average velocity of the current is 1.0 knot in San Carlos Bay off Point Ybel.

**Chart 11427 (856-SC).**-The **Caloosahatchee River** flows generally SW from its source in Lake Okeechobee and empties into San Carlos Bay at Punta Rassa. The river has an average width of about a mile to a point 3 miles above Fort Myers, and then narrows to little more than the width of the channel which has been dredged to Lake Okeechobee.

A dredged channel, part of the Okeechobee Waterway, leads from Punta Rassa to Fort Myers. The channel is well marked by lights, daybeacons, and ranges. In 1965, the controlling depth was 10 feet.

The diurnal range of tide in Caloosahatchee River is 2.4 feet at Punta Rassa and 1.2 feet at Fort Myers.

The dredged channel leading from the entrance of the Caloosahatchee River SW to Pine Island Sound is part of the Intracoastal Waterway to Brownsville, Tex., which is discussed in chapter 12.

**Port Comfort** in **Punta Rassa Cove** has a boatyard and marina. Berths with electricity, gasoline, diesel fuel, water, ice, marine supplies, open and covered storage, and a launching ramp are available. A 26-ton mobile hoist can handle boats up to 55 feet for hull, engine. and electronic repairs, and storage. The controlling depth in the privately marked channel to the marina was reported to be 4 feet in May 1972.

**Storm warning signals are displayed.** (See chart.)

**Shell Point Village,** about 250 yards SSE of **Shell Point,** is a large apartment development. A marina here has berths with electricity, gasoline, diesel fuel, and water. A privately marked channel with a reported controlling depth of 7 feet, in 1972-1973, leads from the Okeechobee Waterway to the marina.

**Little Shell Island,** on the N side of the river channel opposite Shell Point, has a pier; a snack bar and water are available. The controlling depth to and alongside the pier was reported to be 5 feet in May 1972.

**Iona Cove,** on the S side of the river and 1 mile above Shell Point, is the site of a small repair yard and boat basin with storage accommodations for 50 boats. Open and covered berths with electricity, gasoline, diesel fuel, water, ice, marine supplies, and a launching ramp are available. A marine railway at the basin can handle vessels up to 36 feet for hull, engine, and electronic repairs. In May 1972, there were reported depths of 3½ feet in the approach channel and 4 feet in the basin. The approach channel is marked by private markers; a

private lighted marker is at the facility. In 1971, a shoal area, bare at low water, was reported just N of the approach channel in about 26°31′14″N., 81°58′49″W.

**Cape Coral,** the extensive canalized area NW of **Redfish Point** on the N side of the river 7 miles above the mouth, is the site of a large year-round community. A white golf-ball-shaped tank (26°34.0′N., 81°57.9′W.) at Cape Coral is prominent.

A privately marked channel, which had a reported controlling midchannel depth of 6 feet in May 1972, leads to the basin and marina of the Cape Coral Yacht and Racquet Club just W of Redfish Point. There was 4½ to 13 feet in the basin and lagoons of the development. Berths with electricity, gasoline, water, ice, marine supplies, and launching ramps were available in the basin. Craft up to 28 feet can be handled with forklifts or cranes for hull and engine repairs, or storage.

In May 1972, there was reported to be 2 feet in the privately marked channel leading to the W entrance to the lagoons at the W half of the Cape Coral developments.

**Deep Lagoon,** across the river from Cape Coral, provides good anchorage and moorings for drafts up to 7 feet. In May 1972, the controlling depth in the privately marked channel leading to the lagoon had a reported depth of 6 feet. Two marinas are on the lagoon. Berths with electricity, gasoline, diesel fuel, water, ice, marine supplies, and launching ramps are available. Hull and engine repairs can be made. A lift here can handle craft up to 27 feet or 6 tons.

The highway bridge (Cape Coral Bridge) crossing Caloosahatchee River from Negro Head to Cape Coral has a fixed span with a clearance of 55 feet at the center.

**Whiskey Creek,** on the SE side of the river 10 miles above the mouth, has a privately marked channel with a reported depth of 2 feet in May 1972. A housing development borders the creek, but there are no marine facilities. A fixed highway bridge, with a clearance of 12 feet at the center, crosses the creek about 0.1 mile above the mouth. An overhead power cable crossing the creek at the bridge has a clearance of 32 feet.

**Waterway Estates** is a community on the W side of the river opposite Fort Myers, about 2 miles SW of the Edison Memorial Bridge. Lagoons have been dredged to provide waterfront homesites. A channel leading to a basin and marina had a reported depth of 4 feet in May 1972, with 3 to 5 feet in the basins and lagoons. Berths with electricity and gasoline were available at the marina which, in May 1972, was being operated only part time.

**Hancock Creek,** on the W side of Caloosahatchee River across from Fort Myers, leads to a housing development a mile upstream. In May 1972, the channel had a reported controlling midchannel depth of 3 feet and was well marked by private daybeacons. A highway bridge, 0.6 mile above the mouth, has a 18-foot fixed span with a clearance of 5 feet.

**Fort Myers,** on the SE side of Caloosahatchee River 14 miles above the mouth, is the commercial center for this part of the State. The city is served by the Seaboard Coast Line Railroad and is on the Tamiami Trail which connects Tampa and Miami. Other State highways lead to West Palm Beach and to Punta Rassa. Fort Myers has a municipal airport, a hospital, and some fishing, canning, and manufacturing industries. The U.S. Public Health Service maintains a **contract physician's office** in Fort Myers. (See appendix for address.)

**Weather.**–Fort Myers has a climate characterized as subtropical, with potential temperature extremes of both summer and winter safely checked by the tempering marine influence of the Gulf.

The annual average temperature is near 74°F. with monthly averages ranging from the low sixties in January to the low eighties in the summer. Winters are mild, with many bright, warm days and moderately cool nights. From November to March, maximum temperatures average in the middle or high seventies, and minima in the middle or low fifties. Occasional cold snaps bring temperatures in the thirties, but only occasionally does the temperature drop below 32°F. and on rare occasions into the twenties. Frost occurs in the farming areas on only a few occasions each year, and usually is light and scattered and confined to the colder pockets. In the summer, maxima average in the low nineties from June through the first part of September, with daily maxima of 90°F. or higher on over 80 percent of the days. Maxima have reached 100°F., but these occurrences are very rare.

Rainfall averages over 50 inches annually, with the heaviest falls during the summer. From June through September the average is over 8 inches per month. In the drier half of the year the monthly average is less than 2 inches for November through January and a little over 2 inches for February through April. There are frequent long periods during the winter when only very light, or no rain falls. Most rain during the summer occurs in late afternoon or early evening thundershowers, which cool off the atmosphere on hot summer days. These showers, while yielding large amounts of rain that build up the averages, seldom last long, except during the late summer or fall when tropical storms or hurricanes pass near the Fort Myers area. These may result in heavy downpours that may reach torrential proportions. Twenty-four-hour amounts of from 6 to over 10 inches may occur. There has been one case of snow being officially observed, a trace in February 1899.

The prevailing wind direction is E, and, except during the passage of tropical storms, high velocities are not experienced. During winter and spring there are usually a few days with 20 to 30 m.p.h. winds and thunderstorms are sometimes accom-

panied by strong gusts for brief periods. Winds approximating 100 m.p.h. have been experienced with the passage of hurricanes during the fall. The chance of a hurricane visiting the area in any given year is about 1 in 12.

Thunderstorms have occurred during every month, but are infrequent from November to April. From June through September they occur on 2 out of every 3 days on an average, and as a general rule, in the late afternoons or early evenings. Heavy fog is rather infrequent, occurring mostly in winter during the early mornings, and that mostly as shallow ground fog that burns off rapidly after sunrise. There is seldom a day in which the sun does not shine at some time.

Relative humidity is high during the night, averaging from 80 to 90 percent, dropping off to an average from 50 to 60 percent in the middle of the day.

The National Weather Service has an office in Fort Myers; **barometers** may be compared here or by telephone. (See appendix for address.) **Storm warning display** locations are listed on NOS charts and shown on the Marine Weather Services Charts published by the National Weather Service.

(See page T-1 for the Fort Myers **climatological table.**)

**Small-craft facilities.**-There are numerous small-craft facilities on both sides of the Caloosahatchee River in the vicinity of Fort Myers. Berths with electricity, gasoline, diesel fuel, water, ice, marine supplies, launching ramps, wet and dry storage, and hull, engine, and electronic repairs are available.

The largest marine railway, 0.7 mile E of Edison Memorial Bridge, can handle vessels up to 100 feet for hull, engine, and electronic repairs. The boatyard has four marine railways, machine shops, and builds wood and steel vessels. Berths with electricity, gasoline, diesel fuel, water, and marine supplies are available. In 1963, the midchannel controlling depth in the privately marked channel leading to the boatyard was 8 feet, with 8 to 12 feet at the piers.

**Fort Myers Municipal Yacht Basin** is between the Edison Memorial Bridge and the fixed highway bridge 0.4 mile SW of it. In May 1972, the controlling depth in the approach channel was reported to be 10 feet with 7½ feet, in 1963, within the protected basin. Excellent berths with electricity, gasoline, diesel fuel, water, ice, marine supplies, and a launching ramp are available. Engine and electronic repairs can be made. A **dockmaster** is in attendance to assign berths and can be reached by telephone (day, 813-334-1285; night, 813-334-0456). In May 1972, construction was started on an adjoining 156-berth municipal marina just E of the existing facility.

Local fishing guides can be obtained as pilots for the adjacent waterways and the Gulf.

**Edison Memorial Bridge,** which crosses Caloosahatchee River at Fort Myers, has a bascule span with a clearance of 10 feet at the center and 6 feet at the fenders. (See 117.462, chapter 2, for drawbridge regulations and opening signals.)

U.S. Route 41 (Tamiami Trail) highway bridge crossing the river about 0.4 mile SW of Edison Memorial Bridge has a fixed span with a clearance of 55 feet at the main channel.

About 0.9 mile and 1.7 miles above the Edison Memorial Bridge, overhead power cables with clearances over the main channel of 75 and 80 feet, respectively, cross the river.

The **Okeechobee Waterway** is a shallow-draft passage across Florida by way of Caloosahatchee River, Lake Okeechobee, St. Lucie River, and the connecting canals. The Federal project for the waterway provides for a channel 8 feet deep from Fort Myers to the Intracoastal Waterway near Stuart. Controlling depths are given in Local Notice to Mariners. (See **United States Coast Pilot 4, Atlantic Coast, Cape Henry to Key West,** for detailed description of the waterway.)

The section of the Intracoastal Waterway from Caloosahatchee River, Fla., to Tampa Bay passing through the waters described in this chapter and places along its route is discussed in chapter 12.

**Charts 11427 (856-SC), 11426 (1255).-Matlacha Pass** is a shallow body of water extending N from San Carlos Bay to Charlotte Harbor between Pine Island and the mainland. The pass is navigable for drafts of 2 to 3 feet, but the channel, reportedly marked by private pilings, is narrow and crooked and has numerous oyster bars. This channel is not recommended without local knowledge as the hydrography in Matlacha Pass is from surveys made before 1900.

About 4 miles above the entrance, the pass is crossed by an overhead power cable with a clearance of 32 feet. State Route 78 highway bridge from Pine Island to Little Pine Island and to the mainland has a bascule span with a clearance of 9 feet. (See 117.240 and 117.245 (a) through (e) and (i), (2-b), chapter 2, for drawbridge regulations and opening signals.) Overhead power cables just above and below the bridge have a least clearance of 56 feet. Gasoline and oil can be obtained at the small piers near the bridge.

The coast from San Carlos Bay trends NNW to Boca Grande, the entrance to Charlotte Harbor. The barrier islands of Sanibel, Captiva, North Captiva, and Cayo Costa are separated from the large Pine Island to the E by Pine Island Sound.

**Sanibel Island** is a 10-mile hook-shaped island almost tropical in climate and vegetation. A large portion of the island is part of the U.S. Department of Interior J.N. "Ding" Darling National Wildlife Refuge. (See chapter 12.)

**Blind Pass** separates Sanibel Island from **Captiva Island.** The pass is unmarked and subject to change, and has a controlling depth of only 1 foot. A highway bridge over the pass has a 33-foot fixed span with a clearance of 8 feet. There is a fish

camp at the bridge where water and ice are available.

**Redfish Pass** leads into Pine Island Sound from the Gulf between Captiva Island and **North Captiva Island.** This channel is winding and difficult, with frequent changes in depth and position. Fishing boats frequently use the pass.

**Captiva Pass,** leads from the Gulf into Pine Island Sound between North Captiva Island and **Cayo Costa,** is used to some extent by small fishing vessels. The channel is unmarked and subject to change, and local knowledge is required to carry the best water. The pass has about 6 feet of water. Fair anchorage is available for small boats in **Safety Harbor,** which is 0.5 mile S of Captiva Pass and on the inner side of North Captiva Island. The depth in the harbor is about 5 feet, but only small craft drawing less than 4 feet can enter. The holding ground is good, and the anchorage is well protected from all directions.

**Charts 11425 (857-SC), 11426 (1255).-Charlotte Harbor,** about 60 miles SSE from Tampa Bay, is the approach to Port Boca Grande, Boca Grande, Punta Gorda, and several smaller settlements. On the S side Charlotte Harbor opens into Pine Island Sound and on the N side into Gasparilla Sound, which are described in chapter 12 in connection with the Intracoastal Waterway. Matlacha Pass, on the S side, has been described earlier in this chapter.

**Port Boca Grande** on the inner side of the S end of Gasparilla Island is an important phosphate rock shipping port. The town of **Boca Grande** is about 2 miles to the N.

**Prominent features.**-In the approach to the entrance from the S or SW, the first object sighted in daytime should be **Boca Grande Entrance Range Rear Light** (26°44.5'N., 82°15.8'W.), 1.5 miles from the S end of Gasparilla Island. The light, 105 feet above the water, is shown from a white hexagonal pyramidal skeleton tower, enclosing a stair cylinder. A red sector in the light from 001° to 045° covers the shoals W of Cayo Costa S of the entrance.

Upon closer approach, the loading transporter at Port Boca Grande, and two buff-colored storage tanks, both about 0.4 mile N of the end of the island, will be seen. Two silver-colored water tanks and a microwave tower at the town of Boca Grande also are prominent. **Port Boca Grande Light** (26°43.0'N., 82°15.6'W.), 58 feet above the water, is shown from a black and white checkered diamond daymark on a white skeleton tower on the S end of the island.

**Boundary lines of inland waters.**-The line established for Charlotte Harbor is described in 82.70, chapter 2.

**Vessels should approach the harbor through the Charlotte Safety Fairway.** (See 209.135, chapter 2.)

**Channels.**-The Federal project for Charlotte Harbor provides for a channel 32 feet deep from deep water in the Gulf to Port Boca Grande. (See Notice to Mariners and latest edition of the charts for controlling depths.) The channel is marked by a **036°** lighted range and other aids to navigation.

A dredged channel leads from deep water at Port Boca Grande across Charlotte Harbor to a turning basin at the Municipal Terminal, 0.9 mile below the highway bridge at Punta Gorda. The channel is marked by lights, daybeacons, and buoys. In 1967-68, the controlling depth was 9 feet from Port Boca Grande to Punta Gorda Light 2, thence 6 feet to the Municipal Terminal at Punta Gorda.

A break in the shoal on the N side of the channel near the S end of Gasparilla Island forms a swash channel which was reported to have a controlling depth of 8 feet in May 1972. The best water in this swash channel is about 150 yards off the point, using the end of the fishing pier as a guide. Local craft also cross the shoal on the N side of the channel between Boca Grande Entrance Front Range Light and the Inner Channel Front Range Light. In May 1972, it was reported that about 7 feet could be carried across the shoal with local knowledge; however, this area is subject to frequent change.

**Anchorages.**-The best anchorage in Charlotte Harbor for large vessels is in depths of 20 to 40 feet at the inner end of the entrance channel; the holding bottom is good. This is the anchorage used by vessels while waiting for loading berths at Port Boca Grande. The anchorage affords excellent shelter from all winds, and is used as a harbor of refuge by coasting vessels and others. Vessels finding it necessary to anchor before entering the harbor do so in the vicinity of the entrance buoy in 35 feet or more of water. Small vessels can anchor almost anywhere in Charlotte Harbor. Good depths for small craft can be found close inshore between Port Boca Grande and Boca Grande. Small craft also can use the lagoon at Boca Grande.

**Tides and currents.**-The diurnal range of tide in the harbor is about 1.8 feet, but the variations in the water surface due to the force and direction of the wind are as much as 4 to 5 feet, at times. The tidal currents in the entrance channel average 2.2 knots at strength. The ebb current, which is said to attain occasionally an extreme velocity of 3 to 4 knots, depending also upon the force and direction of the wind. In the harbor channel between Cape Haze and the N end of Pine Island, the average velocity of the current is 0.5 knot. In Matlacha Pass at Little Pine Island bridge the current floods to the SE with an average velocity of 0.6 knot; the ebb current is weak and variable. To the N at the Myakka River bridges the current floods to the NW and ebbs to the E with an average velocity of about 0.5 knot. In Peace River the current floods to the NE and ebbs to the SW with an average velocity of about 0.4 knot at strength. Predictions of the current at several places in Charlotte Harbor may be obtained in the Tidal Current Tables.

**Storm warning signals are displayed.** (See chart.)

**Pilotage** is compulsory for all foreign vessels and U.S. vessels under register in the foreign trade. Pilotage is optional for U.S. coastwise vessels that have on board a pilot licensed by the Federal Government for these waters, however, most commercial vessels take a pilot. Pilots board vessels off Charlotte Harbor Entrance Lighted Bell Buoy 2 (26°39.8'N., 82°19.6'W.), and take vessels in day or night if a berth is available. The pilot boat is a 41-foot wooden hulled boat with a white hull and superstructure and buff deck with the word PILOT in black on the bow, and is equipped with portable radiotelephones. The pilots carry portable radiotelephones. The pilots monitor VHF-FM channels 16 (156.80 MHz), 13 (156.65 MHz), and 12 (156.60 MHz) when vessels are expected. Pilots can be obtained by prior notice by radiotelegraph or by radiotelephone through the Tampa Marine Operator; telephone (813-964-2245 or 813-964-2252), or through the ships' agents.

**Towage.**-A small tug is available for light towing jobs.

**Quarantine, immigration,** and **agricultural quarantine** officials are stationed in Tampa, Fla., **customs** officials at Boca Grande. (See appendix for addresses.) Vessels subject to such inspections generally make arrangements in advance through the ship's agents; officials usually board vessels at their berths.

**Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Boca Grande is a **customs port of entry.**

**Wharves.**-The 300-foot T-head phosphate loading pier is 0.2 mile N of Port Boca Grande Light. Phosphate rock can be loaded by conveyor at the rate of about 1,000 tons per hour. A 225-foot T-head petroleum pier is about 0.1 mile S of the phosphate pier. There is reported to be 31 feet alongside the phosphate pier and 33 feet alongside the petroleum pier. Caution should be exercised in coming alongside the piers because of the possibility of strong current eddies.

**Supplies.**-Bunker fuels are not available locally. Limited amounts of gasoline, provisions, and marine supplies are available locally; large amounts require advance notice. Unlimited amounts of ice are available on short notice. Fresh water is available at both piers.

**Repairs.**-There are no drydocking or major repair facilities for deep-draft vessels at Port Boca Grande; the nearest such facilities are at Tampa, Fla. Small machine-shop repairs are available locally; larger above-the-waterline repairs using portable equipment are available from the mainland on about 4 hours notice. Divers are available on a few hours notice.

**Communications.**-The Seaboard Coast Line Railroad operates freight service in and out of Port Boca Grande.

**Chart 11426 (1255).-Riviera Lagoons** is a development on Alligator Creek, on the E side of Charlotte Harbor about 14 miles NE of Boca Grande. Lagoons have been dredged to provide waterfront homesites. A marina has berthage in 6 to 7 feet, and, in 1965, there was reported to be 2 feet in the staked channel leading into the creek. Gasoline, diesel fuel, water, ice, and marine supplies are available. There is a launching ramp on which a large trailer can handle craft up to 35 feet for hull and engine repairs, or storage.

**Peace River** empties into the head of Charlotte Harbor from NE. Above Punta Gorda the river is navigable by small outboards with local knowledge as far as Hull, 15 miles above the entrance, but caution is necessary to avoid the snags in the upper reaches. Heavy growths of hyacinth also are found in the upper reaches, which completely block many of the small inlets, bayous, and lakes.

The entrance to the river is marked by a light about 1.7 miles W of **Mangrove Point.** The river channel is marked by a light and daybeacons as far as Long Island just above Cleveland, about 9 miles above the entrance; above that stakes mark the channel.

**Punta Gorda,** a town on the S side of Peace River, 4 miles above the entrance, has rail and highway connections with points to the N and S as well as to the interior of the State. Punta Gorda is a commercial fishing port. The town has a hospital.

Vessels can anchor off Punta Gorda in depths of 6 to 10 feet. A dredged channel leads from the river to the Municipal Terminal at the SW end of town. The channel is marked by lights and daybeacons. In May 1972, it was reported that about 6 feet could be carried to the terminal.

The Municipal Terminal has several seafood processing plants and an oil terminal. Gasoline, diesel fuel, water, and ice are available at the oil terminal on the S side of the pier. In May 1972, 6 feet was reported alongside the S side, with lesser depths along the N side, which was in poor condition. A seafood company has a private shipyard on the N side of the terminal, which has a marine railway that can handle craft up to 75 feet for repairs. It is reported that there is little water in the approaches to the railway, and difficulty may be experienced in handling vessels.

U.S. Route 41 (Tamiami Trail) highway bridge crossing the river at Punta Gorda has a bascule span with a clearance of 13 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) An overhead power cable at the bridge has a clearance of 75 feet. The channel span of the old highway bridge close NE has been removed; the NW section has been retained as a fishing pier and the SE section is in ruins. Mariners are advised not to anchor near the SE section as concrete sections may collapse without warning.

A marina, on the S side of the river about 1 mile NE of the bridge, has gasoline and marine supplies. A privately marked channel, with a reported

controlling depth of about 3 feet in 1972, leads to the marina. Craft up to about 24 feet can be handled on trailers for hull and engine repairs.

**Charlotte Harbor** is a community at the NW end of the bridge. A marina on the W side of the bridge can provide gasoline, water, marine supplies, a launching ramp, and dry storage. Berths are not available. A 2½-ton forklift can handle boats up to 24 feet for hull and engine repairs. In May 1972, there was reported to be 3 feet of water in the approaches. Intercity bus service is available at Punta Gorda. The Seaboard Coast Line Railroad provides freight service.

**Port Charlotte** is a year-round community on Alligator Bay, immediately NW of Charlotte Harbor. It has a hospital, rail freight, and bus connections.

**Cleveland** is a small village on the S side of Peace River 3 miles above Punta Gorda. The only dock along the waterfront is for small boats only and is privately owned. No supplies are available. The natural channel above the highway bridge at Punta Gorda is marked by daybeacons as far as Long Island, about 1 mile above Cleveland. The controlling depth was reported to be about 3 feet in May 1972, but local knowledge is required to carry the best water. Overhead power cables crossing the river, about 5 miles and 6.1 miles above Punta Gorda, have a clearance of 60 feet.

There are numerous private fishing piers and fish camps along the Peace River above Punta Gorda. About 14 miles above the entrance, a highway bridge crossing the river has a fixed span with a clearance of 12 feet.

**Myakka River** empties into the head of Charlotte Harbor from NW. A depth of 9 feet can be taken into the mouth of the river, and 5 feet can be carried to a fish camp at **El Jobean,** at the N end of the bridges crossing the river 3 miles above the mouth; gasoline in cans is available. The highway bridge has a fixed span with a clearance of 24 feet, and the swing span of the railroad bridge has a channel width of 30 feet and a clearance of 3 feet under the drawspan and 6 feet under the trestle. (See 117.240 and 117.245 (a) through (e) and (i)(3), chapter 2, for drawbridge regulations and opening signals.)

Boats drawing 3 feet can navigate Myakka River as far as the Tamiami Trail highway bridge, 10 miles above the mouth with local knowledge. The bridge has a fixed span with a clearance of 14 feet. The nearby overhead power cable has a clearance of 32 feet. Gasoline, water, and some supplies are available.

The flora and fauna of the Everglades region are preserved in Myakka State Park in the upper reaches of the river.

**Charts 11425 (857-SC), 11414 (586), 11426 (1255), 11424 (1256).**-The coast between Charlotte Harbor and Tampa Bay trends about NW by N, and has a nearly straight sand beach that is broken in places by small inlets. Back of the barrier islands are shallow bays and lagoons which can be entered from the Gulf of Mexico through Gasparilla Pass, Stump Pass, Venice Inlet, Big Sarasota Pass, New Pass, and Longboat Pass. Most of these passes, though marked, are subject to change, and the aids are frequently shifted in position. The low shore is wooded nearly to the water's edge and has few prominent features except in the vicinity of Boca Grande and Sarasota, and for the 720-foot Venice Fishing Pier, about 2.5 miles S of the entrance to Venice Inlet. The pier is reported marked at its end by two fixed red lights.

**Gasparilla Pass** between **Gasparilla Island** and **Little Gasparilla Island** affords passage from the Gulf to Gasparilla Sound, Placida Harbor, and the Intracoastal Waterway. Local knowledge is needed to carry the deepest water. The controlling depth over the bar through the unmarked channel was reported to be about 6 feet in May 1972.

**Stump Pass,** 6 miles N of Gasparilla Pass, between **Knight Island** and Manasota Key, affords passage from the Gulf into the S end of Lemon Bay and the Intracoastal Waterway. The pass had a reported controlling depth of about 5 feet in May 1972, but the channel is subject to frequent change and should only be used with local knowledge. The pass is marked by private daybeacons.

**Venice Inlet,** about 26 miles NW of Port Boca Grande, affords a passage from the Gulf to the Intracoastal Waterway, Roberts, Dona, and Lyons Bays. A Federal project provides for a 9-foot channel from the Gulf through the 600-foot jetties to the Intracoastal Waterway, 0.5 mile above the entrance. (See Local Notice to Mariners for controlling depth.) Daybeacons mark the channel. **Venice Inlet Light** (27°06.8'N., 82°28.2'W.), 20 feet above the water, is shown from a red and white daymark on a skeleton structure on the outer end of the N jetty.

**Storm warning signals are displayed.** (See charts.)

**Midnight Pass,** 6 miles N from Venice Inlet, between **Casey Key** and **Siesta Key,** affords a passage from the Gulf to **Little Sarasota Bay** and the Intracoastal Waterway. The pass is narrow and subject to change, and has a controlling depth of about 3 feet; strangers should not attempt passage.

**Currents.**-In Midnight Pass the flood current sets NE with an average velocity of 1.8 knots, and the ebb sets SW at an average velocity of 1.4 knots.

**Big Sarasota Pass,** 12 miles NNW from Venice Inlet, is an inlet from the Gulf of Mexico to the S end of Sarasota Bay and the Intracoastal Waterway. The pass lies between **Siesta Key** and **Lido Key,** and is marked by lights, buoys, and daybeacons. Big Sarasota Pass Lighted Buoy 1 (27°15.0'N., 82°34.4'W.) marks the entrance. Buoy 3 at the entrance is not charted, as it is frequently shifted in position to mark the changing channel. The pass had a reported controlling depth of 6 feet over the bar in May 1972. Several large hotel

buildings at the S end of Lido Key and along the shore of Siesta Key are prominent.

**Currents.**-In Big Sarasota Pass the flood current sets N with an average velocity of 1.5 knots, and the ebb sets S with an average velocity of 1 knot.

Unmarked fish havens are about 1.5 miles offshore between Big Sarasota Pass and New Pass.

**New Pass,** 2 miles NE from Big Sarasota Pass, between **Cerol Isles** and **Longboat Key,** affords passage from the Gulf of Mexico to Sarasota Bay and the Intracoastal Waterway. A dredged channel leads from the Gulf through the pass to the Intracoastal Waterway. The channel is marked by lights, buoys, and daybeacons. In 1970-May 1974, the controlling depth was 5½ feet from the channel entrance to the Intracoastal Waterway.

The highway bridge over the pass has a bascule span with a clearance of 13 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

**Currents.**-In New Pass the flood current sets NE with an average velocity of 1.6 knots, and the ebb sets SW with an average velocity of 1 knot.

**Longboat Pass,** 11 miles NW of Big Sarasota Pass, between Longboat Key and **Anna Maria Key,** affords passage from the Gulf of Mexico to Sarasota Bay and the Intracoastal Waterway. The pass is constantly changing and has depths of about 6 feet over the bar. The channel is marked only by a buoy at the S end of the shoal extending W and S in an arc from Anna Maria Key. The highway bridge over the pass has a 45-foot bascule span with a clearance of 17 feet. (See 117.240, and 117.245 (a) through (e) and (i)(c-3), chapter 2, for drawbridge regulations and opening signals.)

**Currents.**-In Longboat Pass the flood current sets E with an average velocity of 1.8 knots, and ebb sets W with an average velocity of 1.6 knots.

**Anna Maria Key,** about 6.5 miles long and about a mile wide near the N end, extends NW from Longboat Pass to Passage Key Inlet on the S side of Tampa Bay Entrance. It is separated from the mainland by Sarasota Pass, which joins Sarasota Bay with Tampa Bay. A fishing haven, marked by two privately maintained buoys, has been established about a mile offshore from Holmes Beach, Anna Maria Key. There are several year-round communities and a yacht club, marinas, and boatyards on the island, which is also a winter resort.

# 5. TAMPA BAY TO APALACHEE BAY

This chapter describes the 170-mile Gulf coast of Florida from Tampa Bay to Apalachee Bay, the numerous rivers emptying into this section of the Gulf, and the passes making from the Gulf to the Intracoastal Waterway. Also described are the deepwater ports of Tampa, Port Tampa, Port Sutton, St. Petersburg, and Port Manatee, and many smaller ports.

The section of the Intracoastal Waterway from Tampa Bay to Anclote Anchorage passing through the waters described in this chapter and places along its route are discussed in chapter 12.

**Chart 11400 (1114).**-Depths of 18 feet extend nearly 5 miles from shore on either side of the dredged channel into Tampa Bay.

From Tampa Bay 35 miles N to Anclote Keys, the bottom is broken, and depths of 18 feet or less are sometimes found more than 4 miles offshore. The coast is bordered by a line of long narrow barrier islands which overlap at the ends. The Gulf sides of the islands are straight or gently curving sand beaches, backed by dense growth. Between the islands and the mainland is a chain of shallow bays and passages. Prominent N of Tampa Bay are water tanks and numerous tall buildings along the beaches; a large hotel in Clearwater and a water tank near the center of Clearwater Beach Island; and Anclote Keys Light.

Between Anclote Keys and Cedar Keys, 60 miles to the N, the low coast is fringed with marsh broken by shallow rivers and creeks that can be entered only by small craft. Small keys and islets border the coast, and broken ground extends as much as 15 miles from shore. The bottom slopes gradually shoreward, but there are many rocks and shoals in the deeper water. Between Anclote Keys and Cedar Keys there are no prominent landmarks.

Bird guano racks, consisting of square platforms on piles about 10 feet above water, have been built on the outermost shoals between Tampa and Apalachee Bays; some have been destroyed in aerial gunnery practice, leaving broken piling which constitute a hazard. Not all of the racks are charted.

Numerous fish havens, some marked by private buoys, extend as much as 10 miles offshore along this section of coast.

The coast extends in a general NW direction from Cedar Keys for about 75 miles to Apalachee Bay. The low marsh along the shoreline is 1 to 2 miles wide and is backed by pine forests. The coast is broken by several small rivers and creeks, some of which are navigable for drafts of 4 to 5 feet. The bottom is broken and irregular for a distance of about 10 miles from shore, and coral heads and reefs are numerous. This stretch of coast is frequented mostly by shrimpers and other fishermen, who can assist strangers to enter any of the rivers or creeks. The shoal water affords fair anchorage, with considerable protection from heavy seas, for light-draft boats.

**Chart 11412 (1257).-Tampa Bay,** a large natural indentation about midway along the W coast of Florida, is one of the important harbors of the Gulf coast and is easily accessible day or night. The bay extends NE for about 20 miles, and is 6 to 7 miles wide. It is the approach to Manatee River, Boca Ciega Bay, Old Tampa Bay, and Hillsborough Bay, and to the cities of St. Petersburg, Port Tampa, East Tampa, Bradenton, Port Manatee, and Tampa.

The entrance to Tampa Bay, between Mullet Key on the N, and Anna Maria Key on the S, is 4.5 miles wide. Egmont Channel, the main deepwater ship channel, has been dredged through shoals that extend about 6 miles W of the entrance. **Tampa Bay Lighted Whistle Buoy** (27°35.8'N., 82°55.6'W.), 9 miles W of Egmont Key, marks the approach to the bay.

**Prominent features.-Egmont Key,** a low, sandy, and wooded island almost in the middle of the entrance to Tampa Bay, is about 1.6 miles long. **Egmont Key Light** (27°36.0'N., 82°45.6'W.), 85 feet above the water, is shown from a white tower on the N end of the key. A radiobeacon and a fog signal are at the light. A pilot station lookout tower near the center of the island and the buildings of the Coast Guard station are conspicuous. A draft of about 15 feet can be taken to the small pier just inside the N end of the key.

Old **Fort DeSoto** on the S end of **Mullet Key** and a tall water tank on St. Jean Key about 1.5 miles NE of the fort stand out at the head of Egmont Channel. Also prominent to the N are the numerous tall hotel and apartment buildings, an aquatorium, a church spire, and a very tall water tank at St. Petersburg Beach on Long Key; a tall building on Maximo Point; and farther N other numerous tanks and buildings along the beaches and at St. Petersburg and Gulfport.

**Boundary lines of inland waters.**-The line established for Tampa Bay and tributaries is described in 82.80, chapter 2.

**Vessels should approach the harbor through the Tampa Safety Fairway.** (See 209.135, chapter 2.)

**Channels.**-A Federal project provides for a main channel with depths of 36 feet in the entrance from the Gulf, thence 34 feet to Tampa and Port Tampa. (See Notice to Mariners and latest editions of charts for controlling depths.)

**Caution.**-In 1972-74, shoaling to less than the charted depths was reported in the approach to Egmont Channel between the area extending E from the 10-fathom curve in the Gulf to the Egmont Channel entrance buoys (27°36′10″N., 82°52′15″W.). Vessels drawing in excess of 34 feet are urged to use caution when navigating through the area.

**Egmont Channel,** the main ship channel, extends between Mullet Key and Egmont Key and is used by all deep-draft vessels entering Tampa Bay. A lighted **083°30′** range and lighted and unlighted buoys mark the dredged cut over the bar.

The main ship channel continues through Mullet Key Channel and dredged cuts leading up the bay through Tampa Bay, Hillsborough Bay, and Old Tampa Bay to Port Manatee, Big Bend, Alafia River, Port Sutton, Tampa, Port Tampa, and Weedon Island. The channels are marked by lighted ranges, and lighted and unlighted buoys.

**Southwest Channel,** a natural passage on the S side of Egmont Key, has a controlling depth of about 16 feet, but is subject to shoaling. The approach is marked by a lighted bell buoy, and the channel by a lighted buoy and a daybeacon. **Passage Key,** on the S side of Southwest Channel, is a low sand island about 0.3 mile long and showing about 4 feet above high water. The key is barren and is used as a bird refuge. **Passage Key Inlet,** between Passage Key and Anna Maria Key, has a controlling depth of about 9 feet in an unmarked shifting channel; it is used only by small local craft.

**Anchorages.**-Vessels with good ground tackle can anchor anywhere outside Egmont Bar in depths of 35 to 50 feet and ride out any gale short of a hurricane. The usual inside anchorages are S of Mullet Key in depths of 30 to 35 feet; and SW of Gadsden Point in natural depths of 29 to 32 feet.

Explosives and quarantine anchorages are E of Mullet Key, NE of Papys Point, and S of Interbay Peninsula. (See 110.193, chapter 2, for limits and regulations.)

**Dangers.**-Shoal areas extend seaward from Egmont Key as far as **Palantine Shoal,** which is 5 miles W of the key and on the S side of Egmont Channel entrance. Palantine Shoal consists of several small lumps with depths of 19 to 22 feet over them. Spoil areas, for the most part unmarked and of undetermined depth, border the dredged cuts of the main ship channel in Tampa Bay and the channels in Old Tampa Bay. Caution should be observed particularly at the entrances to the side channels leading to Port Manatee, Alafia River, and Port Sutton.

The **Sunshine Skyway** crosses lower Tampa Bay from Maximo Point to Terra Ceia Island. It is a landfilled causeway for the greater part of its length with bridge spans over the channels which it crosses. The high-level 800-foot twin fixed spans over the main ship channel in the middle of the bay have clearances of 149 feet at the center and 140 feet at the fenders. The clearances of the other bridge spans are given in the description of the channels which they cross.

**Tides and currents.**-The diurnal range of tide in Tampa Bay is about 2.3 feet. (See the Tide Tables for predictions.) A strong offshore wind sometimes lowers the water surface at Tampa and in the dredged channels as much as 4 feet, and retards the time of high water by as much as 3 hours. A continued SW wind raises the water by nearly the same amount and advances the time of high water by as much as 1 hour.

Daily tidal current predictions for Tampa Bay Entrance are given in the Tidal Current Tables, and predictions for several places in Tampa Bay and vicinity may be obtained in those tables. There is a large daily inequality in the ebb, and velocities of 3 knots or more may be expected at the strength of the greater ebb of the day in Egmont Channel, Passage Key Inlet, and off Port Tampa. Flood velocities seldom exceed 2 knots. Winds have considerable effect in modifying the tidal current.

At a location 6.7 miles W of Egmont Key Light, the tidal current is rotary, turning clockwise, and has considerable daily inequality. The strengths of the greater floods and ebbs set N and S, respectively. Four days of current observations at this location during a period of moderate N winds indicated a resultant nontidal current of 0.4 knot setting S.

**Weather.**-The following description of general weather conditions in Tampa was prepared by the National Weather Service.

An outstanding feature of Tampa's climate is the summer thundershower season. On the average, the station has 91 days with thundershowers occurring mostly in the late afternoons of June, July, August, and September. The resulting sudden drop in temperature from about 90°F. to 70°F. induces an agreeable physiological reaction. Between a dry spring and a dry fall, some 30 inches (about 60 percent of the annual) of rain falls during the 4 summer months.

Because of the flat terrain, night ground fogs occur frequently during the cool-weather season. Temperature throughout the year is modified by the waters of the Gulf and bays.

Snowfall is negligible, and freezing temperatures rare. The annual temperature ranges about 20°F. from a mean of 61.5°F. in January to 82.0°F. in August. Damaging freezes may occur once or twice in a season, although many winters have none. The winter of 1957-58 was the coldest on record. The cold weather started early in December and was very noticeable on the 12th and 13th when the mercury fell to 27°F. and 26°F., respectively.

Five more freeze periods occurred during the winter of 1957-58 when February was the coldest February on record with a mean temperature of 52.9°F.

The risk of a hurricane moving in from the Gulf of Mexico has been greatest in June and October.

A tropical storm of July 28-29, 1960, brought Tampa's heaviest rain, 12.11 inches, in 24 hours. The Gulf hurricane of October 25, 1921, brought Tampa Bay's most destructive and highest tide, 10.5 feet above mean low water. Highest wind velocity, SE 75 m.p.h. for a 5-minute period, occurred during the passage of the Labor Day hurricane of September 3-5, 1935. Worst damage along local W coast beaches resulted from the small but prolonged Gulf hurricane of September 3-6, 1950. The Florida citrus belt took its worst beating in the great hurricane of October 19, 1944, which brought Tampa's lowest recorded sea level pressures, 28.55 inches. The year 1959 was the wettest on record when 76.57 inches of rainfall was measured. In contrast, the driest year on record occurred in 1956 when 28.89 inches were recorded.

The National Weather Service office is at Tampa International Airport; **barometers** may be compared there or by telephone. (See appendix for address.)

(See page T-2 for **Tampa climatological table.**)

**Storm warning display** locations are listed on NOS charts and shown on the Marine Weather Services Charts published by the National Weather Service.

**Pilotage** is compulsory for all foreign vessels and U.S. vessels under register in the foreign trade. Pilotage is optional for U.S. coastwise vessels drawing over 6 feet, that have on board a pilot licensed by the Federal government. Pilots board vessels day or night. Vessels entering by Egmont Channel are boarded between the Tampa Bay Lighted Whistle Buoy (27°35.8'N., 82°55.6'W.) and Egmont Channel Lighted Bell Buoy 2 (27°36.1'N., 82°52.2'W.). Vessels entering by Southwest Channel are usually boarded between Southwest Channel Daybeacon 2 and Lighted Buoy 5, or if desired, at the lighted bell buoy off the entrance to the channel.

The pilots maintain a lookout station on Egmont Key and board vessels from black-hulled launches with the word PILOT on either side of the white deckhouse. The pilot station monitors 2182 kHz and 2738 kHz, and VHF-FM channels 12 (156.60 MHz) and 16 (156.80 MHz) continuously. The pilot boats are equipped with VHF-FM channels 12 and 16. The pilot boats fly the international code flag "H" and display a white light over a red light at night. Vessels are requested to give a 24-hour and a 12-hour advance notice of their time of arrival. Vessels are normally not moved in dense fog, and during strong NW winds vessels are boarded inside Egmont Key. In 1972, the deepest draft entering Tampa Bay was 33 feet. Pilots can be obtained by making a signal off the bar, or by prior notice by radiotelegraph, or radiotelephone through the Tampa Marine Operator; telephone (813-229-2302), or ships' agents.

Pilots for St. Petersburg can be obtained through the Tampa Pilot Association at the same telephone number.

**Towage.**-The Port of Tampa area has several towing companies with radio-equipped tugs with up to 2,400 hp. Tugs are equipped for firefighting. Vessels are met at Buoy 4B, about 3 miles above the Sunshine Skyway Bridge. Large vessels usually require at least two tugs. Arrangements for tugs are usually made in advance by ships' agents.

The Port of Tampa is a **customs port of entry.** Customs, quarantine, **immigration,** and **agricultural quarantine** officials are stationed in Tampa. (See appendix for addresses.)

**Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) Vessels are usually boarded at their berths. The U.S. Public Health Service maintains an **outpatient clinic** in Tampa. The nearest Public Health Service hospital is at New Orleans. (See appendix for addresses.) Tampa has several public and private hospitals with ample facilities.

**Coast Guard.**-The **Captain of the Port** maintains an office in Tampa; a **Marine Inspection Office** and a **vessel documentation office** are also in the city. (See appendix for addresses.)

**Harbor regulations.**-The Port of Tampa is under the direction of the Tampa Port Authority and includes Tampa proper, Port Tampa, Big Bend, and the mouth of the Alafia River. The Authority is composed of a five-member board appointed by the Governor of Florida. The board appoints a Port Manager to administer the regulations established by the Authority. The Authority publishes an Operations Manual, a Port Directory, and a Terminal Map which includes additional port information. (Address: P.O. Box 981, Tampa, Fla. 33601; telephone (813-248-1924).) There is a **harbormaster;** telephone (813-248-1924). The Authority maintains a patrol craft.

**Chart 11414 (586).-Mullet Key,** on the N side of the entrance to Tampa Bay, is low and wooded. The wharf on the SE side of the key has a depth of about 10 feet at the face. A large pile of rocks, covered 2 feet, is to the N and nearly in line with the face of the wharf. These rocks are a danger for vessels landing with a strong flood current but are usually marked by tide rips except at slack water.

Old Fort DeSoto and a concrete and shell tower, about 25 feet high, at the S end of the key, and a water tank on St. Jean Key are conspicuous. **Fort DeSoto Park** includes Mullet Key, **St. Jean Key, St. Christoper Key,** and **Madelaine Key,** which are connected with the mainland by the Pinellas Bayway. An 800-foot-long T-head fishing pier with a pavilion and a toll house on it extends into the Gulf from in front of the fort; two private, fixed red lights mark the end of the pier. The park has picnic areas, restrooms, bathhouses, surfaced launching ramps, and several large parking areas.

**Manatee River** empties into the S side of Tampa Bay just E of Sarasota Pass. The river width varies from 0.5 mile to nearly a mile for about 10 miles

above the mouth, thence from 80 to 600 feet for some 8 miles to Rye. The river is well protected from all directions and affords good storm anchorage for small boats.

The **tidal current** in the river entrance averages about 0.8 knot; off Bradenton, it averages about 0.8 knot.

In Manatee River, a channel with several dredged sections leads from the entrance to Mitchellville Bridge at Rye, 18.6 miles above the mouth. In 1969, the centerline controlling depths were 9 feet to McNeil Point, thence 8 feet to Rocky Bluff, thence 1 foot to Mitchellville Bridge. Snags and debris obstruct the river above Rocky Bluff. In 1972, shoaling was reported in the channel W of Emerson Point; extent of shoaling is not known. A light marks the entrance, and the channel is marked by lighted ranges, lights, and daybeacons as far as Ellenton.

Two fish havens are in Manatee River. One is on the N side of the river off Emerson Point, and the other is on the S side off Wares Creek. Two private buoys mark each haven.

**Bradenton,** a winter resort on the S side of the river 4.5 miles above the mouth, is the seat of Manatee County and the largest town on the river. Bradenton has a large municipal pier close W of the first highway (U.S. Route 41) bridge with berthing space for larger vessels along the end and numerous berths for small craft inside the pier head. In May 1972, depths of 10 feet were reported in the approach channel, and 3 to 10 feet alongside the berths; a sunken fishing vessel was alongside the E part of the outer face. Diesel fuel by truck, water, ice, a launching ramp, and marine supplies are available. A large white building, housing the **dockmaster's office,** the offices of radio station WTRL, and a snack bar, is at the end of the pier. The South Florida Museum and a city auditorium are at the head of the pier.

The town has numerous stores, several hotels, and a hospital. The Sarasota-Bradenton Municipal Airport is about 6 miles S of the city. Local guides can be obtained as pilots.

**DeSoto National Memorial** of the National Park Service is on **DeSoto Point,** on the S side of the river entrance. A flagpole is prominent at the memorial. A marina and boatyard are in a basin that is protected by an L-shaped concrete pier about 0.5 mile W of the point. Berths, gasoline, diesel fuel, water, ice, marine supplies, and dry open and covered storage are available. The larger of two marine railways at the yard can handle craft up to 50 feet; hull and engine repairs can be made.

Three bridges cross Manatee River at Bradenton. The first, U.S. Route 41 highway bridge close E of the municipal pier, has a bascule span with a clearance of 8 feet. (See 117.240 and 117.463, chapter 2, for drawbridge regulations and opening signals.) The second, the Seaboard Coast Line Railroad Bridge 500 yards above the highway bridge, has a bascule span with a clearance of 5 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) The third, U.S. Route 301 highway bridge about 500 yards above the railroad bridge, has a fixed span with a clearance of 40 feet.

**Emerson Point** is on the N bank at the entrance to the river at the W end of **Snead Island.McKay Point** is on the S shore of the island about 1.5 miles E of Emerson Point. A marina and boatyard in a protected privately dredged basin on the E side of McKay Point has two marine railways and 50- and 20-ton mobile hoists. Craft up to 80 feet can be handled for hull and engine repairs or dry open storage. Gasoline, diesel fuel, water, ice, marine supplies, and open and covered berths with electricity are available. In May 1972, there was reported to be 8 feet in the privately marked approach channel and in the basin.

A paved highway connects with Palmetto. Good anchorage can be had in depths of 15 feet, soft bottom, off McKay Point. A dredged cutoff channel at the E end of Snead Island leads into Terra Ceia Bay from Manatee River. Daybeacons mark each end of the cutoff channel. In July 1974, a reported depth of 4 feet was available in the cut N into Terra Ceia Bay. Gasoline is available at several facilities along the cutoff. A highway bridge over the cutoff has a 33-foot fixed span with a clearance of 13 feet. An overhead power cable crossing close NE of the bridge has a clearance greater than that of the bridge.

A marina is in the lagoon E of the cutoff (27°31.5'N., 82°36.5'W.). The privately marked entrance channel had a reported controlling depth of 4 feet in May 1972. A 15-ton mobile hoist can handle craft up to 40 feet for hull and engine repairs or dry open or covered storage. Gasoline, water, open and covered berths with electricity, and marine supplies are available.

**Palmetto** is on the opposite side of Manatee River from Bradenton. **Ellenton** is on the N bank of the river 2 miles above the Seaboard Coast Line Railroad bridge. All three towns have rail and highway connections to all parts of the State. Manatee County is an important center for the raising of citrus fruits and vegetables. Pilings of a former pier extend 250 yards towards the channel from the N bank of the river about 200 yards W of the lower highway bridge, U.S. Route 41.

There is a marina in a dredged basin at Ellenton which has a 2-ton hoist that can handle craft up to 25 feet for hull and engine repairs, or dry open or covered storage. Gasoline, water, marine supplies, open and covered berths with electricity, and a launching ramp are available. In May 1972, the reported depths were 1½ feet in the privately marked approach channel to the basin with 5 feet in the basin.

There is a small marina in a small basin at **Rocky Bluff,** about 1.5 miles E of Ellenton. A reported depth of about 2 feet can be carried to the facility. Gasoline, berths, a 2-ton hoist, launching ramp,

and water are available. An overhead power cable with a clearance of 49 feet crosses the river at Rocky Bluff.

Manatee Memorial Hospital is a large white building in **Manatee** on the S bank of the river E of Bradenton. There is a large seafood packing and canning plant at Manatee.

**Braden River** empties into Manatee River about 2 miles above the upper highway bridge at Bradenton. In 1972, the river had a reported controlling depth of 1 foot to a point about 2 miles above the highway bridge. The channel is unmarked, and there are many shoals. State Route 64 highway bridge over Braden River has a 45-foot fixed span with a clearance of 8 feet at the center. Overhead power cables 0.1 mile and 0.6 mile above the bridge have clearances of 32 and 35 feet, respectively. A small marina for outboard boats is on the E side of the river just above the highway bridge; gasoline, launching ramp and outboard engine repairs are available.

**Terra Ceia Bay**, just N of Manatee River on the SE side of Tampa Bay, may be entered from Manatee River through the cutoff between Snead Island and the mainland.

The other entrance to Terra Ceia Bay from Tampa Bay is the narrow and generally crooked channel between Snead Island and **Rattlesnake Key**. The channel is marked by a light at the entrance and by daybeacons and has a reported depth of about 1 foot. The Sunshine Skyway crosses the head of the bay on a highway bridge that has a 44-foot fixed span with a clearance of 10 feet. An overhead power cable close SW of the bridge has a clearance of 39 feet.

**McMullen Creek** enters the head of Terra Ceia Bay from the E. A marina in a basin on the N side of the entrance just below the highway bridge has gasoline, water, berths, a launching ramp, and some marine supplies; a 35-foot marine railway can handle craft for hull and engine repairs. The privately marked channel leading to the marina had a reported controlling depth of 3 feet in May 1972.

There is a boat ramp at the head of **Bishop Harbor**, about 7 miles NE of the entrance to Manatee River.

**Port Manatee Terminal** (27°38.0'N., 82°33.7'W.), owned and operated by the Manatee County Port Authority, is a deepwater facility on the SE side of Tampa Bay, about 11 miles above Egmont Key. The facility is reached through a privately dredged and marked channel that leads SE from the main ship channel about 4 miles NE of the Sunshine Skyway Bridge. The channel is marked by a **127°47'** lighted range, lights, and daybeacons. In August 1970, controlling depths of 40 feet were reported in the channel, in the turning basin off the terminal, and alongside the terminal berths. Tankers, general cargo vessels, and barges are handled at the terminal. About 1,500 feet of berthing space is available on the N side of the terminal basin, and about 1,250 feet on the S side. In 1972, 250 feet of additional berthing space was under construction along the E side of the basin. Also available at the terminal are more than 82,000 square feet of covered storage, a bulk storage silo with a capacity of 7,200 tons, a conveyor system for handling bulk cargo, and electrical shore power and water connections at each berth. Imports are petroleum products, bulk minerals, and general cargo; exports include citrus pellets, plywood, and general cargo.

**Piney Point** is a small projection on the SE side of Tampa Bay about 0.3 mile N of Port Manatee Terminal. An abandoned ferry slip is on the point.

**Little Manatee River** (see also chart 11412 (1257)) empties into the SE side of Tampa Bay opposite St. Petersburg. The crooked channel across the bar at the mouth of the river is marked by a light and daybeacons. The controlling depth in the privately maintained channel to the railroad bridge, about 2.3 miles above the mouth, is about 3 feet. The channel, marked by private daybeacons, is difficult to follow without local knowledge. **Marsh Branch**, another privately maintained channel about 1.5 miles above the entrance, has a depth of about 3 feet from its junction with Little Manatee River to the highway bridge at **Ruskin**, an agricultural community. The highway bridge crossing Marsh Branch about 0.5 mile W of Ruskin has a 25-foot fixed span with a clearance of 12 feet.

At **Shell Point**, on the N side of the entrance to Little Manatee River, is a fish camp with two small wharves and a protected yacht basin. Gasoline, water, and some supplies are available. A railroad bridge with a 35-foot swing span and a clearance of 4 feet crosses the river about 2.3 miles above the mouth. (See 117.240, and 117.245 (a) through (e) and (i)(5), chapter 2, for drawbridge regulations and opening signals.) U.S. Route 41 highway bridge with twin fixed spans and clearances of 22 feet crosses the river close S of the railroad bridge. The E span of a former highway swing bridge, immediately S of the fixed spans, remains as a fishing pier. The overhead power cables at the bridge have a minimum clearance of 58 feet.

**Bahia Beach**, about 0.6 mile NE of Shell Point, is a settlement with dredged lagoons for waterfront homesites. A privately marked channel, dredged to 6 feet, leads to a marina at the head of the lagoons which has a 20-ton mobile hoist that can handle craft up to 45 feet for hull and engine repairs, or dry open or covered storage. Electronic repairs can be made. Gasoline, diesel fuel, water, ice, marine supplies, and open and covered berths with electricity are available. A motel dock, also at the head of the channel, has berths for transients.

**Apollo Beach** (chart 11413 (587)), about 4 miles NE of **Mangrove Point** on the E shore of Tampa Bay, is another waterfront development with lagoons and waterfront homesites.

**Chart 11413 (587).-Hillsborough Bay**, the NE arm of Tampa Bay, is 8 miles long and 4 to 5 miles

wide. The main ship channel follows a dredged cut up the middle of the bay to Tampa. Spoil banks border the E side of the channel for most of its length. Good anchorage is available for shallow-draft vessels in the central part of the bay W of the main channel.

At the turn in the main ship channel SE of Gadsden Point, a privately maintained channel leads E to a turning basin, thence S to a powerplant wharf at Big Bend. In May 1973, the reported controlling depths were 30 feet at midchannel from the main ship channel to the turning basin, thence 30 feet to and alongside the powerplant wharf. The channel is privately marked by a lighted **096°** range and lighted and unlighted buoys. Coal for powerplant consumption is unloaded from barges at the powerplant wharf.

Two miles N from the sharp turn in the main channel, a dredged channel leads E to **Alafia River.** Federal project depth for the channel is 30 feet from the ship channel in Hillsborough Bay to and including the turning basin at **East Tampa,** the site of a large chemical plant, on the N side of Alafia River 0.5 mile above the mouth. The channel is well marked. (See Notice to Mariners and latest editions of charts for controlling depths.)

Deep-draft facilities on the Alafia River are described under wharves at Tampa later in this chapter.

A draft of about 3 feet can be taken several miles up Alafia River at high water with local knowledge. A highway bridge, about 1 mile above the mouth of the river, has a 44-foot fixed span with a clearance of 28 feet; the nearby overhead power cables have a clearance of 33 feet. The railroad bridge just above the highway bridge has a 40-foot swing span with a clearance of 6 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) The minimum clearance of the overhead power and telephone cables crossing the river above these bridges is 31 feet.

Small-craft facilities on the Alafia River include a marina in an unnamed cove on the S side of the river immediately W of the highway bridge; a boatyard with a marine railway that can handle craft up to 65 feet on the S side of the river about 0.2 mile E of the railroad bridge; and another marina on the S side of the river about 1.8 miles above the railroad bridge. These facilities can provide berths, gasoline, water, ice, launching ramps, and hull and engine repairs. An oil terminal pier, inactive in 1972, and a salvage company repair yard are on the S side of the river immediately E of the railroad bridge.

The boat basin for McDill Field, on the West side of Hillsborough Bay about 2 miles N of **Gadsden Point** (27°49.3'N., 82°28.5'W.), is entered through a dredged channel marked by lights and daybeacons. In May 1972, controlling depths of 6 feet were reported in the channel and basin.

The McDill Field marina, about 0.5 mile W of Gadsden Point, is entered from Tampa Bay through a privately marked channel. In May 1972, the channel had a reported depth of 2½ feet.

**Port Sutton** is on the E side of Hillsborough Bay just N of **Pendola Point** (27°54.0'N., 82°26.0'W.). A dredged channel leads NE from the main ship channel to a turning basin and slip at Port Sutton, the site of large power, chemical, and cement plants, and a scrap metal wharf. The stack atop the powerplant is floodlighted at night. In 1965-1974, the controlling depth was 30 feet in the entrance channel and 34 feet in the long slip. The entrance channel is marked by a **054°-234°** lighted range, lights, and lighted and unlighted buoys. In addition to several barge wharves, Port Sutton has eight deep-draft wharves which are described later in this chapter under Tampa wharves.

**McKay Bay,** about 1.3 miles N of Port Sutton, is a shallow bay about 1 mile wide and 1.5 miles long. The 22nd Street highway causeway across the bay entrance has a fixed span with a clearance of 17 feet. In 1975, a fixed highway bridge with a design clearance of 40 feet was under construction adjacent to the existing bridge. Overhead power and telephone cables close N of the causeway have clearances of 32 feet. About 0.3 mile N of the bridge is an overhead power cable with a clearance of 40 feet.

**Tampa** is an important manufacturing, shipping, and distribution center at the head of Tampa Bay. It has an expanding economy and sizable cigar, lumber, phosphate, and manufacturing industries. There is considerable foreign and domestic trade in shipments of phosphate rock, petroleum, liquid sulfur, cement, chemicals, cattle, bananas, citrus fruits, grain, scrap iron, machinery, and general cargo. The University of Southern Florida is at the N end, and the University of Tampa is on the W bank of the Hillsborough River in the city.

**Channels.**-The main ship channel leads into Tampa Harbor along the E side of **Davis Islands.** The channel divides off the S end of **Seddon Island; Seddon Channel** continues NW to a turning basin at the mouth of Hillsborough River, and **Sparkman Channel** leads N to the **Ybor Turning Basin** at the end of **Ybor Channel. Garrison Channel,** an E-W channel between Seddon Island and the Tampa waterfront, connects the two turning basins.

A Federal project provides for depths of 34 feet for the main ship channel, Sparkman and Ybor Channels, and Ybor Turning Basin, and 30 feet for Seddon and Garrison Channels. (See Notice to Mariners and latest editions of charts for controlling depths.)

The Seaboard Coast Line Railroad Bridge over Garrison Channel has a bascule span with a clearance of 5 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

A barge anchorage area is close off the SE side of Davis Islands. (See 110.193 (5) and (b), chapter 2, for limits and regulations.)

Only small boats can pass around the N end of Davis Islands. Two fixed highway bridges, about 100 yards apart, connect the N end of the islands with Tampa to the W; minimum width is 34 feet, minimum clearance is 9 feet.

Information on anchorages, tides, currents, pilotage, towage, quarantine, customs, immigration, agricultural quarantine, and harbor regulations can be found at the beginning of this chapter under general information for Tampa Bay.

**Wharves.**-Deep-draft facilities at Tampa are located at East Tampa (Alafia River), Port Sutton, Port Tampa, and Tampa proper. Most of the facilities have railroad and highway connections, and water and electrical shore power connections. A total of over 3½ million cubic feet of freezer and cooler space is available at the port. General cargo is usually handled by ship's tackle; special handling equipment, if available, is mentioned in the description of the particular facility. Shore-based mobile cranes up to 150 tons can be rented, and a 100-ton floating crane is available. Only the deep-draft facilities are described; other active facilities are for barges, tugs, fishing boats, and other small vessels. For a complete description of the port facilities, refer to the Port Series, a Corps of Engineers publication. The alongside depths are reported; for information on the latest depths contact the operator.

The office of the Tampa Port Authority is at the George B. Howell Maritime Center Wharf, Tampa, Fla., 33605; telephone (813-248-1924).

**Facilities at East Tampa (Alafia River):**

Cities Service Co. Slip (27°51'30"N., 80°23'28"W.): deck heights, 8 feet; E side 448 feet long, 23 feet alongside; W side, 448-foot and 500-foot sections, 23 to 30 feet alongside; loading tower-conveyor belt systems, 100- and 450-ton per hour capacities; receipt of salt and shell; shipment of superphosphates; owned and operated by Cities Service Co.

Cities Service Co. Liquid Sulfur Wharf: immediately SW of Cities Service Co. Slip; offshore wharf, 1,000 feet usable with dolphins and W side of Cities Service Co. Slip; 30 feet alongside; deck height, 8 feet; receipt of liquid sulfur; owned and operated by Cities Service Co.

**Facilities at Port Sutton:** All facilities owned by Port Sutton, Inc.;

**S side of slip:**

Duval Corp. Wharf: about 300 yards W of head of slip; offshore platform, 250 feet usable with dolphins; 34 feet alongside; deck height, about 10 feet; receipt of liquid sulfur; operated by Duval Corp.

River-Gulf Terminal, Inc. Wharf: about 800 yards W of head of slip; offshore platform, 700 feet usable with dolphins; 34 feet alongside; receipt of potash; operated by River-Gulf Terminal, Inc.

**Facilities at Port Sutton, N side of slip:**

I.M.C. Corp. Potash Wharf: about 0.5 mile W of head of slip; 460-foot offshore wharf; 34 feet alongside; deck height, 6 feet; receiving hopper-conveyor belt system; receipt of potash from self-unloading vessels; operated by I.M.C. Corp.

I.M.C. Phosphate Terminal: about 0.7 mile W of head of slip; 414-foot offshore wharf; 34 feet alongside; deck height, 10 feet; loading tower, 1,800 tons per hour capacity; shipment of phosphate rock and superphosphate; operated by I.M.C. Corp.

W.R. Grace & Co. Wharf: about 0.9 mile W of head of slip; offshore wharf, 200 feet usable with dolphins; 30 feet alongside; deck height, 7 feet; receipt of anhydrous ammonia; operated by W.R. Grace & Co.

Ideal Cement Co. Wharf (27°54'16"N., 82°25'38"W.): 27-foot offshore wharf, 517 feet usable with in-line bulkhead; 30 feet alongside; deck height, 7½ feet; receipt of bulk cement; operated by Ideal Cement Co.

Pasco Terminals, Inc. Wharf (27°54'21"N., 82°25'40"W.): 500-foot wharf; 30 feet alongside; deck height, 7½ feet; receipt of liquid sulfur; operated by Pasco Terminals, Inc.

Commercial Metals Co. Wharf (27°54'25"N., 82°25'45"W.): 530-foot marginal wharf; 30 feet alongside; deck height, 7½ feet; diesel cranes with electromagnets; shipment of scrap metal; operated by Commercial Metals Co.

**Facilities at Rockport:**

Seaboard Coast Line Railroad Phosphate Terminal (27°54'50"N., 82°25'28"W.): offshore wharf, 880 feet usable; 34 feet alongside; deck height about 8 feet; gantry crane, 3,000 metric tons per hour loading rate; shipment of phosphate, owned and operated by Seaboard Coast Line Railroad.

Eastern Associated Terminals, Inc: about 0.4 mile NE of Seaboard Coast Line Railroad Phosphate Terminal; offshore dolphins; 540 feet usable; 34 feet alongside; height of dolphins, 8 feet; conveyor belt-loader system, 3,500 tons per hour capacity; shipment of phosphate; owned and operated by Eastern Associated Terminals, Inc.

**Facilities along W side of Hooker Point:**

Kreher Terminal (27°55'05"N., 82°26'35"W.): SW side of slip; 1,120 feet long, 18 to 34 feet alongside; deck height, 8 feet; receipt of automobiles and lumber; owned and operated by Tampa Port Authority.

Richard E. Knight Pier: immediately NW of Kreher Terminal; SE and NW sides 880 feet long; deck heights, 8 feet; 31 to 16 feet along SE side; 30 to 22 feet along NW side; receipt of petroleum products and phosphoric acid; owned and operated by Tampa Port Authority.

Tampa Port Authority Cattle Loading Wharf: about 0.3 mile NW of Kreher Terminal; 140-foot offshore wharf, 245 feet usable with dolphins; 29 feet alongside; deck height, 6 feet; cattle loading chute and ramp; shipment of cattle; owned and operated by Tampa Port Authority.

**Facilities along E side of Sparkman Channel:**

Sulfur Terminal Co. Wharf (27°55'48"N., 82°26'49"W.): offshore wharf, 305 feet usable with dolphins; 34 feet alongside; deck height, 8 feet; receipt of liquid sulfur; owned by MTR Terminals Corp. and operated by Sulfur Terminals Co., Inc.

American Oil Co. Wharf: about 0.1 mile N of Sulfur Terminal Co. Wharf: 100-foot offshore wharf, 275 feet usable with dolphins; 33 feet alongside; deck height, 7 feet; receipt and shipment of petroleum products, bunkering vessels; owned and operated by American Oil Co.

B.P. Oil Wharf: about 0.3 mile N of Sulfur Terminal Co. Wharf; 240-foot marginal wharf, 370 feet usable with dolphins; 32 feet alongside; deck height, 10 feet; receipt of petroleum products; owned and operated by B.P. Oil Corp.

Florida Portland Cement Wharf: about 0.4 mile N of Sulfur Terminal Co. Wharf; 820-foot marginal wharf; 34 feet alongside; deck height, 6 feet; cranes up to 30 tons with grab buckets; receipt of gypsum, aragonite, cement, and fuel oil; owned and operated by Florida Portland Cement.

Tampa Electric Co., Hooker Point Plant Wharf: about 0.55 mile N of Sulfur Terminal Co. Wharf; marginal wharf, 550 feet usable; 30 feet alongside; deck height, 8 feet; receipt of fuel oil; owned and operated by Tampa Electric Co.

Sparkman Channel Terminal, South Slip Wharf: about 0.65 mile N of Sulfur Terminal Co. Wharf; N side of slip, 700 feet long; 34 feet alongside; deck height, 5 feet; 24,000 square feet covered storage; 40-ton cranes equipped with electromagnets; shipment of scrap metal; owned by Tampa Port Authority and operated by Sparkman Channel Terminal.

**Facilities along Ybor Channel and Turning Basin, E side:**

George B. Howell Maritime Center Wharf (27°56'30"N., 82°26'35"W.): 1,200-foot marginal wharf; 34 feet alongside; deck height, 5 feet; 39,000 square feet covered storage; three 45-ton mobile cranes; receipt and shipment of general cargo; owned by Tampa Port Authority and operated by Southport Terminals, Inc.

Texaco Wharf: about 0.3 mile N of George B. Howell Maritime Center Wharf; 170-foot marginal wharf, 278 feet usable with dolphins; 33 feet alongside; deck height, 6 feet; receipt of petroleum products; owned and operated by Texaco, Inc.

Phillips Petroleum Co. Wharf: about 0.6 mile N of George B. Howell Maritime Center Wharf; L-shaped wharf, 300 feet usable with dolphins; 34 feet alongside; deck height, 9½ feet; receipt of petroleum products; owned and operated by Phillips Petroleum Co.

Detsco Terminal: at head of Ybor Channel; 540-foot marginal wharf; 30 feet alongside; deck height, 10 feet; receipt of liquid sulfur; owned and operated by Detsco Terminal.

**Facilities along Ybor Channel, W side:**

Detsco Terminal Phosphate Wharf: at head of Ybor Channel; 380-foot marginal wharf; 32 feet alongside; loading tower, 1,200-tons per hour capacity; shipment of phosphate and receipt of liquid sulfur; owned and operated by Detsco Terminal.

Metroport Terminal, North Wharf: immediately S of Detsco Terminal Phosphate Wharf; channel side (at N side of entrance to slip) 200 feet long; 27 feet alongside; N side of slip 680 feet long; 27 to 25 feet alongside; head of slip 350 feet long; 25 feet alongside; deck heights, 10 feet; receipt of bananas; owned and operated by Tampa Port Authority.

Metroport Terminal, South Wharf: channel side (at S entrance to slip) 275 feet long; 30 feet alongside; S side of slip 750 feet long; 27 feet alongside; deck heights, 10 feet; 48,000 square feet covered storage; open storage area; 20-ton crane, forklift trucks; receipt and shipment of general cargo; owned by Tampa Port Authority; various operators.

Gulf Florida Terminal Co. Wharf: about 0.35 mile below head of Ybor Channel; 1,200-foot marginal wharf; 30 feet alongside; deck height, 8 feet; 51,000 square feet covered storage; 10 acres open storage; forklift trucks up to 4 tons, straddle lumber carriers, tractors, and trailers; receipt and shipment of general and containerized cargo, shipment of fruit, lumber, and frozen meat; owned and operated by Gulf-Florida Terminal Corp.

Garrison Terminals Wharves: N side of Ybor Turning Basin; 540- and 1,277-foot marginal wharves; 30 feet alongside; deck heights, 7 and 8 feet; more than 260,000 square feet covered storage; crawler cranes equipped with 4-cubic yard buckets, forklift trucks up to 11 tons; portable receiving hoppers and belt conveyors for bulk chemical handling; receipt and shipment of general and containerized cargo, receipt of bulk nitrate and potash, shipment of fertilizer; owned by Tampa Sand and Material Co., Inc., and Garrison Terminals, Inc., and operated by Garrison Terminals, Inc.

**Facilities along the N side of Garrison Channel:**

Sun Oil Co. Wharf: just E of Seaboard Coast Line Railroad Bridge; 43-foot offshore wharf, 200 feet usable with dolphins; 30 feet alongside; deck height, 8 feet; receipt of petroleum products; owned and operated by Sun Oil Co.

Tampa Import and Export Terminal Wharf: about 0.3 mile W of Seaboard Coast Line Railroad Bridge; 950-foot marginal wharf; 30 feet alongside; deck height, 10 feet; 143,000 square feet covered storage; mobile cranes with 2½-cubic yard buckets, forklift trucks up to 5 tons, front end loaders, portable hoppers serve belt conveyor system; shipment of fertilizer; owned by Tampa Import and Export Terminal, Inc.; various operators.

Luckenbach Steamship Co. Wharf: about 0.35 mile W of Seaboard Coast Line Railroad Bridge; marginal wharf with 536- and 707-foot sections; 30-25 feet alongside; deck height, 10 feet; 138,000

square feet covered storage; open storage area; forklift trucks up to 25 tons; receipt and shipment of general and containerized cargo, shipment of fertilizer; owned and operated by Luckenbach Steamship Co., Inc.

Two facilities on the W side of Seedon Island were inactive in 1972.

**Facilities at Port Tampa dock** (Slip entrance at 27°51'40"N., 82°33'10"W.):

National Gypsum Co. Wharf: S side of slip at entrance; wharf with offshore dolphins; 1,000 feet usable when used with dolphins and Shell Oil Co. Wharf to the E; 34 feet alongside; deck heights, 6 feet; open storage area; hopper and belt conveyor system, unloading rate, 2,000 tons per hour; receipt of gypsum rock by self-unloading vessels; owned and operated by National Gypsum Co.

Shell Oil Co. Wharf: S side of slip about 400 yards E of entrance; wharf with offshore dolphins, 850 feet usable in conjunction with National Gypsum Co. Wharf to the W, plus an additional 250 feet usable with dolphins to the E; 34 feet alongside; deck height, 6 feet; receipt of petroleum products, bunkering vessels; owned by Atlantic Land and Improvement Co. and operated by Shell Oil Co.

Gulf Oil Corp., West and East Wharves: S side of slip about 650 yards E of entrance; wharf with offshore dolphins, 650 feet usable, 32 to 34 feet alongside; deck height, 6 feet; receipt and shipment of petroleum products, bunkering vessels; owned by Atlantic Land and Improvement Co. and operated by Gulf Oil Corp.

Standard Oil Co. Wharf: S side of slip about 850 feet S of the entrance; wharf with offshore dolphins, 880 feet usable with dolphins and part of Gulf Oil Corp. Wharf to the E; 30-34 feet alongside; deck height, 6 feet; receipt of petroleum products; owned by Atlantic Land and Improvement Co. and operated by Standard Oil Co. of Kentucky.

I.S. Joseph Co. Wharf: N side of slip about 300 yards E of entrance; 1,250 feet usable with dolphins; 32 feet alongside; deck height, 7 feet; conveyor loading system, 500 tons per hour loading rate; shipment of citrus pellets; owned by Atlantic Land and Improvement Co. and operated by I.S. Joseph Co.

**Supplies.**-All grades of fuel oil are available. Bunkers can be obtained from American Oil Co. and Texaco terminals in Tampa, or at Shell Oil Co. and Gulf Oil Corp. terminals in Port Tampa, or at the piers by barges. Water is available at most of the piers. Marine supplies and provisions are available in any quantity.

**Repairs.**-The Port of Tampa has facilities for making all types of hull and engine repairs to vessels of all sizes. Several companies operate waterfront facilities at the port for the repair and conversion of ocean-going vessels, tugs, barges, and small vessels. The largest shipyard, on the E side of Sparkman Channel, has a graving dock that is 548 feet long at the bottom, 80 feet wide, and 16 feet deep over the sill. The largest floating drydock, also at this yard, has a 2,500-ton capacity, a length of 228 feet, a clear width of 51 feet, and a depth of 29 feet over the keel blocks. Other facilities at the yard include machine, foundry, pattern, carpenter, and electric shops, outfitting wharves, and cranes up to 40 tons.

In addition, a number of firms without waterfront facilities engage in marine repair work. These companies maintain shops and portable equipment for making above-the-waterline repairs and for installing equipment, gear, and machinery on all types of craft at their berths.

**Communications.**-Tampa is served by the Seaboard Coast Line Railroad. Regular scheduled steamship service is maintained between Tampa and foreign ports, and Carribbean and West Indies ports. Several major airlines provide frequent scheduled service between Tampa International Airport, at the W end of the city, and domestic and overseas points. There is bus and trucking service to all points.

A privately owned radio station WPD, adjoining the Municipal Terminal on Ybor Channel, is used locally for communication with ships. Operating hours are 0800 to 1700. Radio station WFLA transmits coastal storm warnings and emergency marine information.

**Small-craft facilities.**-Small-craft facilities in Tampa are limited. The municipal boat landing is on the W side of the entrance to Hillsborough River. The Majorie Park Yacht Basin on Davis Islands, on the W side of Seddon Channel, has gasoline, water, a launching ramp, and open and covered berths for boats up to 50 feet. Diesel fuel is available by truck. The basin has depths of about 7 feet.

Davis Islands Yacht Club, in the seaplane basin at the S end of Davis Islands, has gasoline, water, and berthage for members and guests.

Tampa Yacht and Country Club is at **Ballast Point**, about 4 miles N of Gadsden Point. Gasoline, diesel fuel, water, covered berths with electricity, and other services are available for members and guests. A 1,000-foot public fishing pier is close N of the yacht club.

**Hillsborough River** flows S through the city of Tampa into the turning basin at the N end of Seddon Channel. Daymarkers mark the channel for a short distance to the NW side of North Boulevard Bridge. The stream is narrow above Tampa and relatively deep. The head of navigation is the dam at Sulphur Springs, 8 miles above the mouth. In 1961, the controlling depth in the dredged channel in the river was about 7 feet to just above Columbus Drive Bridge, about 2.5 miles above the mouth.

The minimum width of the drawspans of the bridges over Hillsborough River between the entrance and Sligh Avenue, 6 miles above the mouth, is 50 feet, and the minimum clearance is 7 feet. At

Scott Street, a mile above the mouth, are the expressway twin fixed bridges with a clearance of 40 feet. Highway bridges at North Boulevard and at Buffalo Avenue, 3.2 miles above the mouth, have fixed spans with a minimum clearance of 35 feet. The Hillsborough Avenue Bridge, 4.3 miles above the mouth, has a lift span with a clearance of 53 feet up and 10 feet down. Several highway bridges and one railroad bridge between Sligh Avenue and Sulphur Springs have fixed spans with a minimum channel width of 38 feet and minimum clearance of 5 feet. An overhead power cable with a clearance of 60 feet crosses the river at 26th Avenue. About a mile below this, an overhead power cable crossing the river has a clearance of 45 feet. (See 117.465, chapter 2, for drawbridge regulations and opening signals.)

**Old Tampa Bay,** the NW arm of Tampa Bay, is separated from Hillsborough Bay by Interbay Peninsula. Old Tampa Bay is 12 miles long and ranges in width from 2.5 miles at the entrance, to 6 miles; about three-fourths of the bay area has depths ranging from 6 to 17 feet. A branch of the main ship channel leads through the shoals at the entrance to Old Tampa Bay to the wharves and turning basin at Port Tampa. A Federal project provides for a depth of 34 feet to and including the turning basin. (See Notice to Mariners and latest editions of charts for controlling depths.) The channel is well marked by buoys and lighted ranges. Spoil banks border the E side of the N-S reaches of the channel; several spoil islands 5 to 10 feet high are just S of Port Tampa.

A swash channel from Port Tampa parallels the SW shore of Interbay Peninsula at a distance of about 0.6 mile. The channel is marked by daybeacons and has a controlling depth of 7 to 8 feet.

A **danger zone** of a small-arms firing range and aircraft jettison is SW of Interbay Peninsula. (See 204.100, chapter 2, for limits and regulations.)

A privately dredged channel extends from the S end of Port Tampa (Cut K) Channel NW to a turning basin at the powerplant at Weedon Island. In November 1972, the controlling depths were 32 feet for a midwidth of 270 feet in the channel to the bend, thence 32 feet for a midwidth of 200 feet to the turning basin, and 32 feet in the basin. The channel is marked by a lighted range, and lighted and unlighted buoys. A slip at the plant has a controlling depth of 32 feet.

An **explosives anchorage** is about 0.6 mile N of the junction of the Port Tampa Channel and the channel to the powerplant at Weedon Island. (See 110.193 (a)(3), and (b)(2), chapter 2, for limits and regulations.)

**Port Tampa** is an important shipping terminus on the E shore of Old Tampa Bay just inside the entrance. The elevators, oil tanks, and the long slip are conspicuous from Tampa Bay as are two high radio towers near the W end of Gandy Bridge Causeway and the stacks of the powerplant on Weedon Island. The terminal facilities at Port Tampa are at the entrance and along both sides of a long dredged slip. These facilities were described under Tampa wharves, earlier in the chapter.

**Gandy Highway Bridge** (U.S. Route 92), crossing Old Tampa Bay about 1.5 miles N of Port Tampa, has an opening with two parallel spans, about a mile W of the Interbay Peninsula shore. The N bridge is a fixed span with a clearance of 43 feet; the S bridge is a bascule span with a clearance of 13 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

There are two yacht basins, one on either side of the bridge at **Rattlesnake,** at the E end of Gandy Highway Bridge. Unmarked channels lead to the basins. The N basin has covered storage facilities for boats up to 65 feet. In 1972, the controlling depth was reported to be 5 feet. A 25-ton vertical hoist can lift boats up to 45 feet for hull and engine repairs. The S basin has facilities for vessels drawing up to 6 feet. A 50-ton mobile hoist can handle craft up to 65 feet for hull and engine repairs. Gasoline, diesel fuel, water, ice, provisions, open and covered berths with electricity, and dry covered storage are available at both basins.

A privately marked channel leads along the S side of the E end of Gandy Bridge approach to a shipyard at the head of the channel. In 1969, there was reported to be 18 feet in the channel and 15 feet in the basin at the yard. The yard has a 1,000-ton floating drydock that can lift vessels up to 210 feet for hull and engine repairs. There are complete repair facilities at the yard including machine, welding, joiner, paint shops, and a 100-ton floating crane. The yard builds wood and steel vessels and barges; dredging and salvage equipment is available. A liquid propane gas handling and distribution terminal for barges is on the S bank of the turning basin W of the shipyard.

**South Gandy Channel** leads along the S side of the fill at the W end of Gandy Bridge to **Snug Harbor,** where small craft can find good anchorage from storms. Open and covered berths with electricity and open and covered storage are available at several marinas and boatyards. Craft up to 45 feet can be handled on a 30-ton marine hoist for hull and engine repairs. Gasoline, water, ice, and marine supplies are available. The controlling depth in South Gandy Channel to the marinas is about 7 feet.

The approach to South Gandy Channel is from S, between shoals that can be avoided with a little care. When about 100 yards from the outer end of the highway fill, turn W and steer parallel with the fill, following the channel markers.

Along the E shore of Old Tampa Bay, N of Gandy Bridge, are several shallow basins suitable only for small craft. Most of these are privately marked.

The W. Howard Frankland Bridge (Interstate Route 75) and Causeway crosses Old Tampa Bay about 3 miles N of Gandy Bridge from just N of

Beach Park to just S of Big Island on the W shore. The bridge across the main channel has a fixed span with a clearance of 44 feet. Two other bridges in the causeway crossing the S end of **Big Island Gap** have 44-foot fixed spans with a clearance of 6 feet.

**Courtney Campbell Parkway** (State Route 60) crosses Old Tampa Bay about 6 miles above Gandy Bridge. This is a causeway, mostly fill, with a total length of 8 miles. Near the middle is a bascule span with a clearance of 13 feet. Near the W end is an 18-foot fixed span with a clearance of 9 feet. (See 117.240 and 117.464, chapter 2, for drawbridge regulations and opening signals.)

In 1972, it was reported that a shoal, bare at low water, extended across the channel N of the bridge near the W end of the Courtney Campbell Parkway.

**Safety Harbor** is a health resort town on the NW shore of Old Tampa Bay 2 miles N of the Courtney Campbell Parkway. A draft of 8 feet can be taken to within 0.5 miles of the town landing.

In 1972, a reported depth of about 1½ feet could be taken to the small basin on the S side of the large waterfront fill 1.6 miles N of the Courtney Campbell Parkway; depths of 3 feet were reported in the basin. Gasoline is available at the basin, and gasoline, water, ice, and some marine supplies are available in the town.

At the head of Old Tampa Bay about 1 mile N of the town of Safety Harbor is the entrance to a large bight also known as Safety Harbor. A draft of 6 feet can be taken into the bight. An overhead power cable crossing the bight entrance from Booth Point to Phillipi Point has a clearance of 98 feet. The town of **Oldsmar** is on the NE shore of the bight.

**Charts 11414 (586), 11413 (587), 11410 (858).-St. Petersburg,** a large winter resort on the W side of Tampa Bay 6 miles S of Gandy Bridge, is the terminus of the Seaboard Coast Line Railroad, and major highways connect it with all parts of the State. The Gandy Bridge and Frankland Bridge offer a short route to Tampa, and the Sunshine Skyway, a toll bridge, connects with points to the S.

St. Petersburg has a city hospital and several private hospitals. Gasoline, diesel fuel, water, ice, provisions, and marine supplies are available in quantity. Boats can be chartered and guides engaged. The St. Petersburg-Clearwater International Airport is N of the city, and the Albert Whitted Municipal Airport is on the E waterfront at the center of the city.

**Prominent features.**-The large Municipal Auditorium and the baseball stadium on the E waterfront S of the yacht basins, the three stacks of the powerplant at the SW corner of Bayboro Harbor, several large office buildings and hotels, radio towers, tanks, and the dome of a church are all prominent.

**Channels.**-A channel with dredged sections extends N for about 5.5 miles from deepwater in lower Tampa Bay to an entrance channel leading W to the basin at the Port of St. Petersburg. In 1966, the controlling depth was 20 feet in the two dredged sections leading N to the entrance channel, thence, in 1970, 17 feet in the entrance channel.

A draft of 25 feet can be taken within 0.5 mile of St. Petersburg by following the main ship channel in Tampa Bay through the W reach leading to Port Tampa, then turning SW into the natural deepwater area extending toward St. Petersburg. The channels are marked by lights, daybeacons, and lighted and unlighted buoys.

**Pilotage.**-Pilots for St. Petersburg are obtained through the Tampa Pilot Association. (See pilotage for Tampa.)

Quarantine, **immigration,** and **agricultural quarantine** officials are stationed in Tampa. (See appendix for addresses.) Vessels subject to such inspections generally make arrangements in advance through ships' agents; officials usually board vessels at their berths.

**Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) A city hospital and several private hospitals are in St. Petersburg.

St. Petersburg is a **customs port of entry.**

**Port of St. Petersburg,** the deepest and southernmost basin along the city waterfront, is about 500 yards long and 400 yards wide. In 1968, the controlling depth was 16 feet in the dredged port basin. The Port of St. Petersburg's cement wharf with warehouse, along the N side of the basin, provides about 1,500 feet of berthing space with a reported 17 feet alongside and a deck height of 8 feet. Fresh water, electrical shore power connections, and telephone service are available. The wharf is used for the receipt of cement, lumber, and general cargo and the shipment of frozen and canned foods. Cargo is handled by rented mobile cranes or ships' gear. Limited warehouse facilities are available. The Coast Guard operates a buoy depot and air-sea rescue base at the outer end of the basin.

**Bayboro Harbor,** which is entered from the inner end of the ship basin, is used by numerous fishing boats and other small commercial craft. In 1960, depths of 9 to 12 feet were in the harbor. Boatyards on the harbor can handle craft up to 80 feet for complete repairs.

Oil terminals, marinas, boatyards, and other commercial landings are along the banks of **Salt Creek,** which empties into the S side of Bayboro Harbor. Controlling depths in the creek are about 8 feet to the first bend, thence 5 feet to about 100 yards E of the first bridge at Third Street South, which is the head of navigation. A marina near the head of navigation has a 20-ton mobile hoist and a 20-ton marine lift used to handle craft up to about 45 feet for complete repairs. Gasoline and berthage are available.

Northward along the St. Petersburg waterfront from the ship basin are the Municipal Pier and three yacht basins. The pier is a concrete structure about 0.5 mile long with a five-story concrete structure in the shape of an inverted pyramid at its outer end. Red lights mark the NE and SE corners of the pier and the top of the inverted pyramidal structure. North Yacht Basin and Central Yacht Basin are on either side of the inner half of the pier. Both basins are enclosed by sea walls and provide excellent protection for vessels up to about 100 feet. Depths of about 10 feet are in North and Central Yacht Basins. Gasoline, diesel fuel, water, ice, marine supplies, launching ramps, and open and covered berthage are available at the St. Petersburg Municipal Marina and the yacht club in Central Basin. South Yacht Basin, the second S of the pier, is used by small sailing vessels. A **marina manager** is at the Municipal Marina; telephone (813-894-4842).

A daybeacon marks the approach to the Central Yacht Basin, and lights mark the ends of the moles on either side of the entrance to the basin. Numerous slips are on the N and W sides of the basin, and a public landing is on the W side. The St. Petersburg Yacht Club is in the Central Yacht Basin.

**Coffeepot Bayou,** 1 mile N of the Municipal Pier, affords good anchorage for small craft that can pass under the highway bridge, which has a 34-foot bascule span with a clearance of 6 feet. (See 117.240 and 117.245 (a) through (e) and (i)(4), chapter 2, for drawbridge regulations and opening signals.) The entrance channel is well marked with private daymarkers, and a depth of about 3 feet can be carried.

**Smacks Bayou,** about a mile NE of Coffeepot Bayou, has a depth of about 4 feet; the approach from the S is marked by private lights. Inside, there is deeper water resulting from dredging to provide land fill. Any vessel able to enter and pass Overlook Drive Highway Bridge, which has a 38-foot fixed span with a clearance of 11 feet, will find good shelter. A marina just inside the entrance has gasoline, water, ice, and berthing for about 30 boats.

**Bayou Grande,** about 1.8 miles N of Smacks Bayou and about 3.3 miles S of the Gandy Bridge, empties into the W side of Tampa Bay. The depth into the bayou is about 2½ feet, but local knowledge is needed to carry the best water. The basins on the S side of the bayou entrance offer good protection for small boats during periods of very bad weather.

The center 100-foot section of the former Weedon Drive Highway Bridge crossing the N end of Bayou Grande has been removed, and the fixed portions of the bridge on either side of the channel remain as fishing piers. An overhead power cable just E of the fishing piers has a clearance of 27 feet. Above Bayou Grande, the waterway is known as **Riviera Bay.** A highway bridge at the W end of the bay has a 22-foot fixed span with a clearance of 10 feet.

**Big Bayou** is a mile S of the St. Petersburg ship basin. The privately marked channel into the bayou has a depth of about 3 feet.

**Bayou Bonita,** a small-boat channel behind **Lewis Island,** which is also known as **Coquina Key,** connects Big and Little Bayous. It is crossed by two highway bridges each with a 40-foot fixed span and a clearance of 10 feet at the center, and by a pipeline with a clearance of 10 feet.

**Little Bayou** is 2.5 miles S of the St. Petersburg ship basin. A privately owned yacht basin is in the S part of the bayou.

**Point Pinellas** is the SE extremity of Pinellas Peninsula. An abandoned ferry slip on the point is now used for berthing of excursion and party boats. A paved launching ramp is just W of the slip.

**Charts 11414 (586), 11410 (858).**-The Intracoastal Waterway leads from Sarasota Pass, across the lower part of Tampa Bay, thence through **Boca Ciega Bay,** The Narrows, Clearwater Harbor, and St. Joseph Sound to Anclote Anchorage. The section of the Intracoastal Waterway from Tampa Bay to Anclote Anchorage passing through the waters described in this chapter and places along its route are discussed in chapter 12.

**Bunces Pass** (27°38.9'N., 82°44.4'W.), at the N end of Mullet Key, is a passage into the S part of Boca Ciega Bay from the Gulf, and through to Tampa Bay. It is unmarked, and the controlling midchannel depth is about 4 feet over the bar at the Gulf entrance with greater depths inside. Local knowledge is necessary to use the pass. The Pinellas Bayway Bridge over the pass has a fixed span with a clearance of 19 feet. The Sunshine Skyway Bridge over the E end of the pass has a fixed span with a clearance of 16 feet at the center.

A stake-marked channel with a controlling depth of 3 feet leads from Bunces Pass to the S end of **Mullet Key Bayou.** Small craft can anchor in the bayou.

**St. Petersburg Beach,** N of Bunces Pass and about 5 miles N of Egmont Key Light (27°36.0'N., 82°45.6'W.), is a winter resort city that occupies most of the 5-mile-long barrier island known as **Long Key. Pass-a-Grille Beach, Don Ce Sar Beach,** and **Lido Beach** are sections of the resort city. A large hotel with four towers, other hotel and apartment buildings, the large gold dome of an aquatorium, a church spire, and a very tall water tank are prominent. Farther inland, a water tank in Gulfport and cupola to the NW can be seen from seaward.

**Tierra Verde,** immediately E of the S part of Long Key, is a winter resort on what was formerly **Pine Key** and formerly a part of **Cabbage Key.** In 1972, a reported depth of 12 feet could be taken to a marina at the resort in 27°41'20"N., 82°43'24"W. Berths, electricity, gasoline, and diesel fuel are available. A depth of 4 feet was reported alongside

the gas dock in 1972. The marina is reached from the S via a channel entered S of Pass-a-Grille Channel Light 10.

**North Channel,** immediately S of Long Key, is a dredged channel that leads over the bar from the Gulf and connects with **Pass-a-Grille Channel** which separates the S part of Long Key from Tierra Verde and joins the main channel of the Intracoastal Waterway at the N end of Tierra Verde. North Channel and Pass-a-Grille Channel are well marked by lights, buoys, and daybeacons. **South Channel** leads to Pass-a-Grille Channel from the SW and passes E of Shell Key; it is unmarked and not recommended.

In Pass-a-Grille Channel the flood current sets N with an average velocity of 1.2 knots and ebbs S with an average velocity of 1.4 knots. (See Tidal Current Tables for daily predictions.)

In 1972, it was reported that depths of 8 to 10 feet could be taken to the service wharves, marinas, and boatyards on the island channel between Long Key and **Vina del Mar.** Berths, gasoline, diesel fuel, water, ice, marine supplies, and storage are available. A 20-ton mobile lift and other smaller lifts are available at the boatyards.

**Mud Key Channel** connects the island channel between Long Key and Vina del Mar with the main channel of the Intracoastal Waterway N of Vina del Mar. Submerged pilings of former private daybeacons may exist in the channel. Caution is advised. A bridge of the Pinellas Bayway from Long Key to the landfill E has a 19-foot fixed span with a clearance of 9 feet. About 500 yards E, another bridge over the main channel of the Intracoastal Waterway has a bascule span with a clearance of 25 feet at the center. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

**Blind Pass,** about 4 miles N of North Channel, is a shallow pass from the Gulf to Boca Ciega Bay between the N end of Long Key and Treasure Island. Near the pass are several very prominent landmarks that include a large white 10-story apartment hotel, an aquatorium with a large gold dome S of the entrance, and a large hotel with penthouse, a church spire, and a large water tank. The pass is used by local fishing boats and other small craft, and, in 1974, had a reported midchannel controlling depth of 4 feet. State Route 699 highway bridge crossing the pass near the inner end has a 22-foot fixed span with a clearance of 9 feet. An overhead power cable at the bridge has a clearance of 30 feet. There is a marina on the W side of the Intracoastal Waterway about 0.2 mile S of its junction with the channel leading to Blind Pass. Gasoline, diesel fuel, water, ice, berthage, and a forklift that can handle craft up to 26 feet for hull and engine repairs are available.

**Treasure Island** is a winter resort with many hotels, motels, and other conveniences.

**Chart 11410 (858).-Treasure Island Causeway** crosses Boca Ciega Bay from Treasure Island via Paradise Island and South Causeway Isles to the mainland at St. Petersburg. The causeway has a bascule span over the Intracoastal Waterway with a clearance of 8 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) The E and W openings between the mainland and South Causeway Isles and between Paradise and Treasure Islands have fixed spans with clearances of 4 and 5 feet, respectively.

**Johns Pass,** about 3 miles N of Blind Pass, between Treasure Island and **Sand Key,** affords passage for small craft from the Gulf to the N part of Boca Ciega Bay. A dredged channel leads from the Gulf of Mexico through Johns Pass thence N to the Intracoastal Waterway. In April 1973, shoaling to an unknown extent was reported in the entrance to the channel. The channel is marked by lights, buoys, and daybeacons. A natural channel just inside the pass leads E to the Intracoastal Waterway; it is marked at its E end by a daybeacon. In Johns Pass the flood current sets NE at an average velocity of 2.0 knots and ebbs SW at an average velocity of 1.5 knots. (See Tidal Current Tables for daily predictions.)

State Route 699 highway bridge over the pass has a bascule span with a clearance of 25 feet at the center. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) An overhead power cable SW of the bridge has a clearance of 60 feet.

Numerous fishing piers are near Johns Pass Bridge.

Small-craft facilities inside and N and S of Johns Pass can provide berths, gasoline, diesel fuel, water, and ice. A large marina and two boatyards at **Madeira Beach** have marine railways and lifts, the largest of which is 0.8 mile NW of Johns Pass Bridge and can handle craft up to 45 feet long and 5 feet draft for hull and engine repairs. The northerly of the two boatyards is in a cove locally known as Snug Harbor.

**Sand Key** is a 12-mile-long barrier island that extends from Johns Pass to Clearwater Pass. The island has been developed as a winter resort and has several well-developed communities.

**Prominent features.**-A large water tank, about 1.4 miles NW of Johns Pass, a large apartment hotel with penthouse on the island, and the water tank at the Veterans Hospital at Bay Pines are all conspicuous.

**Clearwater Pass,** 12 miles N from Johns Pass, extends E from the Gulf between the N end of Sand Key and the S end of **Clearwater Beach Island.** The pass is crossed by a highway bascule bridge with a clearance of 24 feet at the center. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

There are many prominent features in the Clearwater area including a large white apartment hotel near the N end of Clearwater Beach Island, a tall

water tank near the middle of the island, a large hotel on the island on the N side of the Garden Memorial Causeway, several tall radio towers, and several other prominent buildings. At Dunedin, 3 miles N of Clearwater, a large hotel, two tanks, and a stack are conspicuous.

A dredged channel leads from the Gulf through Clearwater Pass to a junction with the Intracoastal Waterway, and a dredged side channel leads N from just inside the pass along the E side of Clearwater Beach Island to a turning basin at the W end of Garden Memorial Causeway. In 1972-1973, the controlling depths were 8 feet on the centerline in the channel from the Gulf to the junction with the Intracoastal Waterway, and 8 feet on the centerline of the side channel to the turning basin, thence 8 feet in the basin. The channels are well marked by lights and daybeacons. **Clearwater Pass Lighted Bell Buoy 1** (27°58.1'N., 82°50.7'W.) marks the entrance from the Gulf.

The tidal current in Clearwater Pass averages about 1.2 knots. The mean range of tide at Clearwater is 1.8 feet.

The city of Clearwater operates the City Pier and Municipal Marina at the turning basin at the W end of Garden Memorial Causeway. The marina can provide berths, electricity, gasoline, diesel fuel, water, ice, and marine supplies. The **harbormaster** has his office at the marina and assigns berths. He can be reached by telephone (813-442-5690) for marine information or berthing instructions. The Clearwater police boat is based at the marina. The Clearwater Coast Guard Station is at the Island Estates Marina on the N side of the causeway about 0.25 mile NE of the Municipal Marina.

**Storm warning signals are displayed.** (See chart.)

Clearwater Harbor is a link in the Intracoastal Waterway, Caloosahatchee River, Fla., to Brownsville, Tex. Clearwater Harbor and the city of Clearwater are described in chapter 12.

**Charts 11410 (858), 11412 (1257).-St. Joseph Sound** extends N from Clearwater Harbor nearly to Anclote Keys, and is separated from the Gulf for a part of the distance by narrow strips of beach known as **Caladesi Island** and **Honeymoon Island.**

**Dunedin Pass,** 3 miles N of Clearwater Pass at the opposite end of Clearwater Beach Island, was closed due to shoaling in 1968. All navigational aids formerly marking Dunedin Pass and Dunedin Channel have been discontinued.

A fish haven about 1.3 miles long and 300 yards wide and marked by private buoys is about 3 miles W of the pass.

**Hurricane Pass,** between Caladesi Island and Honeymoon Island, is subject to change, but in 1973 it was reported that with local knowledge 3 to 5 feet could be carried. A light and daybeacons mark the pass.

Five miles off St. Joseph Sound the current floods N with a velocity of 0.2 knot and ebbs S with a velocity of 0.5 knot.

**Anclote Keys,** several in number, are about 13 miles N of Clearwater. **Anclote Keys Light** (28°10.0'N., 82°50.7'W.), 101 feet above the water, is shown from a brown square pyramidal skeleton tower enclosing a stair cylinder, on the S end of Anclote Key, the largest of the group. The trees on the S end of Anclote Key are rather tall and can be made out from well offshore.

**Anclote Anchorage,** between the keys and the mainland, offers good protection from W gales for vessels up to 7 feet in draft. The anchorage can be reached by passing either N or S of the keys, both passages being well marked. Vessels drawing more than 7 feet can anchor W of the keys where, though more exposed to W winds, the water shoals so gradually that the seas are never very heavy, and vessels with good ground tackle can ride out anything but a hurricane. In Anclote Anchorage, the tidal current has an average velocity of 0.6 knot on flood and 0.8 knot on the ebb.

**Anclote River** empties into Anclote Anchorage over a broad shoal area. A radar installation and a tall stack at a powerplant, on the N side of the entrance, are conspicuous from the NW at a distance of 10 miles. The tall stack at the powerplant is reported to be lighted at night.

A channel, with dredged sections and with its entrance about 1.75 miles SW of Anclote Keys Light, leads from the Gulf to a turning basin at Tarpon Springs. In December 1974, the centerline controlling depth was 7 feet from the Gulf to Anclote Anchorage; thence in September 1974, 6½ feet on the centerline in Anclote River from the entrance to the turning basin and 6½ feet in the S half of the basin; the N half of the basin has shoaled to 1 foot. The channel is marked by lighted ranges and numerous lights and daybeacons. Above Tarpon Springs the river is navigable for drafts of no more than 2 to 3 feet.

**Anclote** is a small town on the N bank of Anclote River about 1 mile above the mouth. A marina has gasoline and water available. A large elevator and a water tank, at a chemical plant nearby, can be seen for 10 miles; the tank has a light on top.

**Tarpon Springs** is a winter resort and commercial fishing center on the S bank of Anclote River, 3 miles above the mouth. Two water tanks in the town are visible from several miles offshore. Tarpon Springs, headquarters for the sponge fishing fleet on the W coast of Florida, has a municipal hospital, and rail and highway connections to all parts of the State. The municipal landing is a marginal wharf 330 feet long at the Sponge Exchange, just below the Alternate U.S. Route 19 highway bridge.

There are several small-craft facilities and a yacht club at Tarpon Springs. The largest marine railway in the area, on the S side of the channel W of Alternate U.S. Route 19 highway bridge, can handle craft up to 100 feet for engine and hull repairs. Craft up to 90 feet are built. Berths, elec-

tricity, gasoline, diesel fuel, water, ice, marine supplies, dry open or covered storage, electronic repairs, and lifts are available. The yacht club is on the E bank of Tarpon Bayou opposite Chesapeake Point. The mean range of **tide** at Tarpon Springs is 1.9 feet.

Alternate U.S. Route 19 highway bridge over Anclote River at Tarpon Springs has a 40-foot fixed span with a clearance of 10 feet.

**Kreamer Bayou** and **Whitcomb Bayou** empty into Anclote River along the W side of Tarpon Springs. The junction is at the N end of a small island; the river channel passes to the E of the island, and Anclote River South Channel to the bayous passes to the W. The South Channel branches at Chesapeake Point into Kreamer Bayou on the W and via Tarpon Bayou into Whitcomb Bayou on the E. The channel to Kreamer Bayou has shoaled, and only small skiffs can enter. The highway bridge over Tarpon Bayou (South Channel) has a 25-foot bascule span with a clearance of 8 feet. (See 117.240 and 117.245 (a) through (e) and (i)(5-a), chapter 2, for drawbridge regulations and opening signals.) The clearance of the nearby overhead power cable is 38 feet. A public wharf is S of the entrance to **Spring Bayou,** the E arm in Whitcomb Bayou; and another public wharf is at the yacht basin at the entrance. A draft of 3 feet can be carried from Anclote River through Whitcomb Bayou, which is centrally located in the town of Tarpon Springs.

**Chart 11409 (1258).**-The shoals that extend over 10 miles offshore along the coast for 40 miles N from Anclote Keys are known under the general name of **St. Martins Reef.** The outer limit of shallow water and detached shoals is marked by **St. Martin Outer Shoal Light 22** (28°25.3'N., 82°55.8'W.), 16 feet above the water and shown from a red triangular daymark and pointer on a dolphin.

Strangers should approach the coast with care, and deep-draft vessels should stay in depths of 30 to 35 feet. Small craft of 3 to 4 feet in draft usually follow the coast more closely, especially during windy weather, and find comparatively smooth water by keeping about 7 miles offshore. Hazy atmosphere frequently obscures this section of the coast, and the vessels standing inshore close enough to sight land are mostly spongers and fishermen, who sometimes anchor in shoal water, soft bottom, behind shell reefs and ride out the heaviest gales.

Two privately maintained and marked channels, about 3.5 and 4 miles N of Anclote River, respectively, lead E to a private housing development known as **Gulf Harbor.** No known services are available.

A fish haven, marked by private buoys, is about 7 miles W of the entrance to Pithlachascotee River.

**Pithlachascotee River,** locally known as the **Cotee River,** empties into the Gulf 7 miles N of Anclote River. The river has an extensive shoal area off the mouth and numerous oyster reefs just inside. A dredged channel, marked by lights and daybeacons, leads from the Gulf to a turning basin just below the first bridge at Port Rickey, about 1.2 miles above the mouth. In 1972-1973, the controlling depth was 6 feet to the basin. Depths of about 4 feet can be carried across the shoals to the channel entrance. Depths of 2 feet and greater can be carried to New Port Richey with local knowledge.

Three bridges cross the Pithlachascotee River. The first bridge, U.S. Route 19 highway bridge about 1.2 miles above the mouth, has a 48-foot fixed span with a clearance of 13 feet. An overhead power cable about 2 miles above the mouth has an estimated clearance of 40 feet. The second bridge, a highway bridge about 2.7 miles above the mouth, has a 27-foot fixed span with a clearance of 34 feet. An overhead power cable close S of this bridge has a clearance of 34 feet. The third bridge, a highway bridge about 3.3 miles above the mouth, has a 27-foot fixed span with a clearance of 6 feet. Overhead power and telephone cables about 0.2 mile E of this bridge have a clearance of 38 feet.

**Port Richey** is a small town at the entrance to the river. Several small marinas and a boatyard are here. The boatyard on the N side of the river just below the second highway bridge about 2.7 miles above the mouth has a marine railway that can handle craft up to 40 feet for engine, hull, and electronic repairs. There are marinas N of the same highway bridge that have gasoline, diesel fuel, water, ice, berthage, launching ramps, and marine supplies. Party fishing boats operate from the river.

**New Port Richey** is a small town about 2.5 miles above the mouth of Pithlachascotee River. The municipal water tank at the town is prominent from offshore. There is a small public wharf in the town. Gasoline, oil, water, ice, and provisions are available in the town but not on the waterfront.

**Hudson** is a small town on Hudson Creek, which empties into the Gulf 12 miles N of Anclote River. In 1972, a reported depth of about 3 feet could be carried into the creek. The entrance channel through the flats is marked by private daybeacons. Berths, gasoline, diesel fuel, water, ice, and launching ramps are available at marinas along the creek.

**Aripeka** is a village on **Hammock Creek,** 17 miles N of Anclote River. There are numerous deep springs and shoals in the creek, which has a depth of about 1½ feet. The approach to Aripeka is unmarked; local knowledge is needed to carry the best water. The highway bridges over the channels around the N and S sides of the island, in the middle of the creek, have fixed spans with a clearance of 2 to 3 feet. There are fish camps on the creek. Gasoline, water, and provisions are available at the N of the two highway bridges. The village, on State Route 595, has a launching ramp.

**Hernando Beach** is the site of a large housing development 20 miles N of Anclote River. Water, provisions, and a launching ramp are available. The approach channel can be followed by keeping the jetty and fill spit to the N about 15 yards. This channel had a reported controlling depth of about 1 foot in May 1972.

**Bayport** is a village at the mouth of **Weeki Wachee River,** 23 miles N of Anclote River. On a favorable tide a draft of about 2 feet can be taken to fish camps on the river, at some of which gasoline is available, and to the village. The channel begins close S of **Beacon Rock,** which is 2 miles offshore and covers at high water, and continues in a generally E by S direction through the oyster reefs and into the river. A public launching ramp is near the N side of the river entrance.

**Chassahowitzka River** empties into **Chassahowitzka Bay** 31 miles N of Anclote River. On a favorable tide a draft of about 2 feet can be taken into the river. The channel is difficult for strangers. From Johns Island to the village of Chassahowitzka, the river is shallow and partly blocked by grass and during the summer by hyacinths; the depth is about 1½ feet. **Chassahowitzka** is a small fishing village with a lodge, cabins, and a trailer park; a road connects with the State highway. Gasoline and berthing are available.

**Bird Island** is prominent in the entrance to Chassahowitzka Bay. **Black Rock,** 1.3 miles seaward from the island, bares at half tide. **Chassahowitzka Point,** on the N side of the bay, is a high and conspicuous mangrove key.

**Homosassa River** empties into **Homosassa Bay** 37 miles N from Anclote Keys Light. **St. Martins Keys** are prominent mangrove islets on the N side of the bay entrance. In 1966, an obstruction consisting of a bent railroad track rail was reported about 2.6 miles W of South Point of St. Martins Keys and about 5 miles off the entrance to the river.

**Homosassa** is a small fishing community 4 miles above the mouth of the river. Several commercial fish houses, a public pier for transient craft, and marinas are here; berths with electricity, gasoline, ice, marine supplies, and launching ramps are available. A launching ramp and an outboard engine repair shop are just inside the entrance to Halls River, which empties into the N side of Homosassa River about 1 mile above Homosassa. A highway leads from Homosassa to the town of Crystal River.

In May 1968, a reported depth of 3 feet could be taken to **Homosassa Springs. Homosassa Bay Entrance Light 2** (28°41.4′N., 82°48.7′W.), about 3.3 miles SW of the entrance to the channel, marks the approach. The river entrance is clearly marked by lights and daybeacons. Shoals on either side of the channel are discernible by their lighter color. The river channel is marked by daybeacons.

The overhead power cables crossing Homosassa River below Homosassa have a least clearance of 55 feet.

**Crystal River** empties into the N side of **Crystal Bay,** 46 miles N of Anclote Keys Light and 23 miles SE from the town of Cedar Keys. **Mangrove Point,** on the S side of the entrance to the bay, is prominent in the approach from the SW. The white shell of **Shell Island,** on the S side of the river's entrance, is prominent when approached from the dredged channel across Crystal Reefs.

A channel with dredged sections leads from the Gulf to the town of Crystal River. The entrance is through a large shoal area thence across **Crystal Reefs** through the dredged sections. In July 1971, the reported controlling depth was 5½ feet in the entrance channel to Crystal River. The best water is reported to be in the middle of the river; local knowledge is necessary. **Crystal River Approach Lighted Buoy 2** (28°47′27″N., 82°58′33″W.), about 14 miles WSW of the entrance to the bar channel, and a buoy 5 miles off mark the approach. A light and daybeacons mark the channel across the bar and the entrance to the river. Berths, gasoline, and hull and engine repairs are reported available at a marina just above the entrance to Salt River, about 4 miles above the mouth of Crystal River. An overhead power cable with a clearance of 51 feet crosses Salt River just above the entrance. Water is available on the N side of Crystal River, 5 miles above the mouth.

The town of **Crystal River** at the head of the river 6 miles above the mouth, has rail freight and highway connections. Several commercial fish houses and a seafood processing plant are here. There are several marinas and boatyards. The largest marine railway, in a cove leading E from the NE part of Kings Bay, can handle craft up to 60 feet for hull and engine repairs or dry open or covered storage. Berths, electricity, gasoline, diesel fuel, water, ice, provisions, marine supplies, storage, launching ramps, and a forklift for hauling out craft are available. There are two waterfront motels at the N end of Kings Bay and two hotels on the SE side. A motel on the bay S of the town has berths, electricity, gasoline, water, and ice. It has been reported that local interests have marked several channels in Kings Bay leading to various parts of the bay. The section of the bay N of the entrance and Christmas Island, a small island with a brick house on it, should be navigated with caution. There is fresh water in the upper section of the river, which has its source in numerous springs. The mean range of tide at the mouth of the river is about 2.5 feet.

**Routes.**-From Crystal River Approach Lighted Buoy 2, a course of **048°** leads to the inner approach buoy, thence a course of **081°** to the entrance. If coming from the S, keep at least 5 miles off the outer islands until up to the inner approach buoy, then steer **081°** for the light at the entrance. Follow the daybeacons through the numerous oyster bars and dredged sections through Crystal Reefs. The river is entered at the N side of Shell Island where there is a shoal area with a depth of 6

feet. Midchannel courses should be followed and a lookout kept for shoals. A draft of about 6 feet can be carried into the basin at the head of the river, but only 3 to 4 feet can be taken into the inner basin and to the fish house wharf. Keep close to the W end of a small island when entering the inner basin at Crystal River. Overhead power cables with a least clearance of 32 feet cross the inner basin.

**Chart 11408 (1259).**-A privately dredged and marked channel, about 8 miles long and with a reported controlling depth of 15 feet in 1966, leads from the Gulf to the Florida Power Corporation's Crystal River powerplant about 2 miles NW of Crystal River entrance. The inner end of the channel is protected by two dikes extending to shore. The N dike is about 3 miles long, and the S dike about 2 miles long. Two high stacks and the powerplant are conspicuous. The stacks, with alternating bands of white and red, are marked on top by flashing red lights, and by fixed and flashing red lights on the lower section. The powerplant has a wooden T-head pier with 182 feet of usable berthing space with dolphins; 15 feet is reported alongside. The wharf is used to unload petroleum from barges. Fresh water is available.

**Cross Florida Barge Canal** with an indefinite completion date, enters the Gulf about 2.5 miles N of the powerplant. The 8.5-mile approach channel, marked by lights, daybeacons, and by an unlighted **068°** range, had a reported controlling depth of 12 feet in 1967. The canal will be primarily for barge traffic, but will also be open to pleasure and fishing boats. It will extend from the Gulf for 93 miles to the St. Johns River at a point about 12 miles S of Palatka, 60 miles S of Jacksonville, and 81 miles above the entrance to the river from the Atlantic Ocean. The canal will have a Federal project depth of 12 feet and will have five navigation locks.

**Withlacoochee River** rises in the central part of the Florida Peninsula and empties into the Gulf about 17 miles SE of Cedar Keys. **Withlacoochee River Entrance Light 1** (28°58.1'N., 82°49.8'W.), 16 feet above the water and shown from a black square daymark on a dolphin, marks the approach.

A dredged channel leads from the Gulf to **Croom,** 74 miles above the mouth. In March 1970, the controlling depth was 7½ feet on the centerline to the powerplant and turning basin at Inglis, thence 6 feet in the basin, thence 4 feet to the powerplant spillway and to Stokes Ferry, 11 miles and 36 miles, respectively, above the mouth; and thence 1½ feet to Croom. The entrance channel is marked by lights and daybeacons. Above the entrance the river channel is marked by stakes or private daybeacons.

Oil barges drawing better than 8 feet are taken upriver to an oil terminal above Yankeetown with local knowledge. U.S. Route 19 dual highway bridges crossing the river at Inglis have 38-foot fixed spans with clearances of 10 feet. Floating logs and other debris partially obstruct the channel above Inglis making it passable by small boats only.

A spillway obstructs the river about 11 miles above the entrance. Vessels desiring to go above the spillway must enter the barge canal and be locked through. The pool created by the spillway extends to **Dunnellon,** 24 miles above the mouth.

**Port Inglis** was a town at the mouth of the river which has been abandoned; only a few scattered ruins remain. A public launching ramp and park are on the N side of the entrance. A marina, in a basin on the N bank of the river about 2 miles above the mouth, has a marine railway that can handle craft up to 50 feet for hull and engine repairs or dry open or covered storage. Gasoline, diesel fuel, water, ice, marine supplies, and covered and open berthage with electricity are available.

**Yankeetown,** the principal town on the river, is a small winter resort and fishing village 3 miles above the mouth. A city boat basin with a launching ramp and free berthage and several fish camps with wharves are at the town. Gasoline is available, and diesel fuel can be obtained by truck. An oil plant with a basin is about 0.5 mile above Yankeetown on the N bank. State Route 40 connects the town and the marina below it, with the main coastal highway, U.S. Route 19, at Inglis.

**Inglis** is a small town 7 miles above the mouth of the river. Gasoline, oil, water, and provisions are obtainable. A powerplant is located on the river about 0.5 mile below the town. Overhead power cables crossing the river in the vicinity of the powerplant have a minimum clearance of 65 feet.

**Tides and currents.**-The mean range of tide is 2.5 feet. Off the mouth of the river a tidal current sets E during the flood and W during the ebb. The ebb has a reported velocity of 3 knots at times, and this must be taken into account by vessels coming in from the entrance buoy. A strong NE wind may increase the velocity of the ebb current, and a SW wind may decrease it.

**Waccasassa River,** 10 miles N of Withlacoochee River, has the extensive Waccasassa Reefs off its entrance. A channel marked by private poles reportedly leads E of the reefs, and in 1972 had a reported controlling depth of 2 feet with deeper depths inside the river. A public launching ramp and a marina are on the N shore about 4 and 4.3 miles, respectively, above the mouth. The marina is in a small basin. Gasoline, berths, water, ice, and a launching ramp are available.

**Cedar Keys,** 95 miles N of Tampa Bay, are a group of low sandy islets covered with mangrove trees. Prominent from offshore is the white tower of the abandoned lighthouse on **Seahorse Key,** the outermost of the group. The tower, which is flanked by two white-roofed buildings, shows to seaward among the trees; the tower is 30 feet high and stands on a 45-foot mound on the S side of the key. **Seahorse Reef,** a dangerous shoal with little

depth over it, extends 11 miles SW from Seahorse Key. The outer end of the reef is marked by **Seahorse Reef Light** (28°58.5'N., 83°09.2'W.), 43 feet above the water and shown from a white triangular pyramidal skeleton structure on piles. A lighted whistle buoy is about 3.8 miles SW of the light.

**Main Ship Channel,** a dredged channel, leads from the Gulf in a general NE direction between East Bank and West Bank, E of Seahorse Key and Grassy Key; thence by a crooked and winding channel W of Atsena Otie Key into Cedar Key Harbor. In 1972, the reported controlling depth was 9½ feet. The channel is well marked by lights and daybeacons. Extreme caution must be exercised at two hairpin curves. In 1971, shoaling was reported in the vicinity of Daybeacon 12, and in 1968 in the vicinity of Daybeacon 36.

**Northwest Channel,** a dredged channel, leads from the W between North Bank and South Bank. In 1965, the controlling depth was 8 feet from the entrance to Main Ship Channel. The channel is marked by lights, daybeacons, and an approach light. Small craft bound up the coast should enter by Main Ship Channel and leave by Northwest Channel rather than cross Seahorse Reef. In 1972, local fishermen reported a controlling depth of 4 feet in **Deadmans Channel,** a natural channel, which is unmarked and should not be used without local knowledge.

**South Bar Channel,** the approach channel to Cedar Key from the E, has a depth of about 4 feet. The channel is marked by an entrance light and several daybeacons.

**Fog.**-This area has considerable fog during the winter; S winds bring it in, and N winds clear it away.

**Tides and currents.**-The mean range of tide at Cedar Keys is 2.6 feet. Outside the entrance channel the current sets E on the flood and W on the ebb. Inside, the currents generally follow the channels. Currents are strong in the vicinity of the city dock, and caution must be observed when docking with a fair current.

**Cedar Key** is a small town on **Way Key.** The most prominent object in the town is the municipal water tank, 140 feet high. In 1972, it was reported that a draft of about 8½ feet could be taken through the main channel to the city dock which had reported depths of 8 to 15 feet alongside; a depth of 4 feet was reported alongside the fuel pier. Gasoline, diesel fuel, water, ice, and some supplies for small boats are available. A circular boat basin, accessible through a causeway with an estimated clearance of 3 feet, is also used by small boats at Cedar Key.

The U.S. Public Health Service maintains a **contract physician's office** in Cedar Key. (See appendix for address.)

The **Cedar Key State Memorial and Museum** is on the W side of Way Key. An airstrip is here. A marina with limited berthage and a launching ramp are in **Daughtry Bayou.**

**Suwannee Sound,** 7 miles N from Cedar Keys, has a long line of narrow shoals on the seaward side known as **Suwannee Reef.** The sound is about 8 miles long and has an average width of about 3 miles. The principal entrance to Suwannee Sound is through **Derrick Key Gap,** a dredged channel 4 miles NW from Cedar Keys. In 1962, the controlling midchannel depth was 4 feet. The channel is marked by daybeacons. In 1969, shoaling was reported encroaching from the W about 30 feet into the channel in the vicinity of Daybeacon 3.

**Steamboat Gap, Ranch Bar Gap,** and **West Gap** unmarked secondary channels with depths of 4 feet or less, and should not be entered without local knowledge. **Shell Bar Channel,** about 1 mile NW of Ranch Bar Gap, has a controlling depth of about 3 feet through an unmarked channel.

The passage through Suwannee Sound from Derrick Key Gap is W of **Lone Cabbage Reef,** which extends NW from **Lone Cabbage Island** to East Pass, the southernmost and one of three entrances to Suwannee River. In 1972, the approach dredged channel to East Pass was reported to be impassable because of shoaling, and the daybeacons marking the channel were temporarily discontinued. Long Cabbage Reef bares in spots at low water and is to be avoided.

**Suwannee River** empties into the N part of Suwannee Sound through the two mouths known as **East Passand West Pass.** East Pass is the main entrance. West Pass is unmarked, little used, and good only for shallow-draft boats. A dredged channel leads through the shoals off the entrance to East Pass. In 1972, the dredged channel was reported to be impassable and the daybeacons marking the channel were discontinued but the structures remain.

The mean range of **tide** at the mouth of the river is 2.4 feet. Fluctuations are extreme because of freshets. Low river stage occurs in the winter, and high river stage in the fall months.

Once inside the river the centerline controlling depths, in 1967, were 1 foot from the junction of East and West Passes (29°19.0'N., 83°07.2'W.) to **Fanning,** about 26 miles above the junction, thence 3½ feet to **Ellaville,** 109 miles above the junction. At high water stages small boats can go to **White Springs,** 147 miles above the junction.

An unmarked sandbar, locally known as **Jack's Sandbar,** is about 13.7 miles above the junction of East and West Passes. The bar is about 800 yards long and 200 yards wide in places, and is said to cover almost two-thirds of the E side of the river. Depths over the bar range from less than 1 foot to 3 feet. The bar is not discernible because vegetation colors the water a dark brown. It can best be avoided by passing close to the W shore to within 75 to 100 feet of the shore vegetation.

The Suwannee River Authority has dredged new channels in the river and Salt Creek. The entrance channel leads on a bearing **102°** from a point in the Gulf about 1.4 miles 260° from **Axe Island**

(29°18'45"N., 83°10'30"W.), thence S and E of **Little Bradford Island** to **Northwest Pass.** At the SE end of Little Bradford Island, the channel divides into two branches. One branch continues E through **Wadley Pass** to a junction with West Pass. The other leads N through Northwest Pass, thence NE into **Salt Creek** to the village of **Suwannee.** Suwannee is also fronted on its E side by the Suwannee River, and is about 4 miles above the channel entrance. In August 1973, the centerline controlling depths were 2 feet in the entrance channel to its junction with Northwest Pass, thence 5½ feet to the junction with West Pass. The centerline controlling depth in the branch channel leading through Northwest Pass and into Salt Creek was 4½ feet. Private daybeacons mark these channels.

There is little commerce on the river.

A marina on the N side of Suwannee River at the town of Suwannee can provide berths, gasoline, marine supplies, and hull and engine repairs. There are marinas, several fish camps, fish wharves, and a seafood packing plant at the town on Salt Creek. Berths, gasoline, a limited supply of water, and launching ramps are available. Minor hull and engine repairs can be made. There is a post office at the town, and State Route 349 connects the town with Old Town on the main coastal highway.

Water is available at a fish camp at **Vista** about 7.5 miles above the junction of East and West Passes. Gasoline, water, and marine supplies can be obtained at **Fowler Bluff,** 10 miles above the junction of East and West Passes; at **Manatee Springs State Park,** 16 miles above the junction; and at **Old Town** at U.S. Route 19 highway bridge, 25 miles above the junction. This bridge, the first above the mouth, has a fixed span with a clearance of about 30 feet at low water and 15 feet at high water. The minimum channel clearance of the bridges crossing the river is at the Seaboard Coast Line Railroad Bridge at **Old Town** and 28 miles above the junction of East and West Passes. This bridge has a swing span with a channel width of 48 feet and a clearance of 5 feet at high water stage and 15 feet at low water stage. (See 117.240 and 117.245 (a) through (e) and (i)(6), chapter 2, for drawbridge regulations and opening signals.) An overhead pipeline and numerous overhead power cables cross Suwannee River between the mouth and Ellaville, least clearance is 23 feet.

**Boiler Gap,** about 1 mile 290° from Axe Island, was formerly used as a passage by local boats going up Salt Creek to Suwannee. The channel through Northwest Pass is now used.

**Shired Island** (29°24.0'N., 82°12.5'W.) is a village at the mouth of **Shired Creek,** about 18 miles NW of Cedar Keys. The village can be reached from the S by a winding staked channel that leads through the oyster bars. In May 1972, depths of about 3 to 5 feet were reported in the channel. Gasoline, water, marine supplies, launching ramp, and limited berths with electricity are available at a marina and fish camp at the village. State Route 357 joins State Route 351 leading to Cross City.

**Chart 11407 (1260).-Horseshoe Beach** is a village on **Horseshoe Point,** which is 5 miles WNW from Shired Creek. The village has a seafood packing plant, several fish wharves, a county wharf, and is a shrimp boat base. State Route 351 connects the village with **Cross City** on U.S. Route 19, the main coastal highway. **Horseshoe Beach Approach Light 2** (29°23.3'N., 83°20.4' W.), 16 feet above the water and shown from a triangular-shaped red daymark on a dolphin, marks the approach. A dredged channel leads from the Gulf to a turning basin at the 100-foot marginal county wharf. In August 1974, the controlling depths were 4 feet in the channel with 3 feet in the basin. The channel is marked by lights and daybeacons. A branch channel leads from the turning basin around Horseshoe Point to a basin on the N side of the point. This channel is marked by private stakes.

Spoil banks are on either side of the entrance channel about in the middle of the dredged cut. A fish haven is about 6 miles SE of the entrance light. There are fish wharves on a dredged basin that extends about 1,000 feet NE from the E end of the turning basin. There is a boatyard at the head of the basin with a marine railway that can handle craft up to 50 feet for hull and engine repairs. Berths, gasoline, diesel fuel, water, ice, marine supplies, and a launching ramp are available.

Overhead power cables leading from the mainland at Horseshoe Beach to offlying Grassy Island, Bird Island, and Cotton Island have clearances of 34 feet.

**Pepperfish Keys,** about 5 miles NW of Horseshoe Point, are the only features that a stranger can recognize between Cedar Keys and St. Marks River. Pepperfish Keys are 0.3 to 1 mile off the mainland and can be made out at a distance of 5 to 6 miles. The white sand beach on the northwesternmost key is easily identified. Protected anchorage is available for small craft N of this key where depths are 3 to 10 feet and the bottom is sand with patches of boulders. The approach to the anchorage is through an unmarked channel that extends in an ESE direction. Boats of less than 3 feet in draft can enter by keeping in dark water; the shoals are discernible by lighter color.

**Steinhatchee River** empties into **Deadman Bay** about 15 miles NNW of Horseshoe Point. **Steinhatchee River Light 1** (29°39.4'N., 83°27.4'W.), 30 feet above the water and shown from a square-shaped black daymark on a white square pyramidal tower on piles, marks the entrance. A dredged channel leads through Deadman Bay to a turning basin at the seafood plants on the S bank of the river about 2 miles above the mouth; in 1964, the controlling depth was 6 feet. Lights and daybeacons mark the channel. A water tower at

Steinhatchee is reported to be prominent from seaward.

A fish haven, marked by private buoys, is about 9 miles W of the light marking the entrance to Steinhatchee River.

**Steinhatchee** is a small village and fishing resort on the N bank of the river about 1.2 miles above the mouth. It is the base for a commercial fishing fleet and a porpoise-capturing operation. There are marinas with boat lifts and several fish camps. Craft up to 23 feet can be handled for hull and engine repairs, or open or covered storage. Berths, electricity, gasoline, diesel fuel, water, marine supplies, and launching ramps are available. On the S bank of the river about 0.5 miles above Steinhatchee are seafood packing plants, a fishing pier, and two private boatyards. Craft up to 50 feet can be handled in an emergency. Berths, gasoline, water, and ice are available.

About 2.3 miles above the mouth, State Route 358 swing bridge crossing the river has a clearance of 8 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) At **Jena** about 3 miles above the mouth, there is a small marina where water and limited berthage are available. An overhead power cable about 0.8 mile above the bridge has a clearance of 43 feet. There are several fish camps on the river above Jena. State Route 358 connects Jena with the main coastal highway, U.S. Route 19. State Route 51 runs along the N bank of the river to the main highway. State Route 361 runs along the coast as far as Adams Beach and joins U.S. Route 19 a few miles S of **Perry**.

**Dallus Creek** 5 miles NW from Steinhatchee River, has a bar across its mouth that bares at low water. Small boats of not more than 2 feet in draft use the creek as far as **Dallus Creek Landing** a mile above the mouth, where a road connects with the main highway.

The pine trees on **Piney Point** 10 miles NW from Steinhatchee River, are visible from well offshore on a clear day. Several small villages N of Piney Point have roads connecting with State Route 361 and the main U.S. Route 19 coastal highway, but offer no supplies. The village of **Fish Creek** is 0.5 mile above the mouth of Fish Creek, 2 miles N from Piney Point.

**Cedar Beach** on **Cedar Island,** about 13 miles NW of Steinhatchee and about 3 miles N of Piney Point, has a boat ramp and a fishing pier for the use of Cedar Island residents. Fresh water is available.

**Keaton Beach,** a fishing village 4 miles NW of Piney Point, is reached through a small-boat channel that had a reported controlling depth of 3 feet in May 1972. Small docks and several marinas are at the village. Berths, gasoline, diesel fuel, water, marine supplies, and hull and engine repairs are available as well as a hoist that can handle craft up to 40 feet.

**Jug Island,** a summer resort 5 miles NW of Piney Point, has a small-boat wharf. **Dekle Beach,** about 0.5 mile N of Jug Island, has a boat ramp, rental cottages, and a grocery store. **Adams Beach** is 8 miles N from Piney Point. **Yates Creek Landing** and **Spring Warrior** are small landings on the creeks of the same names 9 and 11 miles, respectively, NNW from Piney Point. A fish camp is about 0.5 mile above the mouth of the Spring Warrior Creek on the N side. Gasoline and ice are available. The privately marked creek is reported navigable by craft drawing 3 feet.

**Fenholloway River** empties into the Gulf of Mexico E of Apalachee Bay and about 17 miles NW of Piney Point. A draft of 3 feet can be taken into the river on a favorable tide, but a knowledge of local conditions is needed. The entrance is not marked. The river is navigable for only a few miles above the mouth. About 2 miles above the river's mouth is a small-boat landing but no supplies are available. A paved road connects the landing with U.S. Route 98 at **Hampton Springs** where gasoline and supplies are available.

# 6. APALACHEE BAY TO MOBILE BAY

This chapter describes the coasts of Florida and Alabama bordering the Gulf of Mexico from Apalachee Bay to Mobile Bay and the numerous bodies of water emptying into the Gulf including Apalachee Bay, St. George Sound, Apalachicola Bay, St. Joseph Bay, St. Andrew Bay, Pensacola Bay, and their tributaries. Also discussed are the ports of Port St. Joe, Panama City, and Pensacola, and other smaller ports and landings.

The Intracoastal Waterway for this section of the coast is described in chapter 12.

**Charts 11400 (1114), 11360 (1115).**-The coast consists of a chain of generally narrow and wooded sand islands that trends SW for about 40 miles from Apalachee Bay to Cape St. George, thence NW for 95 miles to Choctawhatchee Bay, and thence about 80 miles W and SW to Mobile Bay.

A **danger zone** for a guided missile test operations area extends well offshore between Apalachee Bay and Choctawhatchee Bay. (See 204.135, chapter 2, for limits and regulations.)

**Caution.**-Mariners engaged in bottom dragging operations are advised that the area between 29°23.5'N. and 29°50.5'N. and from 86°36.5'W. to 86°48.0'W., has previously been used for emergency release of munitions, and unexploded munitions are lying on the bottom.

From Apalachee Bay to St. Andrew Bay, the 10-fathom curve extends as much as 19 miles offshore; shoals with as little as 3 feet over them extend several miles from the E end of St. James Island, from Cape St. George, and from Cape San Blas. From St. Andrew Bay to Pensacola Bay the 10-fathom curve is close inshore and the beach is steep-to. The 10-fathom curve gradually extends farther offshore beyond Pensacola Bay until off Mobile Bay where it is about 11 miles offshore.

The coral formation which characterizes the coast from the Florida Keys to Apalachee Bay begins to give way in the vicinity of Cape St. George and Cape San Blas to the sand formation to the W.

**Chart 11405 (1261).- Apalachee Bay,** about 170 miles NW of Tampa Bay, is formed by the bend in the coastline from a NW to a SW direction. Depths range from 6 to 20 feet with numerous shoals and rocks, some bare at low water. The bay is the approach to St. Marks River.

**Boundary lines of inland waters.**-The line established for Apalachee Bay is described in 82.89, chapter 2.

**Danger zone.**-An Air Force rocket-firing range has been established in the Gulf S of Apalachee Bay. (See 204.111, chapter 2, for limits and regulations.)

**Econfina River,** entering the E part of Apalachee Bay, is shallow and navigable by boats drawing about 2 feet at half tide or better; although lesser depths may be found during protracted periods of offshore winds. The river channel is rocky and should be used only with local knowledge. **Econfina Landing,** on the W bank 2 miles above the mouth, has facilities for small craft. Gasoline, water, ice, a natural launching ramp, and limited berthage are available. State Route 14 leads to the main coastal highway U.S. Route 98.

**Aucilla River** flows into Apalachee Bay 4.5 miles NW of Econfina River. The approach for a distance of 3 miles is a narrow winding channel, unmarked and difficult for strangers. The river is reported to be poorly marked, fast-flowing, and with depths of over 5 feet. A fish camp is on the E bank of the river, about 2 miles above the mouth. A grass airstrip is at the camp; gasoline, food, and limited repair facilities are available. It has been further reported that by giving the bends in the river a good berth, and by avoiding the rocks in the channel which are discernible by ripples, boats drawing 4 feet will have little difficulty. Local knowledge is advised.

**St. Marks National Wildlife Refuge** covers much of the coastal area between Aucilla River and Ochlockonee Bay, about 12 miles SW of St. Marks River.

**Chart 11406 (484).-St. Marks River** flows into the head of Apalachee Bay 83 miles NW of Cedar Keys and 54 miles NW of Cape St. George. The river is the approach to the town of **St. Marks** about 5.5 miles above the entrance. A cracking plant, several oil terminals, a chemical plant, and a powerplant, which is about 0.5 mile above the town, are the principal facilities on the river. Barges constitute the major traffic on the river.

**Prominent feature.-St. Marks Light** (30°04.4'N., 84°10.8'W.), the most conspicuous object in the approach to St. Marks River, is 82 feet above the water and shown from an 80-foot white conical tower adjoining a one-story dwelling. The light also serves as the rear light to the **356°02'** lighted entrance range.

**Channels.**-A dredged channel leads from the Gulf into St. Marks River to a turning basin at St. Marks, thence to the powerplant about 0.5 mile above the turning basin. In June 1972, the controlling depths were 12 feet at midchannel to the powerplant. The channel is marked by a lighted range, lights, daybeacons, and lighted and unlighted buoys. The natural channel of the river has

depths of 8 feet or more from the head of the dredged channel to the U.S. Route 98 highway bridge at Newport, about 4 miles above St. Marks.

A land cut, about 500 yards long, has been dredged from the E side of Spanish Hole, about 0.3 mile NW of St. Marks Light for the St. Marks National Wildlife Refuge boat anchorage. In 1972, the channel had a reported controlling depth of about 2 feet. A public launching ramp is available on the land cut.

**Dangers.**-Shoal water extends about 3 miles S of St. Marks Light, and numerous shoals are on both sides of the channel. They are for the most part unmarked.

**Tides and currents.**-The mean range of tide in St. Marks River is 2.4 feet. (See the Tide Tables for predictions.) The tidal current in St. Marks River approach averages about 0.5 knot at strength. In the river the average is from 0.3 to 0.4 knot, although 2-knot currents have been reported.

**Wakulla River** enters St. Marks River 5 miles N of St. Marks Light. A draft of about 7 feet can be taken upriver for about 0.4 mile above the confluence, and about 3 feet to just above U.S. Route 319 highway bridge, about 5 miles above St. Marks. At this point the river is closed to navigation by a 6-foot-high fence across the river that provides protection for a wildlife refuge. The channel is obstructed by grass, and local knowledge is needed to carry the best water.

The **San Marcos De Apalache State Park and Monument** is on the point formed by the confluence of St. Marks and Wakulla Rivers. A private yacht club and a fish camp are on the E side of Wakulla River about 0.5 and 0.8 mile, respectively, above the confluence of the rivers. Berths, gasoline, and a launching ramp are available.

**Wharves.**-The river front at St. Marks has several oil terminal wharves and a power company wharf. The wharves are used to unload petroleum products from barges and, in 1972, had reported depths of 10 to 15 feet alongside. There are several marinas, two of which have boatyards. The larger of two marine railways can handle craft up to 60 feet for hull and engine repairs. Open or covered storage is available as well as open and covered berthage with electricity and launching ramps.

**Supplies.**-Gasoline, diesel fuel, water, ice, and marine supplies are available.

An overhead power cable with a clearance of 58 feet crosses St. Marks River about midway between St. Marks and Newport.

**Newport** is a small resort about 3.4 miles above St. Marks. There is a boatyard at Newport, which builds fiberglass boats up to 86 feet; craft up to 100 feet can also be hauled out for hull and engine repairs. U.S. Route 98 highway bridge crossing the river at the N part of the town has a 40-foot bascule span with a clearance of 9 feet. (See 117.240 and 117.245 (a) through (e) and (i) (6-a), chapter 2, for drawbridge regulations and opening signals.) A public launching ramp is above the bridge at Phillips State Park. Fuel and some supplies are available.

**Chart 11405 (1261).**-A beach resort is at **Shell Point** (30°03.4'N., 84°17.4'W.), about 5 miles W of St. Marks River. A marina is in a privately dredged basin on the point. Berths, electricity, gasoline, diesel fuel, water, ice, and marine supplies are available. There is a concrete launching ramp, and craft up to 30 feet can be hauled out for engine and hull repairs or storage. A motel and restaurant are nearby. In June 1972, depths of 5 feet were reported in the privately marked entrance channel and 5 to 10 feet in the basin. The mean range of **tide** is 2.5 feet. **Shell Point Light** (30°02.4'N., 84°17.5'W.), 17 feet above the water and shown from a square-shaped black daymark on a pile, marks the approach. Private sailboat mooring facilities are in a basin just N of the marina.

**Spring Creek,** 2 miles NW of Shell Point, is entered through a narrow, winding, and privately marked channel that leads between oyster bars to two small marinas on the E side of the creek, about 0.5 mile above the entrance. Local knowledge is advised. Berths and gasoline are available at the marinas.

**Panacea Harbor,** in **Dickerson Bay,** is about 11 miles SW of St. Marks Light. A dredged channel, with a controlling depth of 6 feet in February 1975, leads from Apalachee Bay to the public wharf at the town of Panacea. The channel is marked by lights and daybeacons. Panacea is a summer resort and fishing center with a seafood processing plant in the harbor and several more in town. Gasoline and some supplies can be obtained in town. The mean range of **tide** is 3.4 feet.

**Ochlockonee Bay,** on the W side of Apalachee Bay, is a shallow bay 5 miles long and a mile wide. The approach from Apalachee Bay is obstructed by shoals, which probably shift from time to time. The S half of the mouth is closed entirely by oyster bars. The entrance is between **Ochlockonee Point** on the N and **Bald Point** on the S. **Ochlockonee Bay Approach Light 2** (29°56.0'N., 84°18.0'W.), 16 feet above the water and shown from a red triangular daymark on a pile, about 3 miles SE of Ochlockonee Point, marks the approach to the bay.

A narrow channel marked by private markers leads into the bay. In May 1972, it was reported that craft drawing up to 8 feet experienced no trouble going to the facilities about 1.5 miles above the bridge. Craft up to 50 feet long can dock at the long pier on the N side of Ochlockonee Bay about a mile in from the end of Ochlockonee Point. In February 1965, there was reported to be 10 feet at the end of the pier and 9 feet in a dredged basin close E of it. A marina in the basin has covered and open berths with electricity, a launching ramp, and open and covered dry storage. Gasoline, diesel fuel, water, ice, and some marine supplies are available. Provisions can be obtained in Panacea.

U.S. Route 98 highway bridge, about 2.3 miles W of the entrance to the bay, has a 36-foot fixed span with a clearance of 13 feet. A launching ramp is at the S end of the bridge.

About 1.5 miles W of the bridge on the N bank, there is a marina in a basin reported to be privately dredged to 12 feet. In June 1972, a depth of 9 feet was reported in the privately marked channel from the bay. Berths, gasoline, water, ice, marine supplies, and storage are available. There is a concrete launching ramp and a 7½-ton forklift that can haul out craft up to 25 feet for hull and engine repairs, or dry open or covered storage.

With local knowledge, a depth of 4 feet can be carried through **Buckhorn Creek** into **Sopchoppy River** to the fixed highway bridge about 7 miles from the bay. The bridge has a 33-foot channel span and clearance of 6 feet. The creek is little used.

**Ochlockonee River**, emptying into the head of Ochlockonee Bay, leads W to the junction of Crooked River and then turns N and finally E. A depth of 5 feet, with local knowledge, can be found for 29 miles. U.S. Route 319 highway bridge about 6 miles above the mouth has a 33-foot fixed span and clearance of 10 feet. The river is little used. About 8 miles above the mouth, piling of a former railroad bridge is a hazard in the river. A launching ramp is reported available at a State park on the N side of the river, about 4.5 miles above the mouth.

**Crooked River**, a narrow, crooked tidal stream 22 miles long, connects Ochlockonee River with Carrabelle River. In June 1961, Crooked River was completely blocked by trees and growth about 10 miles above the E mouth.

**Ochlockonee Shoal**, lying about 8 miles SE of Ochlockonee Point, has depths of 3 to 17 feet. Although the shoal is separated from St. James Island by lanes of moderate depths, there is no safe passage between the shoal and the island except for small craft. A lighted bell buoy is SE of the shoal. The buoy also marks the approach to St. Marks River and Apalachee Bay.

There are three fish havens in Apalachee Bay. The first is about 2.2 miles 167° from Shell Point Light, the second about 4.5 miles 108° from Ochlockonee Bay Approach Light 2, and the third about 4.6 miles 161° from St. Marks Light. The first two are each marked by a white and orange special purpose buoy; the third is unmarked.

**Charts 11405 (1261), 11401 (1262).-St. George Sound and Apalachicola Bay** are adjoining bodies of water, 40 miles long and 3 to 6 miles wide, separated from the Gulf by Dog, St. George, and St. Vincent Islands. Both sound and bay are generally shallow with numerous oyster reefs and shoals dangerous to navigation. East Pass, West Pass, and the cut through St. George Island south of Apalachicola are the principal entrances to the sound and the bay from the Gulf, and thence into the towns of Carrabelle and Apalachicola.

**St. James Island** is the 20-mile-long portion of coast from **Lighthouse Point**, on the W side of Apalachee Bay, W to Carrabelle. The island is separated from the mainland by Ochlockonee Bay, and by Ochlockonee, Crooked, and Carrabelle Rivers.

**South Shoal** extends S from the E end of St. James Island for about 6 miles. The sea breaks on portions of the shoal even in good weather. A lighted whistle buoy marks the S end of the shoal.

**Duer Channel**, unmarked and subject to frequent changes, lies at the E end of St. George Sound between South Shoal and Dog Island Reef. The channel is used occasionally by light-draft vessels with local knowledge, but is difficult for strangers.

**Alligator Harbor**, a shallow body of water at the E end of St. George Sound, is formed by a long, narrow spit of land that extends W from Lighthouse Point to Peninsula Point. The harbor is entered from Duer Channel through a crooked channel, marked at the entrance by a private dolphin, that leads from just S of **Peninsula Point** to a marina and basin about 0.8 mile E of the point. In June 1972, depths of about 4 feet were reported in the channel, and depths of 7 to 12 feet in the basin. The channel requires local knowledge, and local guides are available to act as pilots. Good anchorage can be found in depths of 5 to 7 feet, hard sand bottom, N of Peninsula Point.

Gasoline, diesel fuel, water, ice, marine supplies, storage facilities, and a 40-ton mobile hoist that can handle craft up to 65 feet are available at the marina; hull and engine repairs can be made. The marina reportedly monitors VHF-FM channel 16 (156.80 MHz) continuously.

Prominent at Alligator Harbor are the large green boat storage building and skeleton tower at the marina, and the water tank at Southwest Cape, about 1.7 miles W of Lighthouse Point.

**Storm warning signals are displayed.** (See chart.)

**Dog Island Reef**, lying 5 to 6 miles offshore S of St. James Island, extends from a point about 5 miles WSW of Lighthouse Point to the E end of Dog Island. There are depths of 2 to 6 feet over a considerable part of the reef. Local fishermen sometimes enter St. George Sound through the shoal close to the eastern side of Dog Island. The reef is marked near its NE extremity by a light and by a buoy near its W end about 2.7 miles E of the E end of Dog Island.

N of Dog Island Reef and about 4.5 miles W of Peninsula Point a privately dredged and marked channel, with a reported controlling depth of 10 feet in 1972, leads to a basin on which is the Florida State University's Ed Ball Marine Laboratory. The 180-foot concrete marginal wharf had a reported depth of 10 feet alongside.

**Dog Island**, a narrow, sparsely wooded island over 5 miles long, is the first land sighted in approaching East Pass from the SE. A toll ferry runs from Carrabelle to the small cove on the N side at the E end of the island. Several houses are on the

island, and lodging is available near the ferry landing. In 1972, the reported controlling depth was 6 feet to the ferry slip. The channel is reported to be marked by private aids. Gasoline and limited berthage are available at a small marina in the cove.

A private boat basin, used by local residents, is at the small village of **Lanark**, about 9 miles W of Peninsula Point. In 1972, the private channel leading to the basin had a reported controlling depth of 1 foot. A launching ramp, gasoline in cans, and berths are available in the basin.

**Chart 11404 (865-SC).-Carrabelle Harbor** is at the entrance to Carrabelle River which flows into St. George Sound. The principal entrance to the harbor and the sound is through **East Pass** between Dog and St. George Islands, about 31 miles SW of St. Marks Light. **Carrabelle** is a small town at the mouth of the river that has a flour mill, an oil terminal, and seafood processing plants. The town is on the main coastal highway, U.S. Route 98, and a good road leads to the interior.

**Carrabelle River** flows into St. George Sound 5 miles NNE of East Pass. River currents are rather strong on the ebb. A highway bridge about 0.4 mile above the basin has a swing span with a channel width of 40 feet and a clearance of 9 feet; the nearby overhead power cable has a clearance of 50 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

**Prominent features.**-Approaching East Pass from SE on a clear day, the first objects to be seen are the sand dunes on Dog and St. George Island. On closer approach, the trees on the mainland can be seen over the islands and a few pine trees will be noticed near the W end of Dog Island. A water tower and several radio towers are also prominent.

**Crooked River Light** (29°49.6'N., 84°42.1'W.), 115 feet above the water, is shown from a 103-foot-square skeleton tower, lower half white, upper half dark red, on the N shore of St. George Sound, about 2.3 miles W of the town.

**Channels.**-A dredged channel leads from the Gulf of Mexico for 3 miles through East Pass to a point W of Dog Island, thence for 5 miles through St. George Sound and Carrabelle River to a turning basin at the town of Carrabelle. From the turning basin, the channel continues for 3 miles to the confluence of New and Crooked Rivers. In 1973-January 1974, the controlling depths were 15 feet from the Gulf to the turning basin, 11 feet at midchannel in the turning basin, and thence 6 feet to the confluence of New and Crooked Rivers.

The channels are marked by lighted ranges, a light, lighted and unlighted buoys, and daybeacons. A 022°24' lighted range leads through the harbor channel, and a 324° lighted range leads into the river entrance.

In heavy seas, deep-draft vessels should stay in depths of 30 to 40 feet until Carrabelle Channel Lighted Whistle Buoy 1 is picked up. In 1969, a submerged object, covered 15 feet, was reported in the vicinity of the whistle buoy.

**Anchorages.**-Vessels may anchor in St. George Sound behind the W end of Dog Island in depths of about 20 feet and to the NW of the E end of St. George Island in depths of 18 to 20 feet. At these anchorages, vessels with good ground tackle can safely ride out any gale except a hurricane. Small boats can anchor closer inshore behind the hook at the E end of St. George Island or at various points in the sound where depths are suitable.

**Tides and currents.**-At East Pass and Carrabelle the diurnal tidal range is about 2.6 feet. The tidal currents are strong, sometimes having a velocity of 3 to 4 knots, and ordinarily at least 1 knot. They usually set across the shoals at an angle with the channel, and great care should be taken not to be set toward the shoals on either hand.

**Storm warning signals are displayed.** (See chart.)

**Pilotage.**-Arrangements can be made for local fishing guides to pilot yachts from Carrabelle to Tampa and other coast ports.

Carrabelle is a **customs port of entry.**

**Wharves.**-The flour company wharf, with a reported depth of 7 feet alongside, is the largest wharf at Carrabelle. A town wharf, several fish wharves, and service wharves are along the waterfront. There is a tieup berth for barges on the S bank of the river opposite the town.

**Small-craft facilities.**-Two boatyards and three marine railways are available at Carrabelle. The largest marine railway can handle craft up to 40 feet for hull and engine repairs or dry open storage. Berths, gasoline, diesel fuel, water, ice, marine supplies, and launching ramps are available.

**Charts 11404 (865-SC), 11402 (866-SC), 11401 (1262).-St. George Island,** the S boundary of Apalachicola Bay, extends about 24 miles W from East Pass. The island is densely wooded except at its E end, which is a low and barren spit. A marked channel leads to the town of **Eastpoint,** a mile NE of Cat Point. In February 1975, the midchannel controlling depths were 6 feet in the entrance channel, thence 6 feet in the channel paralleling the shore at Eastpoint. A bridge-causeway extends from Cat Point to St. George Island; clearances are given in chapter 12. Gasoline in cans, groceries, and ice are available on St. George Island from a store at the SW end of the causeway. Gasoline and limited marine supplies are available at the wharves at Eastpoint. There are seafood packing plants and numerous fish piers at Eastpoint.

**Bulkhead Shoal,** which extends from Cat Point S to Bulkhead Point on St. George Island, marks the dividing line between St. George Sound and Apalachicola Bay. The Intracoastal Waterway has been dredged through this shoal. An overhead power cable with a clearance of 40 feet crosses along the shoal, but is submerged at the waterway channel.

**West Pass** enters Apalachicola Bay between **Sand Island,** the NW tip of St. George Island, and **St. Vincent Island.** The pass is the W approach to Apalachicola Bay and the town of Apalachicola.

**Apalachicola** is on the N shore of Apalachicola Bay at the mouth of the Apalachicola River. The principal industries are fishing and oystering. Waterborne commerce consists of petroleum products, chemicals, fertilizer products, sand, gravel, cement, liquid and dry sulfur, grain, feeds, and logs. The port is the gateway for the extensive river systems of the Chattahoochee and Flint Rivers. The Intracoastal Waterway enters Apalachicola River, passes the town, and then continues W through Jackson River. (See chapter 12.) The town has several historic buildings, a museum, and a hospital.

**Prominent features.-Cape St. George Light** (29°35.2'N., 85°02.8'W.), 72 feet above the water and shown from a white conical tower on the W end of the island, is the most conspicuous object in the West Pass area. From inside the pass on the approach to Apalachicola, the water tank, several microwave and radio towers, a radar dome, and the highway bridges are prominent.

**Dangers.**-A fan-shaped test firing area, marked by unlighted buoys, is centered about 4 miles S of Cape St. George Light. (See 204.112, chapter 2, for limits and regulations.)

**Channels.**-The main entrance to Apalachicola Bay is through a land cut dredged through St. George Island from the Gulf into the bay about 4.9 miles E of St. George Light. The entrance to the cut is protected by twin jetties. In February 1975, the midchannel controlling depth was 9 feet. The channel is marked by a lighted bell buoy at the entrance, a **334°30'** lighted range, and two daybeacons at the inner end of the dredged cut.

The channel from the Gulf through West Pass and Apalachicola Bay to Apalachicola is entered through a buoyed bar channel, marked at the entrance by a lighted buoy, about 3.7 miles W of Sand Island. The passage from inside the pass to Apalachicola is via Link Channel leading SE along the N side of the W end of St. George Island to the Lower Anchorage and Horseshoe Cove, thence NE via an unmarked route across Apalachicola Bay to the Intracoastal Waterway, and thence to Apalachicola. The bar channel is subject to frequent shoaling, and is marked by buoys which may be relocated to mark the best water without prior notice. Mariners should use caution when transiting West Pass. Once inside the pass, depths of about 9 feet can be carried to Apalachicola. Link Channel is marked by lights and a daybeacon.

A swash channel, used considerably by local fishermen, lies inside **East Bank** and Sand Island. The channel has a depth of about 3 feet and is passable in all but severe weather. St. George Island Channel and the West Pass channels join the Intracoastal Waterway about 3.5 miles S of Apalachicola.

**Two Mile Channel,** a dredged channel, leads N for 1.2 miles from the bay to a lateral channel leading E and W, parallel to the shore, off the fishing village of **Two Mile,** about 2 miles W of the entrance to Apalachicola River. In October 1974, the controlling depths were 6 feet in the entrance channel, thence 6 feet in the channel paralleling the shore. An entrance light and daybeacons mark the channel.

**Scipio Creek Channel,** a dredged channel, leads from the river off Apalachicola to a municipal boat basin in **Scipio Creek.** In October 1974, the controlling depths were 8 feet in the channel and in the basin.

**Anchorages.**-Vessels may anchor anywhere in **Upper Anchorage** in Apalachicola Bay where depths are suitable. Good anchorage in depths of 12 to 15 feet may be found in **Lower Anchorage,** E of Sand Island. Another good anchorage is about 1 mile S of the turn in the channel leading to Apalachicola.

**Dangers.**-An Air Force **restricted area** for drone recovery is close W of the dredged land cut through St. George Island. (See 204.113, chapter 2, for limits and regulations.)

**Cape St. George Shoal** extends 11 miles S from **Cape St. George,** the SW tip of St. George Island. The shoal consists of several detached spots with moderate depths between them. The shoal is marked by a whistle buoy on its S end and by a buoy off its E side.

Shoals extend more than 3 miles offshore at West Pass. The approach is marked by a lighted buoy and several other buoys which are shifted to conform to changes in the channel.

**Caution.**-The Apalachicola River entrance lighted range is partly obstructed by the highway bridge. The front range is a flashing light suspended below the bridge deck in the third bent W of the swing span and is difficult to see from the channel entrance. The rear range shows above the bridge deck, but may be difficult to identify in the daytime if vessels with tall masts are docked at the wharves north of the bridge. On the sides of the channel are ruins of wooden jetties extending 2 miles S of the highway bridge.

**Tides and currents.**-The diurnal range of tide at West Pass is about 1.4 and 2.2 feet at Cat Point. The currents are influenced by the winds and by freshets, and at times are very strong, especially the ebb; at flood they are generally weak. A velocity of 3 knots has been observed in West Pass Channel at a point inside the bar about 1.2 miles E of the bell buoy. The ebb current runs out through West Pass and divides, part going to the S over the breakers and part following the deeper water to the bar, the latter being the stronger.

In Apalachicola River, the diurnal range of tide is about 1.7 feet at Apalachicola and the current is principally ebb. With strong winds from the N and E there will be little or no flood current or even slack water, and the height of the water in the bay

and river will be reduced a foot or more. The tides meet somewhat to the W of Bulkhead Shoal, the ebb current flowing E through the cut.

**Weather.**-Apalachicola is located in a coastal area that is low and flat and surrounded by the Gulf of Mexico to the S from the ENE to the WNW, and with many rivers, creeks, lakes, and bays to the N. Apalachicola is situated at the mouth of the Apalachicola River and on the Apalachicola Bay which extends from the NE through W of the city. Islands to the E and S offer very good protection from the occasionally rough seas of the Gulf. The land area is generally sandy, and heavily covered with pine and cypress forests and scattered palmetto palms.

The climate of this locality is typical of that experienced on the N Gulf of Mexico. Because of the moderating effect of the surrounding Gulf, temperatures are usually mild and subtropical in nature, but are subject to occasional wide winter variations. Average temperatures for the summer are more uniform with a range of about 5°F. The highest temperature on record is 102°F. and the lowest is 13°F., a range of 89°F.

Average yearly rainfall values vary widely. Actual monthly values show even greater variability. Rain of 0.01 inch or more can be expected on about 106 days a year with the highest frequency in July and the lowest in November.

Thunderstorms occur in all months. About three-fourths of the average annual number occur during the summer.

Hail has fallen on occasions, but averages less than one occurrence a year. There is no record of sleet or glaze. Snow has fallen on rare occasions, but melted as it fell on most occasions. A measurable amount fell only 2 years during the entire period of record.

Only a very few tropical storms have affected Apalachicola. Although Apalachicola is located on the Gulf Coast, hurricane velocity winds have not occurred during the period of record.

The National Weather Service maintains an office in the Post Office. **Barometers** may be compared there or by telephone.

(See page T-2 for **Apalachicola climatological table.**)

**Pilotage.**-Pilots are not available, but local fishing guides can be hired as pilots for the adjacent waters and the Gulf.

Apalachicola is a **customs port of entry**.

The U.S. Public Health Service maintains a **contract physician's office** in the town. (See appendix for address.) There is a public hospital.

**Agricultural quarantine** officials are stationed in Pensacola. (See appendix for address.)

The Coast Guard **vessel documentation office** in Pensacola serves Apalachicola. (See appendix for address.)

**Apalachicola River,** formed by the junction of Flint and Chattahoochee Rivers, flows S for about 98 miles into the N part of Apalachicola Bay. The Intracoastal Waterway extends through the lower part of Apalachicola River, branching W through **Jackson River** at its confluence with Apalachicola River about 5 miles above the latter's mouth. (See chapter 12.) In 1973, the controlling depth in Apalachicola River from Jackson River to the Chattahoochee River was 7½ feet. The channel is marked by buoys and daybeacons.

The John Gorrie Memorial Bridge, a highway causeway, crosses the mouth of the Apalachicola River from **East Point** to Apalachicola. The bridge has a swing span of 28 feet over the main channel. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) Overhead power and telephone cables immediately N of the bridge have a clearance of 84 feet.

About 3.7 miles above the mouth, the river is crossed by a railroad swing bridge with a clearance of 11 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

N and S of the John Gorrie Memorial Bridge are numerous private docks with small-craft berths. The municipal pier and basin are about 300 yards S of the bridge. Berths and a launching ramp are available. In 1972, the pier had a reported depth of about 3 feet alongside the outer face, with 5 feet reported in the basin.

**Small-craft facilities.**-There are several other small-craft facilities at Apalachicola. The largest haul-out capability, at a boatyard on the S side of Scipio Creek, is a 240-ton marine elevator that can haul out craft up to 85 feet for virtually any type of repairs. A machine and woodworking shop are at the yard, and boats up to 86 feet in length are built. There are fish piers on Two Mile Channel, and gasoline and some services are available. Gasoline, diesel fuel, water, ice, and marine supplies are available on the waterfront.

**Communications.**-The town is served by the freight service of the Apalachicola Northern Railroad Company, and the main coastal highway U.S. Route 98 passes through the town.

**Chattahoochee River,** about 365 miles long, rises in NE Georgia and flows generally SW and S to a confluence with Flint River and Apalachicola River at the SW corner of the State. In 1970, a 9-foot channel was available for 142 miles to Columbus, Ga.

There are three dams and navigation locks which are 450 feet long, 82 feet wide, and have a minimum depth of 13 feet over the sills. **Jim Woodruff Dam and Lock,** on the Apalachicola River about 93 miles above the mouth, is 0.5 mile below the confluence of the three rivers. **George W. Andrews (Columbia) Dam and Lock** is about 40 miles above the confluence. **Walter F. George Lock and Dam** is about 65 miles above the confluence. There are general cargo wharf and an oil terminal, and a public ramp at Columbia, Ala., about 43 miles above the confluence, and a marginal masonry general cargo wharf at Columbus, Ga.

**Flint River,** about 287 miles long, rises in central Georgia, flows generally southeastward to **Albany, Ga.,** thence SW to its confluence with Apalachiola and Chattahoochee Rivers, about 25 miles below **Bainbridge, Ga.** There is a public concrete general cargo wharf and an oil terminal at Bainbridge. There is a private wharf with railroad siding at **Chattahoochee** Fla., a few miles below Jim Woodruff Dam. The wharf is used mainly for handling of sand and gravel. There are recreation and small-craft facilities on the three rivers.

Navigation charts for the Apalachicola, Chattahoochee, and Flint Rivers System are available from the District Engineer, U.S. Army Corps of Engineers, P.O. Box 2288, Mobile, Alabama 36628.

**St. Vincent Sound** is a shallow and unimportant extension of Apalachicola Bay at its NW end. The sound can be entered from E through Apalachicola Bay or from the W through **Indian Pass,** a narrow, shifting, unmarked channel. Strangers should not attempt the pass, which is shallow and used only by local fishing vessels. Three tanks and two radio towers on Indian Peninsula are conspicuous.

**Cape San Blas,** 16.5 miles WNW of Cape St. George, is low and wooded. **Cape San Blas Light** (29°40.3'N., 85°21.4'W.), 101 feet above the water, is shown from a 96-foot white square skeleton tower enclosing a stairway cylinder. The light is obscured from 211° to 251°. A radiobeacon is near the light.

**Cape San Blas Shoals,** with depths of 18 feet or less, extend 4 miles S from the cape. Depths of 24 to 30 feet are found 10 miles S and SW of the cape. A lighted bell buoy is moored about 13.5 miles SW of the cape. The waters inshore from the buoy should be avoided by all except light-draft vessels.

With a fresh breeze from any quarter S of E and NW, rough water may be expected at the cape and a breaking sea may run far offshore. Between December and March, fog is frequently encountered off Cape San Blas.

A swash channel marked by buoys crosses the shoals about 2 miles S of the light; depths are about 12 to 14 feet. Although local craft use this channel on a smooth sea, strangers should not. Close inshore is the foundation of a former lighthouse, covered 5 feet.

A **danger zone** of an air-to-air firing practice range is in the Gulf S and W of Apalachicola. (See 204.114, chapter 2, for limits and regulations.)

**Charts 11393 (867-SC), 11389 (1263).-St. Joseph Bay,** which extends about 12 miles N of Cape San Blas, is separated from the Gulf by a long, narrow strip of land and sand hills, wooded in places, that curves NNW from the cape. St. Joseph Bay, recognized as one of the best harbors on the Gulf, is easily entered except during periods of very severe weather such as hurricanes. **St. Joseph Entrance Lighted Whistle Buoy SJ** (29°52.0'N., 85°29.5'W.) marks the entrance.

**Port St. Joe** is a town on the E shore of St. Joseph Bay. A large papermill on the waterfront and two chemical plants on Gulf County Canal furnish the main industry for the town. Fumes from the papermill may discolor paint overnight if docked or anchored on the windward side of the stack. Waterborne commerce consists mainly of paper, marine supplies, and chemical products.

**Time.**-Port St. Joe uses eastern standard time.

**Prominent features.**-The stack and buildings of the papermill and the chemical plant are the most prominent objects visible from the Gulf. Several water tanks are conspicuous at a closer distance inshore.

**Vessels should approach the harbor within the Port St. Joe Safety Fairway.** (See 209.135, chapter 2.)

A fish haven with an authorized minimum depth of 34 feet is close off the SE side of the entrance to the Port St. Joe Safety Fairway about 1.6 miles S of St. Joseph Entrance Lighted Whistle Buoy SJ.

**Channels.**-From the Gulf, the dredged channel leads across 18-foot shoals to the deeper water inside. Federal project depths are 37 feet to a point about 0.5 mile N of St. Joseph Point, thence 35 feet to Harbor Channel and to a turning basin immediately to the W, thence 35 feet to South Channel, thence 27 feet in South Channel; project depth in the turning basin is 32 feet. (See Notice to Mariners and latest editions of the charts for controlling depths.) In 1972, it was reported that the South Channel was no longer maintained.

In 1968, a shoal was encroaching into the W side of the entrance channel at a point about 0.2 mile NE of St. Joseph Point. A lighted buoy marks the shoal; extent of shoaling is unknown. In 1970, shoaling, marked by a light, had occurred along the W edge of the turning basin.

The channels, except for South Channel, are marked by lights and buoys; lighted ranges mark the entrance channel and North Channel. Port St. Joe Entrance Channel lighted range on top of the papermill is often difficult to see because of the smoke and fumes from the mill.

A swash channel with a depth of 14 feet follows the shore of **St. Joseph Point** at a distance of 0.2 mile and passes between the shore and a shoal that has a depth of about 8 feet. The channel is subject to frequent changes and should be used only with local knowledge.

**Gulf County Canal,** a dredged cut, provides a connection between St. Joseph Bay and the Intracoastal Waterway. In May 1971, the midchannel controlling depth was 9½ feet. Near the bay entrance the canal is crossed by a bascule bridge with a clearance of 10 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) The overhead power cable crossing the canal at Highland View has a clearance of 85 feet.

**Anchorages.**-Depths of 24 to 37 feet with hard sand or hard mud bottom are available throughout most of the interior part of the bay. The S third of

the bay, a shelf along the sides, and several spoil areas along the entrance channel and along the E side of St. Joseph Spit are shoal. (See 110.193a, chapter 2, for limits and regulations of **explosives anchorage areas.**)

In St. Joseph Bay the diurnal range of **tide** is about 1.4 feet.

**Pilotage** is compulsory for all foreign vessels and U.S. vessels under register in foreign trade if drawing more than 6 feet of water. Pilotage is optional for U.S. coastwise vessels that have on board a pilot licensed by the Federal government. Vessels desiring a pilot should give at least 18 hours' advance notice to Port St. Joe Pilots Association by telegraph, by radiotelephone through the Mobile Marine Operator (WLO) telephone (904-229-1581), or through the ships' agents. Telegraph service is not available at night. Pilots board incoming vessels in the vicinity of sea buoy (St. Joseph Bay Entrance Lighted Whistle Buoy SJ, 29°52.0'N., 85°29.5'W.). The 44-foot pilot boat has a black hull with the word PILOT on either side of its white deckhouse. A white light over a red light are displayed at night. The pilot boat monitors VHF-FM channel 16 (156.80 MHz) 2 hours in advance of the ETA, and is also equipped with VHF-FM channels 6 (156.30 MHz), 10 (156.50 MHz), and 12 (156.60 MHz).

**Towage.**-Tugs are obtained from Panama City when required.

**Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) The U.S. Public Health Service maintains a **contract physician's office** in Port St. Joe. A hospital is in the city.

**Customs.**-Vessels bound for Port St. Joe notify the customs officer at Pensacola of their arrival. Port St. Joe is a **customs port of entry.** The Deputy Collector of Customs at Panama City usually comes to the vessel at the first opportunity. The records for St. Joe are maintained at Panama City.

**Immigration** affairs are handled out of the Mobile, Ala., headquarters.

**Agricultural quarantine** officials are stationed in Pensacola. (See appendix for address.)

**Harbor regulations.**-There is a harbormaster who assigns berths and supervises the moorings. There are no formal printed harbor regulations. The Port St. Joe Port Authority has jurisdiction over the port. The harbormaster can be reached by radiotelephone (904-227-3641). A **speed limit** of 4 m.p.h. is posted in the harbor.

**Wharves.**-A large papermill and an adjoining oil storage depot have a dock 0.5 mile long with depths of from 26 to 28 feet alongside on the waterfront.

**Supplies.**-Bunker C is available on an emergency basis. Diesel fuel, provisions, water, and limited marine supplies are available.

**Repairs.**-Only minor above-the-waterline repairs can be made at Port St. Joe.

**Small-craft facilities.**-The municipal boat basin and marina, and an adjacent marina are on the N bank of the Gulf County Canal just NE of the highway bridge. Berths, gasoline, diesel fuel, water, ice, marine supplies, and a launching ramp are available.

**Communications.**-Port St. Joe is served by the Apalachicola Northern Railroad and is on the main coastal highway, U.S. Route 98. Interstate bus service is available.

**Bell Shoal** is the broken ground NW of the entrance channel making off from St. Andrew Point, 6.5 miles NW of St. Joseph Point.

**Mexico Beach** is a small resort community about 4.5 miles N of St. Joseph Point. An unmarked channel, with a reported controlling depth of 5 feet in 1972, leads to **Salt Creek.** Several small marinas are on the creek. Berths and gasoline are available, and a 10-ton forklift can haul out craft up to about 28 feet for storage or minor hull and engine repairs.

**Crooked Island** is a narrow island extending 7 miles NW from St. Andrew Point. The island encloses **St. Andrew Sound,** a shallow, unimportant body of water.

A **restricted area** of a drone launch corridor extends through St. Andrew Sound into the Gulf of Mexico. (See 207.175e, chapter 2, for limits and regulations.)

**Chart 11391 (489).-St. Andrew Bay,** a narrow irregularly shaped harbor, lies 30 miles NW of Cape San Blas. Excellent anchorage and protection during hurricanes can be found in this nearly landlocked harbor and its tributary inlets, West, North, and East Bays. A ship channel, protected by jetties, in a land cut through Shell Island, forms a passage from the Gulf to St. Andrew Bay. A fish haven lies about 2.5 miles SW of the entrance.

**Panama City** is the seat of Bay County. One of the largest papermills in the world is at **Bay Harbor,** E of Panama City proper. Waterborne commerce consists mainly of general cargo, paper and petroleum products, shell, scrap iron, marine supplies, chemicals, fertilizers, and small amounts of fish.

**Prominent features.**-On the approach from seaward, the shore first appears as a low unbroken line of woods. Closer approach shows the sand beach in an unbroken white line, with exception of East Entrance which shows as dark breaks in the white expanse. A Navy-maintained research platform 10.5 miles SW of the channel entrance is prominent. The dredged cut will not show unless the vessel is on or near the line of the cut. The first landmarks to be seen are the smoke and tall stacks of the papermill at Bay Harbor and two 130-foot water tanks at **Tyndall Field,** about 5 miles SSE of the stacks. An aerolight is atop the red-and-white checked E tank. Next seen are the Municipal Auditorium at the Panama City Marina, and the

elevated water tank at St. Andrew, a subdivision of Panama City.

**St. Andrew Bay Entrance Lighted Bell Buoy SAB** (30°05.5'N., 85°46.4'W.) about 2.2 miles SW of the entrance to the dredged channel, marks the approach.

**Vessels should approach the harbor within the Panama City Fairway.** (See 209.135, chapter 2.)

**Channels.**-The Federal project for Panama City Harbor provides for an entrance cut through Shell Island 34 feet deep, thence 32 feet deep in the bay. (See Notice to Mariners and latest editions of charts for controlling depths.) The entrance channel is marked by a **052°10'** lighted range and lighted buoys.

**East Entrance,** SE of Shell Island, is not marked, constantly shifting, and considered unsafe for navigation.

**Anchorages.**-Excellent anchorage can be found almost anywhere in the bay where the depth is suitable. The usual anchorage for large vessels is off the wharves at Panama City to the W of **Redfish Point** in depths of 35 to 40 feet.

**Dangers.**-Danger zones for small arms firing ranges are SE of the entrance to St. Andrew Bay. (See 204.120, chapter 2, for limits and regulations.)

**Prohibited areas** with lighted platforms and fog signals are 11 miles SW and 2.3 miles W of the entrance to St. Andrew Bay. (See 204.126, chapter 2, for limits and regulations.)

**Tides.**-The diurnal range of tide is about 1.5 feet. Winds greatly affect the tide. S winds of long duration raise the water level in the bay, and N winds lower it.

**Currents.**-The strong ebb current sets outward through the dredged cut and causes heavy tide rips if the wind is S and of moderate strength. With a S or W breeze, small vessels bound in or out should endeavor to reach the entrance during flood current.

**Pilotage** is compulsory for all foreign vessels and U.S. vessels under register in foreign trade if drawing over 6 feet of water. Pilotage is optional for U.S. coastwise vessels that have on board a pilot licensed by the Federal government. Pilots may be obtained on advance notice by telegraph, radio, or radiotelephone through the Mobile Marine Operator (WLO), to the St. Andrew Bay Pilots Association; telephone (904-769-0058, 785-4563, or 785-4495), or through the ships' agents. Pilots board at the sea buoy and take vessels in day or night. The pilot boat is a 43-foot vessel with a black hull and white superstructure. The word PILOT is on either side of the hull. Code flag "H" is flown in daytime, and a white light over a red light are displayed at night. The boat is equipped with VHF-FM channels 6 (156.30 MHz), 12 (156.60 MHz), 13 (156.65 MHz), 16 (156.80 MHz), and 26 (157.30 MHz). Channel 16 is monitored 2 hours before a vessel is expected. Pilots carry portable radiotelephones.

**Towage.**-Tugs up to 1,800 hp are available. The tugs can be contacted over VHF-FM channel 16 (156.80 MHz) or by telephone (904-785-6471).

**Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) The U.S. Public Health Service maintains a **contract physician's office** in Panama City. (See appendix for address.)

**Customs.**-Panama City is a **customs port of entry.**

**Immigration.**-The Immigration Service has no offices at Panama City. Vessel agents are required to notify the immigration office in Mobile, and the service will be handled by that office.

**Agricultural quarantine** officials at Pensacola serve Panama City. (See appendix for address.)

The **harbormaster** assigns anchorages and berths and enforces the rules and regulations of the port. He can be contacted through City Hall. The Panama City Port Authority has jurisdiction over the Port Authority Terminal on Dyers Point.

**Wharves.**-The deep-draft facilities of Panama City are located at Dyers Point, W of Panama City; on the waterfront proper just W of Massalina Bayou; and at Bay Harbor. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to the Port Series, a Corps of Engineers publication.) The alongside depths are reported; for information on the latest depths contact the private operator. All these facilities have rail and highway connections, and water and electrical shore power connections.

**Facilities at Dyers Point:**

Panama City Port Authority Docks: 65,000 square feet covered storage, 20,000 square feet open storage; three 43-ton gantry cranes, forklift trucks; receipt and shipment of general cargo, and shipment of scrap metal; owned by the city of Panama City and operated by Panama City Port Authority.

Panama City Port Authority West Dock (30°10'40"N., 85°43'58"W.): 641-foot marginal wharf; 32 feet alongside; deck height, 8½ feet.

Panama City Port Authority, Jimmy Smith Dock: immediately E of Panama City Port Authority West Dock; 1,020-foot marginal wharf (being extended an additional 325 feet in 1972); 32 to 18 feet alongside; deck height, 8 feet; also used for shipment of peanuts, peanut meal, drilling mud, and prestressed concrete products.

**Facility at Panama City proper:**

Standard Oil Co. of Kentucky Pier (30°09'20"N., 85°40'08"W.); SE side 160 feet long, 700 feet usable with dolphins; 25 to 15 feet alongside; deck height, 10 feet; receipt of petroleum products; owned and operated by Standard Oil Co. of Kentucky.

**Facilities at Bay Harbor:**

Atlanta and St. Andrews Bay Railway Co. Wharf (30°08'12"N., 85°37'41"W.); 435-foot marginal wharf; 30 feet alongside; deck height, 10 feet; 24,000 square feet covered storage; receipt of fertilizer materials, shipment of wood products and

chemicals; owned by Atlanta and St. Andrews Railway Co. and operated by Ryan Stevedoring Co. and International Paper Co.

International Paper Co. No. 2 Dock: immediately NE and in line with Atlanta and St. Andrews Bay Railway Co. Wharf; 485-foot marginal wharf; 30 feet alongside; deck height, 10 feet; more than 55,000 square feet covered storage; receipt and shipment of general cargo, shipment of paper products and chemicals; owned by International Paper Co. and operated by Bay Harbor Warehouse Co.

International Paper Co. No. 1 Dock: about 0.1 mile E of International Paper Co. No. 2 Dock; E and W sides 420 feet long; 31 to 33 feet alongside; deck height, 9 feet; 11,000 square feet covered storage; receipt and shipment of general cargo, receipt of salt and fuel oil for plant consumption, shipment of chemicals; owned by International Paper Co. and operated by Bay Harbor Warehouse Co.

**Supplies.**-Bunker C is available to oceangoing vessels on an emergency basis at the International Paper Plant Co. Dock No. 2. Diesel fuel can be supplied by truck to vessels at their berths. Water and some marine supplies are available.

**Repairs.**-There are no facilities for making major repairs or drydocking deep-draft vessels at Panama City; the nearest facilities are at Mobile. There are machine shops in the city, and minor above-the-waterline repairs can be made to large vessels.

**Small-craft facilities.**-There are large municipal yacht basins at the head of the main ship channel in Panama City and in St. Andrew Bay. Other small-craft facilities are on Watson and Massalina Bayous, Lake Ware, and at the Hathaway Bridge near Dyers Point. Berths, electricity, gasoline, diesel fuel, water, ice, storage, and marine supplies are available, and hull, engine, and electronic repairs can be made. The largest marine railway, at a boatyard on the E side of Watson Bayou, can handle craft up to 250 tons or 125 feet long.

**Communications.**-Panama City is served by the Atlanta and St. Andrews Bay Railway and has bus connections to all points. There is some foreign and coastwise shipping. Maritime radio service is through the Mobile Marine Operator (WLO). Panama City County Airport is about 4 miles NW of the center of the city.

**Watson Bayou** is an irregular-shaped body of water with depths of 9 to 17 feet. There are several piers for light-draft vessels. Over the E arm, near **Millville,** is a railroad bridge with a 26-foot fixed span and a clearance of 13 feet. A fixed highway bridge is close E of the railroad bridge. Several oil terminals, served by barges, are on the bayou. U.S. Route 98 highway bridge crossing the bayou, about 1.2 miles above the entrance, has a 30-foot fixed span with a clearance of 7 feet. There are two marinas at the bridge. The channel is unmarked.

In **Massalina Bayou,** N of Bunkers Point, are many landings for small craft. The bayou has depths of 5 to 10 feet. Beach Drive Highway Bridge over the entrance has a 40-foot bascule span with a clearance of 7 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

A submerged jetty extends along the NW side of the channel into Massalina Bayou; a light is at the outer end. The drawspan of the bridge and the prominent tank 1 mile to the NE form a good range for the channel. In 1972, a depth of about 9 feet could be carried to U.S. Route 98 highway bridge, about 0.4 mile N of the entrance. The bridge has a 28-foot fixed span with a clearance of 6 feet.

About 400 yards NW of Massalina Bayou is the Municipal Pier and Yacht Basin. In 1972, depths along the face of the inner fuel area were reported to be about 9 feet. It is protected by small jetties from wind and seas from the SW through the NW. Another municipally owned long pier and yacht basin at St. Andrew N of **Buena Vista Point** is used as a public landing for sport fishermen.

**Grand Lagoon** extends about 5 miles NW from just within the dredged entrance to St. Andrew Bay. A dredged channel leads into the lagoon from St. Andrew Bay to a point about 0.4 mile E of State Highway 392 Bridge, thence branches to serve facilities of both the N and S shores; these branches are connected by a channel running parallel to the highway bridge. In September 1973, the controlling depth was 8 feet. The channel is marked by a light and daybeacons. State Route 392 bridge has a 23-foot fixed span with a clearance of 8 feet. Marinas are near the highway bridge. Gasoline, diesel fuel, water, ice, and marine supplies are available.

**Chart 11389 (1263).-East Bay,** an arm of St. Andrew Bay, extends in a general ESE direction for about 18 miles. The several small towns on East Bay are of little commercial importance.

**West Bay,** the NW arm of St. Andrew Bay, is generally free from dangers except for several oyster bars with depths of 5 to 8 feet over them. A small island, created by the dredging of the new Port Authority Terminal, is off Dyers Point; the island is marked by a light.

**Panama City Beach, Long Beach, Edgewater Gulf Beach, Florida Beach, Gulf Resort Beach,** and **Laguna Beach** are sections of the residential and resort areas. **St. Andrews State Park** is on both sides of the dredged cut of the main ship channel in St. Andrew Bay entrance.

The route of the Intracoastal Waterway is through East Bay, St. Andrew Bay, and West Bay. East Bay, West Bay, and North Bay are discussed in chapter 12 in connection with the waterway.

**Chart 11360 (1115).**-From St. Andrew Bay W for 85 miles to Pensacola Bay, the shoreline is a gently curving sand beach, unbroken except at the en-

trance to Choctawhatchee Bay, 44 miles W of St. Andrew Bay entrance. Except at the entrances to the bays, the beach is steep-to and can be approached closely. Depths of less than 30 feet are rarely over 0.3 mile offshore. For this reason, the sea rolls in with undiminished strength and breaks heavily on the shore when driven by S winds. Small craft bound W from St. Andrew Bay should use the Intracoastal Waterway.

**Chart 11388 (1264).-Topsail Bluff,** a slightly elevated knoll, is about 10 miles E of the entrance to Choctawhatchee Bay and can be seen for several miles.

The **danger zones** of aerial gunnery and bombing ranges are in Choctawhatchee Bay. (See 204.130, chapter 2, for limits and regulations.) The **danger zone** of a guided missiles test operations area is in the Gulf S of Choctawhatchee Bay. (See 204.135, chapter 2, for limits and regulations.)

**Charts 11385 (870-SC), 11388 (1264).-Choctawhatchee Bay Entrance.** East Pass, about 44 miles WNW of St. Andrew Bay entrance, extends into the W part of Choctawhatchee Bay between Moreno Point and Santa Rosa Island, and is protected by two jetties. The E jetty is marked by a light off its seaward end. A 1,000-foot-long low weir section in the W jetty permits the passage of littoral drift into a dredged deposition basin located between the jetty and the channel. **Choctawhatchee Bay Entrance Lighted Buoy CB** (30°22.3'N., 86°30.5'W.), about 0.5 mile off the entrance to the channel, marks the approach. To carry the best depths, mariners should be guided by the color of the water. Passage should not be attempted in rough weather. In June 1974, the controlling depths were 10 feet in the dredged channel from the Gulf into the bay, thence 6 feet in the channel to the harbor at Destin. However the channel S of the bridge is subject to frequent changes and shoals rapidly between dredgings. The channel is marked by lights and buoys.

In 1971, a 12-foot shoal, extent unknown, was reported about 500 yards NE of Choctawhatchee Bay Entrance Lighted Buoy CB. Mariners transiting the area are advised to exercise caution.

An unlighted wreck of a shrimp boat with red superstructure lies sunk and awash in 30°20'30"N., 86°42'50"W., about 3 miles offshore and 10 miles W of the entrance.

From close offshore the entrance is easily identified by U.S. Route 98 fixed highway bridges crossing the channel just inside the E end of Santa Rosa Island. The parallel bridges have a least clearance of 38 feet.

**Choctawhatchee Bay,** about 25 miles long, extends nearly parallel with the coast and separated from it by a strip of land varying in width from 0.3 to 4 miles. Depths in the bay decrease gradually from W to E with 18 to 43 feet in the W two-thirds, except near the shores, and 8 to 16 feet in the E third. Traffic in Choctawhatchee Bay consists principally of travel along the Intracoastal Waterway and oil deliveries to Freeport. There are good highway connections to Pensacola and Panama City on both the N and S shores of the bay.

U.S. Route 331 highway causeway over the bay at **Wheeler Point,** has a bascule span at the Intracoastal Waterway channel; clearances are given in chapter 12. A small-craft opening near the point has a 23-foot fixed span with a clearance of 8 feet.

There is a marina in a basin on the W side of the N end of the bridge which has gasoline, water, a launching ramp, and open and covered storage. In 1972, the reported controlling depth was 3 feet in the unmarked channel leading to the marina.

**Choctawhatchee River,** empties into the E end of Choctawhatchee Bay. **Cypress River, Indian River,** and **Mitchell River,** are branch outlets N of the main river. The mouth of Choctawhatchee River is very shallow, and boats generally enter through Cypress River. A rectangular area of exposed piling, about 1.2 miles long and 0.5 mile wide just off the mouths of the several rivers in this system, is used as a radar target range by Eglin Air Force Base. Cypress River entrance, marked by a light, has a controlling depth of about 6 feet. The river extends 1.5 miles inland to a junction with Choctawhatchee River. **Black Creek,** with depths of 8 feet inside but bars of about 1-foot depth blocking the entrance, leads to the village of **Black Creek.** Berths, gasoline, a launching ramp, water, ice, and some marine supplies are available at a small fish camp on the W bank of the creek about 1.6 miles above its mouth.

**Freeport,** a small town on **Fourmile Creek,** which empties into **LaGrange Bayou,** is a distribution point for petroleum products, grain, and molasses which are brought in by barge.

A dredged channel leads from Choctawhatchee Bay to a turning basin at the head of navigation just S of the fixed highway bridge at Freeport. In June 1974, the controlling depths were 8 feet in the channel and 9 feet in the turning basin. The channel is well marked. The bridge at Freeport has a fixed 18-foot span with a clearance of 5 feet. An overhead power cable with a clearance of 24 feet crosses the channel close E of the bridge.

Access channels have been dug through the spoil banks to a channel along the E bank as far as **Ramsey Bayou.** Depths of about 5 feet were reported in these channels in 1972.

There are numerous private piers and fish piers on LaGrange Bayou and Fourmile Creek. Gasoline and some marine supplies can be obtained at stores and service stations on U.S. Route 331 and State Route 20 in Freeport.

**Basin Bayou,** is a landlocked lake about 5 miles W of LaGrange Bayou. State Route 20 highway bridge across the narrow entrance has a 15-foot fixed span with a clearance of 4 feet. A paved launching ramp is near the bridge and gasoline is available in cans.

**Boggy Bayou,** about 7 miles NNE of Choctawhatchee Bay entrance, leads to two towns on the bayou. **Niceville,** a small town at the head of the bayou, has a hospital, an oil terminal with wharf, and a fish packing plant. There are many private piers. Gasoline, diesel fuel, water, ice, and marine supplies can be obtained, but berthage is limited. There are public launching ramps. The U.S. Public Health Service maintains a **contract physician's office** in Niceville. (See appendix for address.)

**Valparaiso,** is a small town on the W bank of the bayou at the intersection of the bayou with **Toms Bayou.** There is a public park with a launching ramp on the point. A boatyard on the N bank just inside the entrance to Toms Bayou, has a marine railway that can handle craft up to 83 feet for hull and engine repairs. Limited open and covered berthage with electricity is available at the yard.

**Storm warning signals are displayed.**(See chart.)

A fixed highway bridge across Toms Bayou has a 33-foot channel span with a clearance of 11 feet. The overhead power and TV cables close W of the bridge have a clearance of 38 feet.

A **restricted area** has been designated in **Weekley Bayou,** an arm of Boggy Bayou. (See 207.175b, chapter 2, for limits and regulations.)

**Eglin Air Force Base** covers the NW shore of Choctawhatchee Bay from Boggy Bayou to Garnier Bayou. The tanks and buildings at the base are conspicuous.

**Bens Lake,** about 1.7 miles NE of **Black Point,** is an Air Force **restricted area.** (See 207.175c, chapter 2, for limits and regulations.) In 1972, the private channel into the lake had a controlling depth of 5 feet. The channel is marked by private aids. **Joes Bayou,** 2 miles NE of the bay entrance, is entered through a channel marked by daybeacons which, in June 1972, was reported to have a controlling depth of 7 feet. The bayou affords good anchorage for small craft. A marine railway here can handle craft up to 85 feet for hull and engine repairs.

**Garnier Bayou,** and **Cinco Bayou,** have a common entrance at the NW corner of Choctawhatchee Bay, and each has depths of 7 feet or more and excellent anchorage against bad weather. State Route 85 highway crossing Garnier Bayou, about 0.5 mile above the entrance, has a 50-foot fixed span with a clearance of 19 feet. A large marina is in a protected basin on the E shore about 0.3 mile S of the bridge at **Shalimar.** A tall cylindrical water tank, which resembles a stack near the marina, is prominent. A 12-ton mobile hoist at the marina can haul out craft up to 35 feet for hull and engine repairs or dry open or covered storage. Berths, electricity, gasoline, diesel fuel, water, ice, marine supplies, and a launching ramp are available. In June 1972, depths of 10 to 12 feet were reported in the basin.

There are two marinas on the W shore of the bayou, about 0.3 and 0.5 mile NW of the highway bridge. Berths, gasoline, water, and ice are available. A marine railway S of the marinas can handle craft up to about 45 feet for hull and engine repairs.

A yacht club on **Smack Point,** on the S side of the entrance to Cinco Bayou has gasoline, berths, and other services for members and guests.

State Route 85 highway bridge crossing Cinco Bayou, about 0.5 mile W of the entrance, has a clearance of 19 feet. An overhead power cable at the bridge has a clearance of 55 feet.

**Fort Walton Beach,** at the W end of Choctawhatchee Bay, is on the Intracoastal Waterway, which is described in chapter 12.

**Destin,** is a small fishing village and resort on **Moreno Point.** There are two marinas in the lagoon behind the spit on the E side of the entrance to East Pass, Choctawhatchee Bay Entrance. There is reported to be excellent anchorage in the lagoon along the S shore. Gasoline, diesel fuel, water, ice, marine supplies, and limited berthage are available. Local fishing guides can be hired as pilots for the bay and the waters of the Gulf. Numerous charter boats moor along the N side of the lagoon, and a few moor on the bay side of Destin close N of the bridge. In June 1974, the controlling depth through the channel was 6 feet. It is reported that the channel shoals rapidly after dredging.

A marina is on Santa Rosa Island about 3 miles W of the highway bridge over East Pass, Choctawhatchee Bay Entrance. There is a mobile hoist that can handle craft up to 40 feet for hull and engine repairs or storage. Berths, electricity, gasoline, and water are available. There is a fuel dock at the S end of the bridge over Santa Rosa Sound to Fort Walton Beach. Gasoline and diesel fuel are available.

**Chart 11360 (1115).-Santa Rosa Sound** and its E continuation, **The Narrows,** parallel the coast between Choctawhatchee Bay and Pensacola Bay and are separated from the Gulf by **Santa Rosa Island,** a narrow strip of beach. Santa Rosa Sound and The Narrows have a combined length of 33 miles and a width varying from 1.8 miles in the widest part of the sound to 200 yards in the narrowest part. The W part of the sound has a depth of 15 feet or more; the central part and The Narrows have been dredged where necessary to provide a channel for the Intracoastal Waterway. The Narrows and Santa Rosa Sound are discussed further in chapter 12 in connection with the waterway.

The **danger zones** of two Air Force proving grounds have been established in Santa Rosa Sound and the Gulf. (See 204.134 and 204.136, chapter 2, for limits and regulations.)

Unexploded ordnance lies on the bottom a mile offshore from Santa Rosa Island, about 8 miles W of Choctawhatchee Bay Entrance.

**Charts 11384 (413), 11383 (490), 11382 (1265).-Pensacola Bay** lies 110 miles WNW of Cape

San Blas and 125 miles NE of South Pass , Mississippi River. The bay, about 12.5 miles in length, has depths of 20 to 50 feet, and affords excellent shelter and anchorage; it is frequently used as a harbor of refuge. The bay is the approach to several towns and the city of Pensacola; to Escambia and East Bays, extending N and E, respectively, from its E end; and to Santa Rosa Sound.

Vessels approaching Pensacola Bay by day can verify their positions by the appearance of the land. For 40 miles E of the entrance, Santa Rosa Island presents a white sand beach and low white sand hills with scattered clumps of trees and bushes; back of this on the mainland are thick woods. For 40 miles W of the entrance, the shore is low and thickly wooded nearly to the water, showing no breaks and very few hillocks. Soundings will indicate whether a vessel is E or W of the entrance, the 10-fathom curve approaches the coast much more closely E of the entrance. Depths of 10 fathoms less than 3 miles off the beach indicate the vessel is E of the entrance.

At night or in thick weather it is well for a vessel uncertain of her position to stay in depths of at least 12 fathoms until the light is sighted or the position is otherwise determined.

**Pensacola,** 7 miles above the entrance to Pensacola Bay, is a commercial city and the site of a U.S. Naval Air Station. The port has good facilities for coastwise and foreign shipping. Shipments through the port include seafood products, logs, lumber, steel products, scrap iron, marine supplies, grain, petroleum products, sand and gravel, flour, canned goods, paper products, produce, chemicals, fertilizer, rice, peanuts, and general cargo.

**Prominent features-Pensacola Light** (30°20.7'N., 87°18.5'W.), 191 feet above the water, and shown from a 171-foot conical brick tower, lower third white, upper two-thirds black, on the shore N of the entrance, is the principal mark for the entrance.

**Fort Pickens,** on the E point of the entrance, is a part of Fort Pickens State Park. **Fort McRee,** is on the W point of the entrance. The lookout tower and buildings of the Coast Guard station 2.5 miles E of the entrance, two spherical elevated tanks 8.6 and 10.8 miles E, the W one painted red and the E one silver, and a 220-foot water tank about 26.5 miles E of the entrance are prominent when coming from the E. The span of the Perdido Pass highway bridge 13 miles W of the entrance, and the buildings at Gulf Beach 6.5 miles W are conspicuous when coming from the W. The wreck of the old battleship MASSACHUSETTS on the S end of Caucus Shoal, W of the entrance, is awash and can no longer be seen for any distance offshore. The buildings, tanks, towers, and other features of the naval air station on the neck S of Warrington can be seen over Santa Rosa Island from the S.

In Pensacola, the Municipal Auditorium on the end of the Municipal Pier, the large water tank, a church steeple, the radio mast atop the telephone building, the Empire Building, the highest building in town which has a small square elevator house on top, and a large green 11-story building about 3.3 miles W of the Municipal Pier can be identified from offshore. At night the numerous radio towers with occulting red lights on top and the aviation lights are easily seen.

**Vessels should approach the harbor through the prescribed Safety Fairways.** (See 209.135, chapter 2.)

**Channels.**-The entrance to Pensacola Bay, 0.6 mile wide, is through **Caucus Channel,** a cut dredged through shoals that extend 1.5 miles seaward from the entrance. A Federal project provides for a depth of 35 feet for 5 miles from the Gulf to a large turning basin off the naval air station. The U.S. Navy provides an additional depth to 37 feet for a width of 800 feet in Caucus Channel. (See Notice to Mariners and latest editions of charts for controlling depths.)

**Bay Channel,** extends NE for about 4 miles to the two parallel **West Channel,** and **East Channel,** leading to **Inner Harbor Channel,** along the wharves at Pensacola. Project depth in these channels is 33 feet. (See Notice to Mariners and latest editions of charts for controlling depths.)

**Bayou Chico Channel,** is a dredged channel that leads from the bay to a turning basin about a mile above the entrance to the bayou. In May 1973, the midchannel controlling depth was 7 feet to the turning basin, thence in 1968, 12 to 14 feet in the basin. A stranded wreck is in the SE corner of the basin.

The channels are marked by lighted ranges, lights, daybeacons, and lighted and unlighted buoys.

**Anchorages.**-Vessels should anchor in the Pensacola Anchorage, E of the Safety Fairways. (See 209.135, chapter 2.) In addition, good anchorage can be found in any part of the bay except S of the naval air station. Inside Pensacola Bay, the usual anchorage is off the city of Pensacola where the holding ground is good.

**Dangers.-East Bank,** with depths of 15 to 18 feet, extends 1 mile S from the W part of Santa Rosa Island. **Caucus Shoal,** with depths of 2 to 18 feet, extends 1.5 miles from the W side of the entrance. **Middle Ground,** between the two, has depths of 8 to 18 feet; it is marked by a lighted bell buoy off the NW tip of the shoal, opposite Fort Pickens.

A seaplane **restricted area** is in Pensacola Bay. (See 207.176, chapter 2, for limits and regulations.)

**Tides and currents.**-The diurnal range of tide at the entrance is 1.1 feet, at Pensacola 1.3 feet, and at Milton on Blackwater River 1.6 feet. (Daily predictions for Pensacola are given in the Tide Tables.) N winds sometimes lower the water surface 1.5 feet, and hurricanes may raise the water sur-

face from 2 to 9 feet. The diurnal velocity of the tidal current in Pensacola Bay Entrance in midchannel is about 1.7 knots at strength.

In Caucus Cut, for 2 hours at the strongest of the ebb, the normal current has a velocity of 2 to 2.5 knots, setting S somewhat across the channel. The flood has less velocity and sets along the channels. The flood has greater velocity following a norther than at other times.

**Weather.**-Pensacola is situated in latitude 30°25'N., longitude 87°13'W., on a somewhat hilly, sandy slope which borders Pensacola Bay, an expanse of deep water several miles in width, which in turn is separated from the Gulf of Mexico by a long, narrow island that forms a natural breakwater for the harbor. Elevations in the city range from a few feet above sea level to more than 100 feet in portions of the residential sections, and most of the city is well above storm tides.

Pensacola's nearness to the Gulf of Mexico, about 6 miles distant, gives it the full benefit of the moderating effect of that body of water, tempering the cold "Northers" of winter, and causing cool and refreshing sea breezes during the daytime in summer.

Temperatures of 90°F. or higher occur on the average of 39 times a year, but a temperature of 100°F. or higher has been recorded only 11 times in 84 years. On the average, the temperature goes to freezing or below 9 days a year. The average date of the last freezing temperature is February 20, and the average date of the earliest freezing temperature is December 9. Severe cold waves are infrequent, but several have occurred.

Rainfall is usually well distributed through the year, and on the average, measurable amounts occur on 112 days annually; the greatest frequency normally is in July and August. The monthly rainfall averages greatest in July and least in October. A considerable part of the rainfall in summer occurs during daylight and comes in the form of thundershowers and is often excessive, while the rains of winter are more often not so heavy but extend over longer periods. Snow has occurred in 28 of the 84 years of record, but only 8 years have had measurable amounts.

There is an average of 343 days during the year on which sunshine occurs. During the 3 winter months the average daily sunshine is 5.8 hours, while during the 3 midsummer months the average is 9.4 hours.

The average barometric pressure, reduced to sea level, is 30.06 inches, ranging from 30.15 inches in January to 29.99 inches in May and June.

March is the windiest month of the year on the basis of average hourly velocity, while August has the lowest average wind velocity of any month. A moderate sea breeze usually blows off the Gulf of Mexico during most of the day in summer. Seriously destructive hurricanes have been experienced in this vicinity only nine times since 1879, and in only one of these storms was there loss of life in this locality. The most noteworthy hurricanes were those of September 27, 1906, and September 20, 1926. The earliest in the season that hurricanes have ever been experienced in this section is July 5, and the latest October 18.

The National Weather Service maintains an office in Pensacola. **Barometers** may be compared there. (See appendix for address.)

(See page T-3 for **Pensacola climatological table.**)

**Storm warning signals are displayed.** (See chart.)

**Pilotage** is compulsory for all foreign vessels and U.S. vessels under register in foreign trade if drawing over 6 feet. Pilotage is optional for coastwise vessels that have on board a pilot licensed by the Federal government. Pilots board vessels at the sea buoy and take vessels in day or night. The pilot boat is a 50-foot motor vessel painted white with the word PILOT in large black letters on the bows, and flies the code flag "P." The pilot boat is equipped with radiotelephone and maintains watch on 2182 kHz, 2638 kHz, 2830 kHz, and VHF-FM channel 16 (156.80 MHz).

The Pensacola Bar & Harbor Pilots maintain a station at the Pensacola Naval Air Station. They can contacted by telegraph, radio, or radiotelephone through the Mobile Marine Operator (904-438-3677 or 438-3476), or through the ships' agents.

**Towage.**-Tugs up to 1,500 hp for assisting vessels in docking and undocking are obtainable only on advance notice. The towing companies in the area specialize in towing through the Intracoastal Waterway.

Quarantine and **immigration** officials are stationed in Mobile, Ala., and **agricultural quarantine** officials in Pensacola. (See appendix for addresses.) Vessels subject to such inspections generally make arrangements in advance through ships' agents; officials usually board vessels at their berths.

**Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) The U.S. Public Health Service maintains a **contract physician's office** in Pensacola. (See appendix for address.) There are several hospitals in Pensacola.

Pensacola is a **customs port of entry.**

**Coast Guard.**-The Coast Guard maintains a **vessel documentation office** in Pensacola. (See appendix for address.)

**Harbor regulations** are established by the Board of Pilot Commissioners and are enforced by the harbor police. The City of Pensacola, Department of Transportation, establishes regulations governing the piers under the control of the Port of Pensacola. The **Port Director** is the manager of the Port of Pensacola and has an office on the Municipal Recreation Pier.

**Bridges.**-No bridges cross Pensacola Bay between the entrance and Pensacola. A highway causeway over the bay between the E part of the city and Town Point has a fixed span with a clearance of 50 feet.

**Wharves.**-Pensacola has more than 25 wharves and piers. Only the deep-draft facilities are described. (For a complete description of the port facilities refer to the Port Series, a Corps of Engineers publication.) The alongside depths are reported depths; for information on the latest depths contact the port authorities. All the deep-draft facilities are at the head of East Channel. The facilities are owned by the City of Pensacola and operated by the Port of Pensacola. Water, electrical shore power, and railroad and highway connections are available. General cargo at the port is usually handled by ship's tackle; cranes up to 45 tons are available. The port has 138,000 square feet of covered storage and 150,000 square feet of open storage.

**Port of Pensacola Terminal** (30°24.2'N., 87°12.6'W.):

Berths 1 and 2: W side of the terminal has a 1,050-foot marginal wharf with 35 feet alongside. The deck height for Berth 1 on the N end is 11¾ feet for 650 feet. Berth 2 on the S end has a deck height of 11 feet for 400 feet; hopper-conveyor system for receipt of bulk fertilizer products.

Berths 3, 5, and 6: on S side of terminal; 1,430-foot marginal wharf; 35 feet alongside; deck height, 11 feet.

Facilities at the Naval Air Station (30°20.7'N., 87°15.9'W.), SW of Pensacola proper, include a long marginal wharf with a depth of 40 feet alongside, and slips with depths alongside of 25 feet and 8 to 15 feet, respectively. A daybeacon marks the end of submerged seawall, about 125 yards S of the S slip.

**Supplies.**-No bunker fuels are available. Water, gasoline, diesel fuel, and marine supplies are available.

**Repairs.**-Facilities are available for making repairs to hulls and machinery. The largest marine railway at a shipyard in Bayou Chico can handle vessels or barges up to 700 tons or 225 feet. Woodworking, machine, and steel fabrication shops are available for almost any type of repairs. A movable 6-ton crane is at the yard, and a mobile 50-ton crane is available. Above-the-waterline repairs are made anywhere in the port area.

**Small-craft facilities.**-Limited transient berths, gasoline, diesel fuel, water, ice, and marine supplies are available in Bayou Chico. Hull and engine repairs can be made. (See Repairs for largest facility.) Additional facilities along the Intracoastal Waterway SE and SW of Pensacola are discussed in chapter 12.

**Communications.**-Pensacola is a seaport terminal for freight service of the Frisco Lines and the Louisville and Nashville Railroad. Sailings are made to Atlantic coast, European, Mediterranean, South and Central American, and Caribbean ports, in addition to the Gulf barge service. A U.S. Navy radio station, NAS, operates here.

The Pensacola Municipal Airport is in the NE part of the city.

**Bayou Chico,** an inlet in the SW part of the city, extends about 1.1 miles W from the Pensacola Bay where it divides into a N arm and a SW arm. Bayou Chico Channel, a dredged channel in the bayou, is discussed earlier in this chapter under Channels. Waterborne commerce on the bayou includes petroleum products, shell, rafted logs, stone and crushed rock, gravel and sand, and trailers on barges. The Frisco Lines railroad bridge and Barrancas Avenue highway bridge, crossing the bayou 0.3 mile above the mouth, have bascule spans with a minimum clearance of 1 foot. (See 117.240 and 117.245 (a)through (e) and (i) (11), chapter 2, for drawbridge regulations and opening signals.) An overhead power cable with a clearance of 100 feet crosses the bayou just W of the bascule bridges. Frisco Lines railroad bridge, crossing the mouth of the N arm, has a 29-foot fixed span with a clearance of 7 feet. The twin 28-foot fixed spans of Navy Boulevard Bridge, crossing the N arm 0.2 mile above the railroad bridge, have clearances of 7 feet. Pensacola Yacht Club and basin is on the N side of the entrance to the bayou, and an oil-handling berth is on the S side. There are several marinas, two boatyards, a shipyard, and shell, sand, and gravel plants on the bayou.

**Bayou Texar,** joins the bay just E of the highway causeway to Town Point. In June 1972, a reported depth of 3 feet could be taken to a marina where gasoline and water can be obtained. Two fixed bridges cross the bayou. The Louisville and Nashville railroad bridge at the mouth has a 20-foot fixed span with a clearance of 16 feet. The U.S. Route 90 highway bridge, about 0.5 mile upstream, has a 39-foot fixed span width with a clearance of 12 feet.

**Warrington** is a suburb of Pensacola on Bayou Grande, which is 3 miles SW of the center of the city.

The Frisco Lines railroad bridge over Bayou Grande at **Jones Point,** restricts navigation W to small craft. The bridge has an 11-foot fixed span with a clearance of 7 feet. Admiral Murray Highway Bridge, crossing the bayou about 0.2 mile above the railroad bridge, has a 33-foot fixed span with a clearance of 14 feet.

**Charts 11382 (1265), 11385 (870-SC), 11378 (872-SC).-Escambia Bay,** extends 9 miles N from Pensacola Bay. About 5 miles above its mouth the bay is crossed by a railroad causeway with a swing bridge having a clearance of 6 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) The channel is through the W draw. The twin spans of Interstate Route 10 highway bridge cross the bay about 0.3 mile S of the railroad swing bridge; clearances are 50 feet. The depths in the bay shoal gradually from 15 feet at the mouth to 7 feet in the upper reaches. A dredged channel, marked by lights and buoys, leads from 2 miles above the entrance to the bay to about 7 miles above the mouth of the Escambia River. In July

1974, the controlling depth in the dredged channel was 7 feet to the mouth of the river, thence 8½ feet at midchannel in the river to the head of the project located about 7 miles above the river mouth.

N of **Devils Point,** are shoals and submerged obstructions along the W shore of Escambia Bay. This shore should not be approached closer than 0.5 mile. Above the bridge draw, in line with Escambia River, are a 5-foot shoal and a pile awash at low water. These are outside the dredged channel.

**Escambia River,** which flows into Escambia Bay from NW, extends N for 48 miles to the Alabama State line, where it is known as the **Conecuh River.** The twin highway bridges about 1.5 miles above the mouth have fixed spans with clearances of 43 feet. There is a nylon fiber plant and some commerce in cypress logs and petroleum on this river, the latter barged to a powerplant about 2 miles above the bridge.

Overhead power cables crossing the river 1.7 and 2.3 miles, respectively, above the bridge have minimum clearance of 60 feet. There are fish camps along the highway bridge on the Escambia and White Rivers that have fuel, berths, and some marine supplies.

**East Bay,** an E extension of Pensacola Bay, is entered by way of a passage 1 mile wide between the shoals off **Garcon Point** and **Redfish Point.** Depths in the bay vary from 8 to 13 feet, with several small scattered shoals of 6 feet or less. The channel through the bay is marked.

**Blackwater River** empties into **Blackwater Bay,** the N arm of East Bay. The dredged channel through Blackwater Bay is narrow, and vessels drawing close to maximum draft must keep on the ranges. In May 1974, the controlling depth through the bay and river to the town of Milton was 7½ feet. The channel is marked by lighted ranges, lights, and daybeacons.

Numerous wrecks, submerged piling, and other obstructions constitute hazards in Blackwater River. **Wright Basin,** and **Marquis Basin,** are filled with such obstructions. A boatyard 3 miles below Milton, opposite **Shields Point,** has a marine railway that can handle craft up to 35 feet for hull and engine repairs or dry open storage. Berths, gasoline, and water are available. Twin fixed highway bridges with clearances of 45 feet cross the river at Shields Point.

**Milton** is a small town about 4 miles above the mouth of Blackwater River. There is some barge traffic in grains, soybeans, and petroleum products. Berthage is available at the town wharf above the bridges with depths of 10 to 15 feet reported alongside in 1972. The Louisville and Nashville railroad bridge crossing the river at Milton has a swing span with a clearance of 4 feet. U.S. Route 90 highway bridge, 0.2 mile above the railroad bridge, has a bascule span with a clearance of 8 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) A small marina for Navy personnel is about 1 mile above the bridge on the E side of the river. Gasoline is available in an emergency.

**Chart 11360 (1115).**-The coast between Pensacola Bay and Mobile Bay appears as a low, thickly wooded, unbroken beach. Depths of 5 fathoms or less extend as much as 4 miles offshore between the two bays.

**Charts 11382 (1265), 11378 (872-SC).-Big Lagoon,** which extends W from Pensacola Bay, is about 5 miles long and from 0.2 to 1 mile in width. The lagoon is separated from the Gulf by a narrow strip of sand beach, and is the route of the Intracoastal Waterway, which is discussed in chapter 12.

**Perdido Bay,** an irregularly shaped body of water, lies 13 miles W of Pensacola Bay entrance and 26 miles E of Mobile Bay entrance. Depths of 6 to 20 feet are found in the bay and in **Perdido River,** the latter being the river that serves as a boundary between the States of Florida and Alabama. **Arnica Bay** and **Bay La Launch** connect Perdido Bay with **Wolf Bay** on the W. Bayou St. John and Perdido Pass connect the bay with the Gulf to the S.

The highway causeway over Perdido Bay at **Cummings Point** has a fixed 40-foot span with a clearance of 12 feet.

**Perdido Pass,** extending between **Florida Point** and **Alabama Point,** is easily distinguished from offshore by State Route 182 highway bridge across its entrance with two openings. The fixed span over Perdido Pass Channel has a clearance of 35 feet. The 47-foot fixed span over Cotton Bayou Channel has a clearance of 29 feet. The dredged entrance channel leads from the Gulf through Perdido Pass to a fork at the highway bridge; thence into two channels, one leading N into **Terry Cove** and **Johnson Cove** and the other leading E into **Bayou St. John.** The entrance to the pass is protected by a jetty on the W and by a combination weir and jetty on the E; the top of the weir is submerged 6 inches at mean low tide. In June 1971, the controlling depths were 12 feet in the entrance channel to Light 3, thence 8 feet to the fork, thence in June 1974, 5 feet in the channel leading into Terry Cove and Johnson Cove, and 6½ feet in the channel leading into Bayou St. John. The channels are well marked; a lighted buoy off the entrance marks the approach.

The Intracoastal Waterway in the lower part of Perdido Bay is reached from Perdido Pass via a marked channel through Bayou St. John. An overhead power cable with a clearance of 59 feet crosses the channel leading to Terry Cove and Johnson Cove, about 0.4 mile from State Route 182 fixed bridge. Several small-craft facilities in the coves can provide berths, electricity, gasoline, diesel fuel, water, ice, marine supplies, and open

and covered storage. The largest marine railway can handle craft up to 60 feet for hull and engine repairs. **Cotton Bayou,** on the W side of Perdido Pass 0.7 mile above the entrance, has a marina where berths, gasoline, water, marine supplies, a launching ramp, and open and covered storage are available. A forklift can handle craft up to 20 feet for general repairs.

**Old River** enters Perdido Pass from E between Florida Point and **Ono Island.** In 1972, a reported depth of 5 feet could be carried through the river with local knowledge. The Florida-Alabama State boundary passes through Old River. A fixed highway bridge with a clearance of 24 feet crosses Old River about 1 mile E of Perdido Pass. An overhead power cable with a clearance of 35 feet crosses Old River between the E end of Ono Island and Perdido Key.

**Chart 11376 (1266).-Little Lagoon** is a shallow body of water about 6 miles long and 0.5 mile wide lying just back of the beach between Perdido and Mobile Bays. In June 1972, the opening 15 miles E of Mobile Point, which formerly connected the lagoon with the Gulf, was closed by sand.

# 7. MOBILE BAY TO MISSISSIPPI RIVER

This chapter describes the coasts of Alabama, Mississippi, and Louisiana bordering the Gulf of Mexico from Mobile Bay to the Mississippi River and the numerous bodies of water emptying into the Gulf, including Breton Bay, Mobile Bay, Mississippi Sound, Lake Borgne, Lake Pontchartrain, Chandeleur Sound, Breton Sound, and their tributaries. Also discussed are Mobile, Pascagoula, Biloxi, and Gulfport, and other smaller ports and landings.

The Intracoastal Waterway for this section of the coast is described in chapter 12.

**Charts 11376 (1266), 11378 (872-SC).-Mobile Bay**, 40 miles W of Pensacola and 90 miles NE of South Pass, Mississippi River, is the approach to the city of Mobile and to the Alabama and Tombigbee Rivers. The bay has depths of 7 to 12 feet outside the dredged channels. The entrance is 3 miles wide between Mobile Point on the E and Pelican Point on the W, but most vessels will prefer to follow the dredged channel rather than chance passage between the breakers and shoals that extend 4 miles S on both sides.

**Shipping Safety Fairways.-Vessels should approach Mobile Bay through the prescribed Safety Fairways.** (See 209.135, chapter 2, for limits of fairways.)

**Prominent features.**-The general appearance of the land is a guide to finding the entrance to Mobile Bay. For a distance of 40 miles E of the entrance, the shore, although low, is wooded and unbroken. For 50 miles W of the entrance there is a chain of islands which, although wooded in places, is generally low and bare.

The most conspicuous landmark near the entrance is the 131-foot black conical tower (30°11.3'N., 88°03.0'W.), which was the base for the former Sand Island Light. A two-story white house is on the NW side of the tower.

**Fort Morgan**, an historic State shrine, is on **Mobile Point** on the E side of the entrance. The walls of this old brick pentagon-shaped fort are conspicuous when approaching the entrance. **Mobile Point Light** (30°13.7'N., 88°01.5'W.), 125 feet above the water, is shown from a skeleton tower with a red rectangular daymark. The rear range light is shown below and on the same structure as the light. A radiobeacon is near the light. The station is equipped for special radio direction-finder calibration. (See the Light List for operational information.)

The concrete gun emplacements of later fortifications E of the old fort are also conspicuous.

**Fort Gaines**, an historic landmark and museum on the E end of Dauphin Island, is on the W side of the entrance. A white radar dome is at the fort, and a spherical elevated tank is 2 miles W of the fort.

**Boundary lines of inland waters.**-The lines established from Mobile Bay to Mississippi Passes are described in 82.95, chapter 2.

**Channels.-Main Ship Channel**, the entrance or bar channel, leads from the Gulf between Southeast Shoal and Mobile Point on the E and Sand Island and West Bank on the W. Federal project depth is 42 feet over the bar. (See Notice to Mariners and latest editions of charts for controlling depths.) In addition to the dredged channel across the bar, the natural channel has depths of 18 feet or more. Inside the bar, depths in the channel increase to as much as 56 feet, with a least width of 500 yards between the shoals which rise abruptly from deep water. The wreck of the MAGNOLIA, on the E side of the channel 0.7 mile SW of Mobile Point, is marked by a lighted buoy; one mast extends about 20 feet above the water. The channel is marked by lighted buoys, buoys, and a **020°30'** lighted range on Mobile Point. The rear range light is on the same structure and below Mobile Point Light. **Storm warning signals are displayed.** (See charts.)

From W, boats drawing up to 6 feet can enter Mobile Bay via **Pelican Passage** and **Pelican Bay**, only with local knowledge, owing to the shifting character of the bottom. The channel passes between the shoal SE of Pelican Passage and Dauphin Island, thence E into Pelican Bay. The best water can be found by passing to the S of **Dauphin Island Spit** before shaping a course N into Mobile Bay. The channel is marked by two daybeacons, a buoy, and a light.

From E, only about 3 feet can be taken across Southeast Shoal around Mobile Point. It is necessary to pass very close to shore; the passage should only be attempted under most favorable weather conditions and with local knowledge. The channels shift frequently.

**Mobile Bay Channel** extends from the lower anchorage off Fort Morgan through Mobile Bay to Mobile River. Federal project depth is 40 feet to and in a turning basin off **Magazine Point** at the head of Mobile Ship Channel. Although the channel is subject to shoaling, the project is generally maintained. (See Notice to Mariners and latest editions of charts for controlling depths.) The channel is well marked with lighted ranges, lights, and lighted and unlighted buoys.

The secondary and other channels are covered geographically under their respective headings.

**Anchorages.-Vessels should anchor in the Mobile Bay Anchorage, S of and between the safety fair-**

**ways.** (See 209.135, chapter 2.) The best anchorages in the lower bay for deep-draft vessels are found N and NW of Mobile Point in depths ranging from 20 to 45 feet with excellent holding ground. This anchorage is secure, but during a norther a short heavy choppy sea is raised which may be uncomfortable for small vessels. A circular **explosives anchorage** is just N of Mobile Point. (See 110.194, chapter 2, for limits and regulations.) An anchorage for unmanned and other nondescript vessels has been designated near Cedar Point. (See 110.194a, chapter 2, for limits and regulations.)

Vessels are not permitted to anchor in the Bar Channel, Mobile Bay Channel, or Mobile River Channel.

In emergencies, light-draft vessels can anchor in Mobile River above Cochrane (U.S. Route 90) highway bridge with permission of the harbormaster.

Small boats sometimes anchor N and E of Fort Morgan in **Navy Cove.** Several piles and other obstructions are in this locality.

**Dangers.**-Shoals extend about 4.5 miles S and W of Mobile Bay entrance. **Southeast Shoal,** covered 3 feet, is on the E side of the Bar Channel, and **Sand Island Shoal,** covered 1 foot, and **West Bank,** covered 3 feet, are on the W side.

The wreck of the Civil War vessel TECUMSEH is N of Mobile Point Light in 30°13′47.5″N., 88°01′37.5″W. The wreck is marked by a buoy with orange and white bands. The vessel is reported to be in an unstable condition, and ammunition and powder aboard the wreck could be detonated if the vessel shifts. Mariners are cautioned not to anchor in the area of the buoy and to reduce speed producing as little wake as possible when transiting Mobile Channel between Buoys 15 and 17.

A nearly continuous spoil bank extends along either side of the bay channel from just inside Mobile Bay entrance to the mouth of Mobile River. Through these spoil banks are several charted openings for passage to various points in Mobile Bay.

Fish havens, consisting of concrete pipe, lie within a 3.5-mile-square area which extends offshore from 2.7 miles to 6.2 miles E of Mobile Point.

Fish havens, consisting of old automobile bodies lashed together, scrap iron, and concrete, have been or may be established on the bottom along the 10-fathom curve off the Alabama coast. While they are not dangerous and are reported to have a minimum depth of 10 fathoms over them, vessels are advised not to anchor in their vicinity.

**Tides and currents.**-The tides are chiefly diurnal and the rise and fall is very small, averaging 1.2 and 1.5 feet at Mobile. During the winter, northers may depress the water surface as much as 1.5 feet below mean low water, while hurricanes have been known to raise the level as much as 11.5 feet. (See the Tide Tables for daily predictions.)

In this area strong winds have considerable effect in modifying the times and velocities of the current; in using the tables, allowance should be made for such effects. (See the Tidal Current Tables for daily predictions of current in Mobile Bay entrance and other locations in Mobile Bay.)

The tidal current near the outer end of the Main Ship Channel is rotary. Both the flood and ebb currents set somewhat to the left of the channel direction before reaching their strength, and to the right of the channel direction after the times of strength. During 3 days of current observations at this location there was an outflow of 0.5 knot average velocity combined with the tidal current.

It has been reported that velocities of 8 to 10 knots have been observed in the Bar Channel and Mobile Bay Channel on the runoff of the ebb after protracted periods of strong S winds. Low-powered and deep-draft vessels should be guided by the advice of the pilots under these conditions.

**Weather.**-Mobile is located at the head of Mobile Bay and about 30 miles from the Gulf of Mexico. Its weather is influenced to a considerable extent by the Gulf.

The summers are consistently warm, but maximum temperatures are seldom as high as they are at inland stations. Normally, in summer, the day begins with a minimum in the low seventies and the temperature rises rapidly before noon to the high eighties or low nineties where it is checked by onset of the sea breeze. On the rare occasions when N winds prevail throughout the day, the maxima may reach the high nineties or go slightly above 100°F.

Winter weather is usually mild except for occasional invasions of cold air that last about 3 days. January is the coldest month in the year. An average winter will have less than 20 days with below freezing minima, and the lowest reading will be about 23°F. However, unusual winters may produce much lower readings.

The normal annual rainfall is among the highest in the United States. It is fairly evenly distributed throughout the year with a slight maximum at the height of the summer thunderstorm season and a slight minimum during the late fall. Rainfall is usually of the shower type, and long periods of continuous rain are rare.

Frontal thunderstorms may occur in any month of the year, and airmass storms are frequent in summer. July and August will average a thunderstorm every other day. The summer storms are usually not too violent and seldom produce hail.

While the Mobile area has not had a destructive hurricane since 1926, this seems to be due more to chance than to location. Past records show that this area is subject to hurricanes from the West Indies, as well as to those from the western Caribbean and the southwestern Gulf of Mexico.

Southerly breezes bring considerable fog during the early spring; northerly breezes clear it away.

Severe northers, which blow occasionally during the winter, lower the water in the bay so as to interfere with the deeper draft vessels bound through the dredged channel. During heavy southerly gales it is not always safe for vessels of over 25-foot draft to attempt to cross the bar.

The National Weather Service maintains offices in Mobile. **Barometers** may be compared at these offices or by telephone. (See appendix for addresses.)

(See page T-3 for **Mobile climatological table.**)

**Storm warning display** locations are listed on the NOS charts and shown on the Marine Weather Services Charts published by the National Weather Service.

**Pilotage** is compulsory for all foreign vessels and U.S. vessels under register in foreign trade. Pilotage is optional for coastwise vessels that have on board a pilot licensed by the Federal Government.

The two pilot boats ALABAMA and MOBILE PILOT are fast water taxis and are based at Fort Gaines. They are equipped with radar, VHF-FM, and low-frequency radiotelephones. The pilots monitor VHF-FM channels 13 (156.65 MHz) and 16 (156.80 MHz) continuously from the pilot station or boats. In addition, all pilots carry portable radiotelephones which operate on VHF-FM channels 12 (156.60 MHz) and 13 (156.65 MHz), and some of the sets also operate on VHF-FM channels 6 (156.30 MHz) and 16 (156.80 MHz). The pilot boats, tugs, and bridges are interconnected on the VHF-FM intraport radiotelephone system with the harbormaster's office.

The pilot boats, which have gray hulls and white superstructures with the word PILOT on the front of the deckhouse, meet vessels in the vicinity of Mobile Entrance Lighted Whistle Buoy 1 (30°08.1′N., 88°03.9′W.).

Pilots can be ordered by telegraph (cable address: MOBAPPI), by radio, by radiotelephone through the Mobile Marine Operator (WLO), telephone, Mobile (205-432-2639) or Dauphin Island (205-861-2453), or through the ships' agents. The pilots request that a reasonably correct estimated time of arrival at the bar be given and should be corrected within 2 hours of arrival time.

Vessels drawing up to 40 feet are taken in day or night.

**Bon Secour Bay,** extending about 14 miles E of Mobile Bay entrance, has depths of 7 to 10 feet. Oyster beds are very extensive along the NE shore of the bay. The bay is the route of the Intracoastal Waterway which crosses Mobile Bay Channel at a point 2.6 miles N of the latter's entrance. The waterway is described in chapter 12. A basin protected by the hulks of old barges is on the N side of Mobile Point at Fort Morgan. Berths, gasoline, water, and ice are available. The unmarked approach to the facility was reported navigable by craft drawing 3 feet or less in July 1972.

**Bon Secour River** empties into the E part of Bon Secour Bay. A dredged channel leads from the Intracoastal Waterway through Bon Secour Bay and into Bon Secour River, a total distance of 4.7 miles. In March 1974, the controlling depth was 4 feet. The channel is marked by a light and daybeacons.

About 1 mile above the mouth, an unnamed arm of water leads S from Bon Secour River to shallow **Oyster Bay.** A fixed highway bridge crossing the arm limits navigation to the S to skiffs only.

The town of **Bon Secour** is on the N side of Bon Secour River about 1.5 miles above the mouth.

Small-craft facilities on the E side of the arm leading to Oyster Bay, at the town of Bon Secour, and on Bon Secour River, about 1.3 miles above the dredged channel, can provide berths, gasoline, diesel fuel, water, ice, marine supplies, launching ramps, storage, and hull and engine repairs. The largest marine railway at a boatyard on the E side of the arm leading to Oyster Bay, about 0.4 mile N of the fixed highway bridge, can handle craft up to 80 feet. In 1972, it was reported that, with local knowledge, a depth of 7 feet could be carried through the unmarked channel to this boatyard. Also in 1972, it was reported that a depth of 4 feet could be carried to two facilities about 1.3 miles above the dredged channel.

**Chart 11376 (1266).-Weeks Bay,** on the E side of Mobile Bay about 6.8 miles NW of Bon Secour River, has an average depth of 2 to 5 feet. A privately marked channel, with a reported controlling depth of about 4 feet in July 1972, leads through the entrance and across the bay to **Fish River.** About the same depth can be carried into **Magnolia River** on the E side of the bay.

The approach to the bay is marked by a light about 1 mile W of the entrance. An overhead power cable with a clearance of 56 feet crosses the bay at the entrance.

Small boats go to **Marlow** on Fish River and **Magnolia Springs** on Magnolia River. State Route 98 highway bridge over Fish River at **Yupon** has a fixed span with a clearance of 35 feet. A small marina on the W side of the river just below the bridge has gasoline, some marine supplies, water, and a launching ramp.

State Route 32 highway bridge crossing Fish River at Marlow, about 5.5 miles above the mouth, has a fixed span with a clearance of 22 feet. A marina on the W side, a short distance below the bridge, has berths, electricity, gasoline, water, ice, some marine supplies, and a launching ramp.

**East Fowl River** enters the W side of Mobile Bay about 13.8 miles N of the bay entrance. It extends generally SW. The entrance is marked by lights and daybeacons. In March 1974, the controlling depth was 4½ feet from the entrance in Mobile Bay to a point in 30°26′17″N., 88°07′10″W., about 1 mile above the entrance. Above this point, in 1965, the river was reported dredged to 7 feet to a

point in 30°23′26″N., 88°08′47″W., about 5 miles above the entrance. Just inside the entrance on the N side, a marina can provide berths, gasoline, diesel fuel, water, and some marine supplies. About 0.5 mile above the mouth is State Route 163 highway bridge with a 43-foot fixed span and a clearance of 24 feet. An overhead power cable close E of the bridge has a clearance of 43 feet. A pier on the N side of the river, just E of the bridge, has berths and gasoline. East Fowl River leads into West Fowl River, and thence into Fowl River Bay; these are discussed later in this chapter.

**Fowl River,** the NW branch, joins East Fowl River about 2 miles above the mouth. It is navigable for about 3 miles by small craft with local knowledge.

**Great Point Clear** is on the E side of the bay about 16 miles N of the entrance; a light marks the shoals extending W from the point.

**Point Clear, Battles Wharf, Seacliff,** and **Daphne** are summer resorts along the E shore. Many of the numerous boat landings are in ruins and constitute a danger to small boats navigating close inshore. A large hotel on Great Point Clear has a prominent water tank. A privately dredged channel with a reported controlling depth of 6 feet in 1972 leads to a yacht basin at the hotel; it is marked by private daybeacons. Berths, electricity, gasoline, diesel fuel, water, marine supplies, and a launching ramp are available at the basin; a 2-ton crane can handle craft up to 25 feet.

A marina and boatyard at a basin at **Battles Wharf** has a marine railway that can handle craft up to 35 feet for hull and engine repairs or storage. Berths, electricity, gasoline, water, ice, a launching ramp, and marine supplies are available. An unmarked channel with a reported controlling depth of 4 feet in 1972 leads to the basin.

**Fairhope,** on the E side of the bay about 17.6 miles above the entrance, is a town with bus connections. There is a 1,450-foot municipal pier at the town. A privately marked channel, with a reported controlling depth of 6 feet in 1972, leads to a marina in a basin adjoining the N side of the pier. Berths, gasoline, diesel fuel, and water are available at the marina. Fairhope Yacht Club is located in **Fly Creek,** N of the municipal pier. A dredged channel leads E from Mobile Bay to a turning basin about 0.1 mile above the mouth of the creek. In April 1974, the controlling depth was 3½ feet in the entrance channel and 6 feet in the turning basin. The entrance to the channel is marked by a light. A municipal fish dock, on the W side of Fly Creek about 0.3 mile above the entrance, can provide gasoline and diesel fuel.

Fairhope Yacht Club race course, W of Fly Creek and about 2.2 miles in diameter, is marked by private daybeacons.

**Hollingers Island Channel** leads W from a point in Mobile Bay Channel, 18 miles N of the entrance, to a turning basin and pier on the W shore of Mobile Bay. In July 1972, the reported midchannel depth was 10 feet in the channel with 9 feet alongside the pier. The channel is well marked by lights and daybeacons. The pier has 600 feet of usable berthing space on both the N and S sides and is used for the receipt of oil by barges.

**Theodore Industrial Park Barge Canal,** also privately dredged, leads W from the turning basin at the W end of Hollingers Island Channel for about 1.4 miles to a turning basin with a wharf on its N side; in 1969, the reported depth was 12 feet in the channel and in 1972, a depth of 9 feet was reported alongside the wharf. The 226-foot wharf has 1,134 feet of usable berthing space with dolphins and is used for the receipt of coal, shell, and iron by barge. Overhead power and telephone cables with a least clearance of 50 feet cross the channel about 1 mile W of the Hollingers Island Channel turning basin.

**Dog River,** emptying into the W side of Mobile Bay at a point about 21 miles N of the entrance, is used considerably by yachts and small boats. Boats approaching Dog River generally leave Mobile Bay Channel at Light 36 where 5 feet can be carried through a channel marked by a light and daybeacons between the spoil banks to a point about 1 mile above the entrance. In July 1972, the reported controlling depth was about 3½ feet from this point for about 7 miles to the Louisville and Nashville railroad bridge, which has a 22-foot fixed span with a clearance of 8 feet. The entrance is marked by lights and a daybeacon. State Route 163 highway bridge crossing the mouth of Dog River has a bascule span with a clearance of 11 feet at center. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) An overhead cable at the bridge has a clearance of 68 feet.

There are several small-craft facilities on the river at which berths, electricity, gasoline, diesel fuel, water, ice, storage, and marine supplies are available; hull, engine, and electronic repairs can be made. A 50-ton mobile hoist at a marina in a dredged basin on the N side of the river just above the highway bridge and two marine railways at a marina and boatyard about 3 miles above the highway bridge can each handle craft up to 60 feet.

Along the W shore of the bay, N and S of Dog River, there are numerous small-craft landings; many, however, are in ruins.

**Mobile,** 28 miles N of the bay entrance, is one of the largest and most important seaports on the Gulf of Mexico. A fully equipped ocean terminal, excellent transportation facilities, large shipyards, and all kinds of marine supplies can be obtained at Mobile. Principal foreign exports are marine supplies, paper products, lumber, wood pulp, flour, aluminum, chemicals, grain, soybeans, coal and bunker oil, iron and steel products, and fertilizer. The principal foreign imports are bauxite, mahogany, crude rubber, sugar, newsprint, seafood, rubber, pig iron, ores, molasses, automobiles, fishmeal, frozen foods, and chemicals. The coastwise trade consists mainly of petroleum

products, shell, lumber, iron and steel products, chemicals, and food products. Inland waterway transportation facilities for handling iron and steel products, ore, sugar, and coal serve the Warrior, Tombigbee, and Alabama River systems with connections to the Mississippi River.

**Prominent features.**-From about the center of the bay, a water tank at Great Point Clear, a water tank on the skyline at Fairhope, and the battleship ALABAMA moored at the entrance to Tensaw River are conspicuous. On nearing the city, the 33-story First National Bank Building and other tall buildings near the waterfront are first seen. Next seen are the water tanks NW of Garrows Bend. At night, the fixed red light on the water tank at Great Point Clear and the fixed white light from the tank at Fairhope are visible from Mobile Bay Channel. An aviation light at Brookley Field, S of Mobile, and the occulting red lights on the radio towers at the mouth of Tensaw River are prominent.

**Channels.**-Main Ship Channel, the dredged bar channel, and Mobile Bay Channel leading from the entrance to Mobile River Channel were discussed earlier in this chapter.

From a point 25.7 miles N of the bay entrance, **Arlington Channel,** a dredged channel, leads WNW from Mobile Bay Channel to a turning basin in the W part of Garrows Bend. In August 1974, the controlling depths were 16 feet (23 feet at midchannel) in the channel and 15 to 20 feet in the turning basin. The channel is marked by a lighted 289°20′ range, lights, buoys, and daybeacons. A Coast Guard station is at the W end of the channel. **Garrows Bend Channel,** a dredged channel, leads NE from the turning basin to a causeway between McDuffie Island and the mainland. In 1962, the controlling depth in the channel was 7 feet.

**Mobile River Channel** extends from Mobile Bay Channel for 4 miles to the bridge at **St. Louis Point.** Federal project depths are 40 feet from the mouth of the river to and inside **Mobile Turning Basin,** thence 40 feet to St. Louis Point, and thence 25 feet to the mouth of and in Chickasaw Creek for about 2 miles to just below **Shell Bayou** entrance. (See Notice to Mariners and latest editions of charts for controlling depths.)

**Threemile Creek** leads W from Mobile River Channel just S of **Magazine Point.** About 0.6 mile above the creek entrance, **Industrial Canal** leads S for about 1 mile. Depths of about 9 feet can be carried in the creek to the canal, thence 12 feet in the canal. Chemicals, seafood, cement, gypsum, sand and gravel, lumber, chemical plants, and oil terminals are on the canal. The large bulk material handling plant of the Alabama State Docks, with over 1,600 feet of berthing space in 40 feet, is on the south side of the entrance to Threemile Creek. (See Wharves.)

The old ship channel around the S end of **Pinto Island,** which leads to Tensaw River, had a controlling depth of 8 feet in 1972. The channel is marked by daybeacons.

**Anchorages.**-Vessels with permission of the harbormaster may anchor temporarily in four designated places abreast the city E of the dredged channel, but must maintain position parallel with the channel; not more than one vessel can be anchored abreast. In emergencies, light-draft vessels may anchor in Mobile River above Cochrane (U.S. Route 90) highway bridge crossing at St. Louis Point with the permission of the harbormaster.

**Bridges.**-There are no bridges over the main channel from the Gulf to the State docks. Above the docks, at St. Louis Point, Mobile River is crossed by Cochrane (U.S. Route 90) highway bridge with a vertical lift span with clearances of 23 feet down and 135 feet up. Just above this bridge, at the mouth of Chickasaw Creek, is the Louisville and Nashville railroad bridge with a swing span with a clearance of 6 feet; the channel is through the S draw. (See 117.491, chapter 2, for drawbridge regulations and opening signals.)

Across Threemile Creek are five bridges to a fixed highway bridge at the head of navigation. The first, Louisville and Nashville railroad bridge, has a swing span with a clearance of 10 feet. The channel is through the N draw. The second, the Alabama Terminal Docks railroad bridge, has a swing span with a clearance of 4 feet. The channel is through the N draw. Beyond the Industrial Canal are the U.S. Route 43 highway and the Southern railway bridge with swing spans having a minimum clearance of 1 foot. The channel is through the N draw. (See 117.240 and 117.245 (a) through (e), and (i)(19) and (i)(20), chapter 2, for drawbridge regulations and opening signals.) About 0.15 mile below Route 43 highway bridge, an overhead power cable crosses with a clearance of 53 feet. About 0.4 mile above the Southern railway bridge, the Gulf, Mobile, and Ohio railroad bridge has a fixed span with a clearance of 12 feet.

The **Bankhead Tunnel** crosses under Mobile River between Government Street and **Blakeley Island.** In 1972, a vehicular tunnel was under construction under Mobile River parallel to and just S of the Bankhead Tunnel.

Weather and pilotage information for Mobile is discussed earlier in this chapter.

**Towage.**-Diesel-powered tugs and oceangoing tugs up to 3,600 hp are available at Mobile.

Quarantine, immigration, and **agricultural quarantine** officials are stationed in Mobile. (See appendix for addresses.) Vessels subject to such inspections generally make arrangements in advance through ships' agents; officials usually board vessels at their berths.

**Quarantine.**-Quarantine laws are enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) Officials board vessels at their berths from 0600 to 1800, and at other times by special arrangements.

The U.S. Public Health Service maintains an **outpatient clinic** in Mobile. (See appendix for address.) Mobile has several hospitals and clinics.

**Customs.**-Mobile is a Customs District Headquarters and a customs port of entry with offices in the International Trade Center (Room 218).

**Coast Guard.**-The Captain of the Port maintains an office at the Mobile Coast Guard Base at the SW end of Garrows Bend. A **marine inspection** and **vessel documentation office** is in the Federal Building. (See appendix for addresses.)

**Harbor regulations.**-The Alabama State Docks Department has jurisdiction over the bay, harbor, and that part of all the tributary streams in which the tide ebbs and flows, and extends to the outer shoal 5 miles SSW of Fort Morgan at the entrance to the harbor. It has supervision over harbor pilotage, State wharves and shipping, as well as authority in all matters relating to the arrival, departure, loading, and discharging of all vessels at State wharves. Most routine functions are administered through the **harbormaster.**

The harbormaster controls all of the waterway traffic in the area, assigns berths, and enforces the rules and regulations of the port. Ships are normally taken to their berths by the bar pilots, but any subsequent shifting or redocking of vessels in the harbor is done by the harbormaster and his deputies. The harbormaster's office is in the Administration Building at the State Docks, and is connected by the intraport VHF-FM channels 12 (156.60 MHz) and 16 (156.80 MHz) radiotelephone system with all pilot boats, tugs, and the Cochrane and Dauphin Island bridges. The harbormaster can be reached by telephone (205-438-2481, extension 244).

**Speed limit.**-No vessel, except launches, shall exceed 6 m.p.h. in the inner harbor between Mobile Channel Light 40 to and including Chickasaw Creek, and shall take all possible precautions to prevent disturbance of vessels berthed at marginal wharves.

**Wharves.**-The Port of Mobile has more than 100 piers and wharves, most of which are located on both sides of the Mobile River between the mouth and the confluence with Chickasaw Creek about 4 miles above the mouth. Facilities are also on Theodore Industrial Park Barge Canal, Arlington Channel, Threemile Creek, Industrial Canal, Chickasaw Creek, Hog Bayou, and Black Bayou.

The facilities on the W side of the Mobile River are generally for handling cargo, while the facilities on the E side are service and industry related. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to the Port Series, a Corps of Engineers publication.) The alongside depths of the facilities described are reported; for information on the latest depths contact the Alabama State Docks Department or the private operators. All deep-draft facilities have rail and direct highway connections, and almost all have water and electrical shore power connections.

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.

In the port area, the Alabama State Docks Department and private companies operate warehouses having a total of more than 834,000 square feet of dry storage space and more than 568,000 cubic feet of cold storage space. Warehouse and transit shed space totals 2½-million square feet. About 26 acres of open storage space is available.

**Facilities on Garrows Bend Channel, E side:**

McDuffie Terminals: S end of McDuffie Island; berthing for vessels up to 850 feet long; loading rate 4,000 tons per hour, unloading rate 3,000 tons per hour; bucket unloader and conveyor system; 31 acres open storage; receipt and shipment of bulk coal; barge staging area adjacent to terminal; owned by the State of Alabama, operated by Alabama State Docks Department.

**Facilities on Mobile River, W side:**

Gulf, Mobile and Ohio Railroad Co., Oil Pier (30°40′00″N., 88°02′05″W.): W end of S side, 240 feet long, 15 feet alongside; E end of S side, 235 feet long, 15 feet alongside; N side, 495 feet long, 35 feet alongside; deck heights, 9 feet; receipt of petroleum products, chemicals, and petrochemicals by barges; receipt of molasses and liquid livestock feed; owned by Gulf, Mobile and Ohio Railroad Co., and operated by Triangle Refineries, Inc., Shell Oil Co., and Pro Rico Industries, Inc.

Texaco, Mobile Terminal Pier: about 300 yards N of Gulf, Mobile and Ohio Railroad Co., Oil Pier; S side, 630 feet long, 15 feet alongside; N side, 630 feet long, 34 feet alongside; deck heights, 12 feet; receipt and shipment of petroleum products; bunkering vessels, and loading barges for bunkering vessels at berth; owned and operated by Texaco, Inc.

Marine Bulk Pier: about 400 yards N of Gulf, Mobile and Ohio Railroad Co., Oil Pier; S side, 255 feet long, 12 feet alongside; N side, 1,000 feet long, 42 feet alongside; deck heights, 10 feet; unloading tower with cantilevered boom and bucket system, belt-conveyor system serves rail and barge loading hoppers, 150-ton traveling hopper for self-unloading vessels; receipt of iron, manganese, ferromanganese, and fluorspar ores; receipt and shipment of shale; bunkering vessels; owned by U.S. Steel Corp., and operated by Marine Bulk Handling Corp.

**Alabama State Docks,** Berths 2 through 8, Piers A through D, and Bulk Material Handling Plant; owned by the State of Alabama, operated by the Alabama State Docks Department. These docks form a modern port terminal, open to all users alike. The facilities include many concrete wharves, fireproof shipside transit sheds and covered warehouse space, grain and meal elevators, a cotton compress and warehouse, bonded general cargo warehousing, terminal rail connec-

tions, cold storage and quick-freeze plants, and numerous auxiliary facilities. The largest crane at the terminal is a 100-ton cargo handling crane mounted on rubber tires for mobility and flexibility. Floating cranes up to 80-ton capacity are also available, as are smaller cranes, lift trucks, trailers, and conveyors.

Berths 2, 3, 4, and 5 (30°41′50″N., 88°02′18″W.): 2,131-foot marginal wharf; 36 feet alongside; deck height, 11 feet; 135,000 square feet covered storage; 7 acres of open storage; 50-ton gantry crane; receipt and shipment of steel, heavy-lift cargo, and general and containerized cargo.

Berths 6, 7, and 8 (30°42′05″N., 88°02′25″W.): E face, 1,080 feet long; corner face, 160 feet long; N face, 495 feet long; 36 feet alongside; deck heights, 11 feet; 210,00 square feet covered storage; receipt and shipment of general cargo.

Pier A, South Wharf (30°42′17″N., 88°02′26″W.): S side, 550 feet long, 37 feet alongside, deck height, 11 feet; head of pier, 330 feet long, 36 feet alongside, deck heights, 6 feet; 68,000 square feet covered storage, 2½ acres open storage; pipelines to storage, conveyor belt system; receipt of bagged fishmeal; receipt and shipment of bulk liquids.

Pier A, North Wharf: N side, 1,520 feet long, 38 feet alongside, deck height, 11 feet; head of slip, 457 feet long, 36 feet alongside, deck height, 6 feet; 102,000 square feet covered storage; cotton compress and warehouse; receipt and shipment of general cargo; shipment of cotton.

Pier B: about 300 yards N of Pier A; S side, 1,540 feet long; head of pier, 650 feet long; N side, 1,625 feet long; 36 feet alongside; deck heights, 11 feet; 372,000 square feet covered storage; 1¼ acres of open storage; pipelines for bunkers; receipt and shipment of general cargo; receipt of bunker C and marine fuel; bunkering vessels, and loading barges for bunkering vessels at berth.

Pier C: about 600 yards N of Pier A; S side, 1,540 feet long; head of pier, 810 feet long; N side, 1,015 feet long; 36 feet alongside; deck heights, 11 feet; 221,000 square feet covered storage; 5¾ acres of open storage; 75-ton lift; receipt and shipment of general cargo; bunkering vessels.

Pier D, South Grain Elevator Wharf, Berths 2 and 3: about 0.5 mile N of Pier A; inner portion of S side of Pier D; 830 feet with dolphins; 36 to 40 feet alongside; deck height, 11 feet; 1¼-million-bushel grain elevator; 15,000 bushel per hour unloading rate; 40,000 bushel per hour loading rate; receipt of grain by barge; shipment of grain by vessel.

Pier D, South Meal Elevator Wharf, Berth 1: outer portion of S side of Pier D, in line with and contiguous with South Grain Elevator Wharf to the SE; 645 feet with dolphins, 36 feet alongside; 200 feet of barge berthing space with dolphins, 14 feet alongside; deck height, 11 feet; 18,000-long-ton capacity meal storage elevator; 250 long tons per hour unloading rate; 200 long tons per hour loading rate; receipt of soybean meal by barge; shipment of soybean meal by vessel.

Pier D, North Wharf (30°42′55″N., 88°02′29″W.): 538-foot face; 36 feet alongside; deck height, 11 feet; 38,000 square feet covered storage, 1¾ acres of open storage; 450,000 cubic feet of cold storage cooler and freezer space; receipt and shipment of general cargo; bunkering vessels.

Bulk Material Handling Plant Wharf (30°43′30″N., 88°02′44″W.): on S side of Threemile Creek; 1,612-foot marginal wharf; 40 feet alongside; deck height, 9½ feet; covered warehouse space for 12,000 tons of fishmeal; two 100,000-ton capacity bauxite storage buildings; open storage space for 200,000 tons of ore; one stationary unloading tower, capacity 1,200 tons per hour; four traveling unloading towers, capacities up to 700 tons per hour; a rotary car dumper, two-belt-conveyor systems and hatch trimmers; receipt and shipment of dry bulk commodities including coal, coke, fishmeal, bauxite, gravel, manganese ore, iron ore, and pig iron.

Hess Ship Dock (30°43′40″N., 88°02′38″W.): 74-foot offshore wharf, 290 feet with dolphins; 40 feet alongside; deck height, 12 feet; shipment of crude oil; receipt and shipment of petroleum products; owned and operated by Hess Oil and Chemical Division, Amerada Hess Corp.

Gulf Oil Co.-U.S., Wharf (30°43′58″N., 88°02′38″W.): 100-foot offshore wharf, 280 feet with dolphins; 38 feet alongside; deck height, 8 feet; fueling small vessels; receipt of petroleum products; owned by Gulf Oil Co.-U.S.; operated by Citronelle Mobile Gathering System.

**Facilities on Mobile River, E side:**

Chevron Asphalt Co. Wharf (30°42′25″N., 88°02′12″W.): 105-foot offshore wharf, 240 feet with dolphins; 30 feet alongside; deck height, 7 feet; receipt and shipment of asphalt; owned and operated by Chevron Asphalt Co., Inc.

Reichold Chemicals Wharf (30°41′45″N., 88°02′06″W.): 60-foot offshore wharf, 360 feet with dolphins; 26 feet alongside; deck height, 10 feet; receipt and shipment of petroleum products, chemicals, and petrochemicals; owned and operated by Reichold Chemicals, Inc.

**Supplies.**-Marine supplies of all kinds are available in Mobile. Bunker fuel, diesel oil, and lubricants are available. Large vessels can be bunkered at the Texaco Terminal Pier, Alabama State Docks, Piers B, C, and D North Wharf, or at other berths by tank barges. Water, almost chemically pure, is available at most of the berths.

**Repairs.**-There are three large shipyards in the Mobile area; all types of repairs can be made to deep-draft vessels. The largest floating drydock, at a shipyard on the W side of Pinto Island, has a capacity of 19,400 tons, an overall length of 732 feet, a minimum clear inside width of 102 feet, and a depth of 23 feet over the sill. Cranes up to 75-ton capacity are available at the yard. A 100-ton mobile crane, the heaviest lift in the Mobile area, is at a shipyard on the W side of Mobile River about 0.7

mile N of the N end of McDuffie Island. Smaller shipyards with marine railways and smaller floating drydocks are on Blakeley Island, S of Fairhope, and in Dog River.

Salvage tugs, seagoing and equipped for heavy work, are available. Barges, derricks, pumps, and diving outfits are available for virtually any type of work.

**Small-craft facilities.**-Berths and other facilities for small craft are limited at Mobile due to heavy commercial traffic. Facilities for small craft at Fort Morgan, East Fowl River, Battles Wharf, Fairhope, Fly Creek, and Dog Creek are discussed earlier in this chapter.

**Communications.**-Mobile is served by four trunkline railroads, major airlines, and highway connections. Regular steamer communications with most major ports in the world and all the important Gulf, Atlantic, Caribbean, and Pacific ports are made from Mobile. Inland boats and barges serve the river ports in the interior of the State and also connect with Gulf ports. Radio station WLO at Mobile handles general commercial radio and radiotelephone business between the hours of 0430 and 2315. The station is equipped to handle traffic on VHF-FM radiotelephone and cable traffic. Radio station WNU, New Orleans, handles traffic for station WLO between the hours of 2315 to 0430. The harbormaster's office is equipped with VHF-FM channel 16 (156.80 MHz) and channel 12 (156.60 MHz) on the intraport radiotelephone system which connects all pilot boats, tugs, the Cochrane and Dauphin Island bridges, and all waterway traffic in the area.

**Mobile River** and **Tensaw River** are formed by the confluence of Alabama River and Tombigbee River about 39 miles above Mobile. In 1972, the reported depth to the confluence was about 14 feet. The channel in Mobile River is marked by lights, buoys, and daybeacons.

Tensaw River is crossed at its mouth by two U.S. Route 90 highway bridges, which have fixed spans with a minimum clearance of 23 feet. An overhead power cable with a clearance of 74 feet crosses the river just N of the bridges. In 1975, a fixed highway bridge with a design clearance of 24 feet was under construction about 0.3 mile N of the bridges. The S end of Blakeley Island has been extended E by dredged fill to the W side of the entrance to Tensaw River. The battleship ALABAMA is permanently moored on the E side of the fill at a State park.

The **Mobile-Tensaw Rivers Cutoff** connects the two rivers about 8 miles above Mobile. The cutoff had a reported depth of about 13 feet in July 1972. From the cutoff the channel into Tensaw River is marked by buoys and an unlighted range on the E bank of the river; the controlling depth on the range is about 3 feet. For craft drawing more than 3 feet, it is necessary to turn S at the E end of the cutoff, pass around the S end of Gravine Island, and then proceed upriver in the E branch.

A railroad bridge over Mobile River, 8.3 miles above the city, has a swing span with a clearance of 4 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

Tensaw River, for several miles N and S of the cutoff, is a U.S. Maritime berthing area. (See 207.900, chapter 2, for limits and regulations.)

A railroad bridge crossing Tensaw River about 13 miles above the mouth has a swing span with a clearance of 11 feet. (See 117.240 and 117.245 (a) through (e) and (i)(17), chapter 2, for drawbridge regulations and opening signals.)

Light-draft boats can reach Tensaw River either by going up Mobile River to Spanish River and thence down that river, or from the main channel through the channel S of Pinto Island.

Highway bridges cross the **Blakeley River** and **Apalachee River** at their mouths. They have fixed spans with a minimum width of 30 feet and minimum clearance of 10 feet. Overhead power cables on the N side of these bridges have clearances of 33 feet. In 1975, fixed highway bridges with design clearances of 16 feet were under construction across the Blakeley and Apalachee Rivers, about 0.8 mile and 0.6 mile, respectively, S of the existing bridges. A small boatyard about 0.4 mile S of **Vessel Point**-has a marine railway that can handle craft up to 46 feet for hull and engine repairs. A fish camp has gasoline and water.

Navigation is possible above Mobile to the inland Alabama ports of **Jackson,** mile 78, **Demopolis,** mile 187, **Tuscaloosa,** mile 296, **Port Birmingham,** mile 347, and various landings via dredged channels in the **Black Warrior-Tombigbee River System.** Mobile River joins the Tombigbee River about 39 miles above Mobile. Just above Demopolis at about mile 188, the waterway continues via the Black Warrior River and thence at about mile 335 divides into two navigable forks. The head of navigation on **Mulberry Fork** is at about mile 374, and on **Locust Fork** at mile 355. In July 1972, controlling depth for the waterway was 9 feet.

Six lock and dam systems are on the waterway. The size of vessel that can navigate the waterway is controlled by the dimensions of the smallest lock, the John Hollis Bankhead Lock and Dam at mile 317.5. This lock is 285.5 feet long and 52 feet wide, with a depth of 9.5 feet over the sill. Modification of this lock and dam is the only work left to complete the modernization of the waterway.

Several bridges and numerous overhead power cables cross the waterway. Bridges over the section of the waterway from the mouth of Tombigbee River to the junction with the upper forks are of the vertical-lift or fixed-span type; least clearance is 52 feet for the fixed spans, and 15 feet for the vertical-lift spans. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) Only bridges of the fixed type cross Mulberry and Locust Forks; least clearance is 31 feet over Mulberry Fork, and 38 feet over Locust Fork. Least

clearance of overhead power cables crossing the waterway is 60 feet.

Waterborne commerce on the waterway between Mobile and Port Birmingham is in pulpwood, chemicals, petroleum products, shell, sand and gravel, limestone, ores, pig iron, coal, grain, and steel products.

Navigational charts for the Black Warrior-Tombigbee Rivers System are available from the District Engineer, U.S. Army Corps of Engineers, P.O. Box 2288, Mobile, Ala. 36628.

Mobile River joins **Alabama River** about 39 miles above Mobile. A dredged channel in Alabama River leads from the mouth to Montgomery, Ala., about 300 miles above Mobile. In June 1972, the controlling depth was 3½ feet, but greater depths can be carried from November to June. The channel is marked by buoys and daybeacons for about 215 miles above the mouth. Least clearance of bridges crossing the river is 18 feet for swing bridges and 42 feet for fixed bridges. (See 117.240 and 117.245 (a) through (e) and (i)(12), (i)(12-a), and (i)(12-b), chapter 2, for drawbridge regulations and opening signals.) Least known clearance of overhead power cables crossing the river is 53 feet.

Lock and dam systems on the waterway at mile 63.0 and mile 115.6 are each 600 feet long, 84 feet wide, with 13 feet over the sills. A third lock and dam system with the same dimensions is under construction at mile 201.8.

Waterborne commerce on the river consists of pulpwood, petroleum products, sand, and gravel.

The U.S. Public Health Service maintains a **contract physician's office** in Demopolis, Ala. (See appendix for address.)

Navigational charts for the Alabama River are available from the District Engineers, U.S. Army Corps of Engineers, P.O. Box 2288, Mobile, Ala. 36628.

**Chart 11360 (1115).-Mississippi Sound** extends 70 miles W of Mobile Bay between a chain of narrow, low, sand islands and the mainland, providing a sheltered route for the Intracoastal Waterway from Mobile to New Orleans. Natural depths of 12 to 18 feet are found throughout the sound, and a channel 12 feet deep has been dredged where necessary from Mobile Bay to New Orleans. (See chapter 12 for Intracoastal Waterway.) Mississippi Sound can be entered from Mobile Bay through Pass aux Herons; from the Gulf through Petit Bois, Horn Island, Dog Keys, and Ship Island Passes, and Cat Island Channel; from Lake Borgne through Grand Island Pass.

**Charts 11376 (1266), 11378 (872-SC).-Pass aux Herons** connects the SW corner of Mobile Bay with the E end of Mississippi Sound and is part of the Intracoastal Waterway. (See chapter 12 for Intracoastal Waterway.)

**Grants Pass,** 0.3 mile N of Pass aux Herons, connects Mobile Bay and Mississippi Sound. The channel is unmarked and is used only by small boats.

**Dauphin Island** is a fishing village and summer resort at the NE part of Dauphin Island. A dredged channel leads from Mississippi Sound through Bayou Aloe to a turning basin at Dauphin Island village. In August 1974, the controlling depth was 7 feet in the channel and turning basin. The channel is marked with lights and daybeacons. There are a marina and fish camps at the village; berths, gasoline, diesel fuel, water, and marine supplies are available.

**Dauphin Island Bay** is a shallow bay at the E end of Dauphin Island between Dauphin Island Bridge and Little Dauphin Island. The bay is accessible from Mississippi Sound through a privately dredged channel marked by private buoys, and from Mobile Bay through an inlet protected by a jetty about 0.2 mile N of Pelican Point. A dredged channel marked by a light and a daybeacon leads through the inlet to an anchorage basin at Fort Gaines, thence a connecting channel leads from the anchorage basin to Dauphin Island Bay. In 1973-August 1974, controlling depths were 7 feet in the entrance channel and anchorage basin, thence 4 feet in the connecting channel. A light marks the channel entrance to the inlet.

**Fort Gaines** has a small-boat basin where Coast Guard craft and pilot boat tenders moor. Gasoline and water are available. Shrimp boats and fishing vessels dock at the bulkhead on the S side of the anchorage basin just inside the inlet.

A large marina on the W shore of the bay has surfaced launching ramps and a 10-ton mobile hoist. Craft up to 40 feet can be handled for hull, engine, and electronic repairs, or dry, open or covered storage. Berths, electricity, gasoline, diesel fuel, water, ice, and marine supplies are available. An offshore breakwater protects the marina from N. In July 1972, there was reported to be 8 to 9 feet at the berths and 5 feet in the privately maintained and marked channel that leads along the S and W shores of the bay from the connecting channel to the marina and N and W into Mississippi Sound. The highway bridge, part of Dauphin Island causeway, over the N part of this route has a 40-foot fixed span with a clearance of 25 feet. Overhead power cables immediately W of the bridge have a clearance of 33 feet.

**Heron Bay** is a shallow bay used mainly by skiff-size crabbing and oyster boats; local knowledge is advised.

**Heron Bay Cutoff,** locally known as **The Cutoff,** about 1.8 miles N of Cedar Point, is a pass joining Heron Bay with Mobile Bay. Tidal currents of considerable velocity run through this pass which is used only by small boats. A highway bridge over the pass has a 31-foot fixed span with a clearance of 16 feet.

**Charts 11376 (1266), 11374 (874-SC).-West Fowl River** enters **Fowl River Bay** about 4 miles NW of Cedar Point. It extends NE along the W side of **Mon Louis Island,** separating it from the mainland, and is joined to East Fowl River by a channel reported dredged by the State to 7 feet in 1965. It has been reported that the State has dredged a cutoff channel E of the existing channel, about 2 miles above the mouth in the vicinity of State Route 188 highway bridge; local knowledge is advised as depths are not known. It has been further reported that the bypassed section of the river will no longer be maintained and in 1972 had shoaled to 1 foot. State Route 188 highway bridge over the cutoff channel has a 30-foot fixed span and a clearance of 25 feet.

**Coden** is a small fishing village on **Bayou Coden** on the N shore of **Portersville Bay,** NE of Isle aux Herbes. A dredged channel in Bayou Coden leads from Portersville Bay to a turning basin at State Route 188 highway bridge, about 0.5 mile above the mouth of the bayou. In 1972, the controlling depth to the turning basin and bridge was 1½ feet. The channel entrance is marked by lights and daybeacons. State Route 188 highway bridge has a 15-foot fixed span with a clearance of 6 feet. There are seafood packing plants, a fish camp, and a marina. Berths, gasoline, diesel fuel, water, and a concrete launching ramp are available at the marina.

**Charts 11373 (1267), 11374 (874-SC).**-A dredged channel leads from deep water in Mississippi Sound through **Bayou La Batre** to a turning basin about 0.5 mile below State Route 188 highway bridge at the town of **Bayou La Batre,** thence to the bridge. In February 1972, the controlling depths were 10 feet to the turning basin, thence 6½ to 10 feet in the basin, thence 9 feet to the bridge. The channel is marked by lights and daybeacons. State Route 188 highway bridge has a 50-foot bascule span with a clearance of 8 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) An overhead power cable at the bridge has a clearance of 60 feet.

Shrimp, fishing, and party-boat fleets operate out of Bayou La Batre. The town has several seafood packing plants and canneries. Several boatyards on the bayou build commercial steel and wooden vessels up to about 115 feet in length. Machine shop facilities are also available.

Small-craft facilities can provide berths, gasoline, diesel fuel, water, ice, and marine supplies; hull and engine repairs can be made. A boatyard, on the E side of the bayou just inside the entrance, has several floating drydocks, the largest of which can handle craft up to 800 tons, 170 feet long, and 12 feet in draft. The largest marine railway, on the E side of the bayou near the turning basin, can handle craft up to 100 feet.

**The diurnal range of tide** is 1.5 feet. **Storm warning signals are displayed.** (See chart.)

The Alabama-Mississippi boundary is about 6.5 miles W of Bayou La Batre.

**Petit Bois Pass,** an entrance from the Gulf between Dauphin Island and Petit Bois Island, is used primarily by fishing vessels with local knowledge drawing about 6 feet or less. The pass is subject to frequent changes; passage can generally be made by following the deep green water during calm weather and by avoiding the breakers during rough weather. A lighted bell buoy on the Gulf side marks the E approach to Petit Bois Pass. Lighted and unlighted buoys on the E side of the pass mark the passage from the Gulf to Mississippi Sound. The chart and knowledge of local conditions are the best guides.

**Charts 11375 (414), 11374 (874-SC), 11373 (1267).-Pascagoula Harbor,** one of the important deepwater ports on the Gulf Coast, is on Mississippi Sound about 9 miles N of **Horn Island Pass.** By water, it is 72 miles W of Mobile and 51 miles E of Gulfport. The facilities in the port area include a 3-million-bushel grain elevator, shipyards, and other industries at the mouth of Pascagoula River and an industrial area centered around Bayou Casotte, about 3 miles E of Pascagoula River.

**Pascagoula,** at the mouth of **Pascagoula River,** is a city with many large industries in shipbuilding and ship repair, manufacture of paper products, textiles, containers, seafood packing and processing, oil refining, fertilizer and chemicals, and refractory brick materials. A hospital is in the city. Waterborne traffic in addition to those mentioned above is in petroleum products, crude oil, sand and gravel, liquid sulphur, ores, and logs.

**Prominent features.**-The most conspicuous object is a tall concrete grain elevator, on the W side of Pascagoula River, which may be seen for several miles. The three refinery flares, E of Bayou Casotte, are very prominent from offshore at night. The cranes of the shipyard, a tall elevated tank 0.5 mile E of the mouth of the river, and the twin tanks in Pascagoula are prominent from the sound. The range light towers on the W end of Petit Bois Island, the cracking towers and tanks at the oil refinery E of Bayou Casotte, and the towers, tanks, and elevators of the fertilizer and refractory plants on the E bank of Bayou Casotte are also prominent.

**Horn Island Pass Entrance Lighted Buoy HIP** (30°10.6'N., 88°32.6'W.) marks the approach to Horn Island Pass.

**Shipping Safety Fairways.-Vessels should approach Horn Island Pass and Pascagoula Harbor through the prescribed Safety Fairways.** (See 209.135, chapter 2, for limits of fairways.)

**Channels.**-The deepwater entrance is through dredged cuts in **Horn Island Pass Channel,** and in Mississippi Sound for about 4 miles N of Petit Bois Island where the channel divides, **Pascagoula Channel** leading about 6 miles NW to a turning basin at the railroad bridge at Pascagoula, and

**Bayou Casotte Channel** leading about 4 miles N to the turning basin at the head of Bayou Casotte. A Federal project provides for a depth of 40 feet in Horn Island Pass Channel and 38 feet in the sound, in Pascagoula, and Bayou Casotte Channels to the 38-foot turning basins. (See Notice to Mariners and latest editions of charts for controlling depths.) The channel across the bar is marked by a **041°** lighted range and lighted buoys, and the other channels by lighted ranges, lights, and buoys.

Pascagoula River channel above Pascagoula and Escatawpa River channel are discussed later in this chapter.

**Anchorages.**-Deep-draft vessels may anchor within a mile or two S or SW of the sea buoy, weather permitting. Anchorage for vessels up to 15-foot draft is available in Mississippi Sound E of the channel.

**Explosives anchorage areas** have been designated N and S of the W end of Petit Bois Island. (See 110.194b, chapter 2, for limits and regulations.)

**Dangers.**-Shoal water up to 30 feet extends about 2 miles SW of the W end of Petit Bois Island. Spoil banks are on the W side of Pascagoula Channel and on both sides of Bayou Casotte Channel. Strangers should not enter the channel before the pilot boards, especially light vessels during periods of strong winds and adverse weather.

**Tides and currents.**-The diurnal range of tide is 1.7 feet at Horn Island Pass and 1.6 feet at the mouth of the Pascagoula River. In Horn Island Pass the tidal current is reported to flood N and ebbs S averaging 1.2 knots at strength. In the dredged cut across the bar, the ebb and flood follow the direction of the cut. Winds greatly affect the velocity and direction of the currents, as well as the rise and fall of the tides.

**Weather.**-Northers occur occasionally during the winter months but do not greatly affect vessels at anchor if provided with good ground tackle.

**Storm warning signals are displayed.** (See chart.)

**Pilotage** is compulsory for all foreign vessels and all U.S. vessels over 250 tons under register in foreign trade. Pilotage is optional for U.S. coastwise vessels that have on board a pilot licensed by the Federal Government. The Pascagoula pilots usually handle all vessels that enter; they board within a mile of Horn Island Pass Entrance Lighted Buoy HIP, and take vessels in day or night. The pilot boat is a 40-foot diesel-powered vessel with black hull, white pilot house, and the word PILOT on the front of the deckhouse and either side of the bow. A white light over a red light are displayed at night. The boat is equipped with VHF-FM channels 16 (156.80 MHz), 14 (156.70 MHz), and 13 (156.65 MHz). VHF-FM channel 16 is monitored continuously. Pilots can be notified in advance by radio, telegraph, by radiotelephone through the Mobile Marine Operator, telephone (601-762-1151), or through the ships' agent.

**Towage.**-Tugs up to 3,200 hp are available at Pascagoula. Arrangements should be made in advance through ships' agent.

Quarantine, **immigration,** and **agricultural quarantine** officials are stationed in Mobile. (See appendix for addresses.) Vessels subject to such inspections generally make arrangements in advance through ships' agents; officials usually board vessels at their berths.

**Quarantine.**-Quarantine laws are enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

The nearest U.S. Public Health Service **Hospital** is at New Orleans. There is an **outpatient clinic** in Mobile, and **contract physician's offices** are at Biloxi and Gulfport. (See appendix for addresses.) The Singing River Hospital, which is operated by Jackson County, is at Pascagoula.

**Customs.**-Pascagoula is a **customs port of entry.**

**Harbor regulations.**-The Port of Pascagoula is under the control of the Jackson County Port Authority, which is responsible jointly with the Jackson County Board of Supervisors for the industrial development of the port. The Jackson County Port Authority through its **Port Director** is responsible for port and harbor improvement, harbor management, and regulation enforcement. The office of the Port Director is in Pascagoula; telephone (601-762-4041). Dock superintendents at the Port Authority Terminals and grain elevators assign the berths.

**Speed limit.**-No oceangoing vessel shall proceed in excess of 5 m.p.h. in Pascagoula River or Bayou Casotte.

**Bridges.**-No bridges cross the channel from the Gulf to the municipal wharf. The Louisville and Nashville railroad bridge crossing Pascagoula River about 1.3 miles above the mouth has a swing span with a clearance of 7 feet. U.S. Route 90 highway bridge 0.2 mile above the railroad bridge has a bascule span with a clearance of 31 feet at the center. (See 117.240 and 117.495, chapter 2, for drawbridge regulations and opening signals.)

**Wharves.**-The Port of Pascagoula which includes the lower 5.9 miles of the Pascagoula River, the lower 5.2 miles of the Escatawpa (Dog) River, and Bayou Casotte, has more than 60 piers, wharves, and docks. The principal facilities are on both sides of the Pascagoula River and at the Bayou Casotte. General cargo piers operated by the Jackson County Port Authority are on the W side of the Pascagoula River and on the E side of Bayou Casotte. The other major deep-draft facilities are privately operated by petroleum, chemical, and shipbuilding and repair companies. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to the Port Series, a Corps of Engineers publication.) The alongside depths of the facilities described are reported; for information on the latest depths contact the Jackson County Port Authority or the

private operators. All the piers described have direct highway connections, and most have railroad connections. Water and electrical shore power connections are available at most of the piers and wharves described.

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.

**Facilities on Pascagoula River, W side:**

Jackson County Terminal, Grain Elevator Wharf (30°21′25″N., 88°33′59″W.): 758-foot marginal wharf; 38 feet alongside; deck height, 8 feet; barge facility N and in line with deep-draft berth; 3-million-bushel grain elevator, 25,000 bushels per hour barge unloading rate, 60,000 bushels per hour ship loading rate; receipt of grain by barge, shipment of grain by vessel; owned by the Jackson County Port Authority and operated by the Louis Dreyfus Corporation.

Jackson County Port Authority, Terminal A Wharf: about 0.3 mile N of Grain Elevator Wharf; 500-foot marginal wharf; 38 feet alongside; deck height, 11 feet; 52,800 square feet covered storage; 15,000 square feet of paved open storage; forklift trucks and conveyors; receipt and shipment of general cargo; owned and operated by the Jackson County Port Authority.

Jackson County Port Authority, Terminal B Wharf: immediately N of Terminal A Wharf; 544-foot marginal wharf; 38 feet alongside; deck height, 10½ feet; 52,000 square feet covered storage; 67,000 square foot storage warehouse; forklift trucks and conveyors; receipt and shipment of general cargo; owned and operated by the Jackson County Port Authority.

**Facility on Pascagoula River, E side:**

National Marine Fisheries Service Wharf (30°21′58″N., 88°33′48″W.): 140-foot marginal wharf; 17 feet alongside; deck height, 8½ feet; mooring National Marine Fisheries Service vessels; owned by the City of Pascagoula and operated by the National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce.

**Facilities on Bayou Casotte:**

Corchem Dock (30°19′54″N., 88°30′37″W.): offshore wharf; W side, 573 feet long; 28 to 24 feet alongside; deck height, 8 feet; receipt and shipment of ores by barge; owned and operated by Corchem, Inc.

Standard Oil Co., Pascagoula Refinery Wharf (30°20′23″N., 88°30′30″W.): offshore wharf, about 1,400 feet long providing two tanker berths, lower berth 710 feet with dolphins, upper berth 523 feet with dolphins; 38 feet alongside; deck height, 12 feet; inner side of wharf used for barges; receipt and shipment of petroleum products and petrochemicals; bunkering tankers berthed at wharf, and loading barges for bunkering vessels at berth in harbor; owned and operated by Standard Oil Co., Division of Chevron Oil Co.

Jackson County Port Authority, Terminals G and H Wharf: about 0.3 mile N of Standard Oil Co., Pascagoula Refinery Wharf; W face, 556 feet long; N face, 520 feet long; 38 feet alongside; deck height, 12 feet; transit shed with 111,000 square feet of covered storage; ample open storage; receipt and shipment of general cargo; owned and operated by the Jackson County Port Authority.

Jackson County Port Authority, Terminals E and F Wharf: about 0.4 mile N of Standard Oil Co., Pascagoula Refinery Wharf; S face, 744 feet long; W face, 526 feet long; 38 feet alongside; deck height, 12 feet; transit shed with 111,000 square feet of covered storage; 147,000 square feet of open storage; forklifts up to 4-ton capacities; receipt and shipment of general cargo; owned and operated by the Jackson County Port Authority.

Mississippi Chemical Corp., South Dock: about 0.5 mile N of Standard Oil Co., Pascagoula Refinery Wharf; 83-foot offshore wharf, 415 feet with dolphins; 34 feet alongside; deck height, 9 feet; conveyor and loading tower with 75 tons per hour loading rate; chemical pipelines and storage tank capacity for 12,500 tons of sulfuric acid; receipt of sulfuric acid; shipment of bulk fertilizer; owned and operated by Mississippi Chemical Corp.

Mississippi Chemical Corp., North Dock: about 0.6 mile N of Standard Oil Co., Pascagoula Refinery Wharf; 76-foot offshore wharf, 500 feet with dolphins; 32 feet alongside; deck height, 9 feet; conveyor and a 50-ton electric stiff-leg derrick with 250 tons per hour unloading rate; chemical pipelines to storage tanks; receipt of phosphate rock, sulfuric acid, and liquid sulfur; shipment of liquid ammonia and sulfuric acid; owned and operated by Mississippi Chemical Corp.

**Supplies.**-Marine supplies of all kinds are available in Pascagoula. Bunker fuel, diesel oil, and lubricants are available. Large vessels are bunkered at their berths by barge. Water is available at most of the berths.

**Repairs.**-The Ingalls Shipbuilding Corp. is engaged primarily in new construction and major overhauls. Their facilities are on the E and W sides of Pascagoula River just above the mouth, and include shipbuilding and launching ways, outfitting piers, and electrical, electronic, sheet metal, pipe, and machine shops. The shipyard's floating drydock on the W side of the river can handle vessels up to 1,000 feet long, 178 feet wide, 35 feet in draft, and virtually any tonnage that can enter the harbor. On the E side of the river, the shipyard has a graving dock 519 feet long, 75 feet wide, with a depth of 35.8 feet over the keel blocks. Cranes up to 250-ton capacities are at the outfitting piers, and floating cranes up to 50-ton capacities are available.

Several small shipbuilding and repair yards are in Pascagoula where numerous tugs, barges, and small craft are built. The largest of these, on the E side of Pascagoula River just above U.S. Route 90

highway bridge, has an 800-ton floating drydock that can handle vessels up to 180 feet long with a 13-foot draft. Other yards have marine lifts and marine ways with facilities for handling vessels and barges. The largest marine railway, on the E side of Pascagoula River about 250 yards N of U.S. Route 90 highway bridge, can handle vessels up to 175 feet or 425 tons. Machine shops are available. Several of the smaller yards build wooden and steel vessels up to 140 feet and barges up to 250 feet. Deep-sea diving and salvage equipment are available.

**Communications.**-The port is served by freight service of the Louisville and Nashville Railroad and freight service by the Mississippi Export Railroad which connects with the Gulf, Mobile and Ohio Railroad at **Evanston** about 35 miles N of the city. Jackson County Airport, which provides charter or private aircraft service but no scheduled airline services, is about 2 miles NE of the city. Major bus lines and several motor freight lines serve the city.

**Small-craft facilities.**-There is a municipal boat basin with berths for small craft up to 40 feet at the head of Lake Yazoo, which is entered through a channel on the E side of the river entrance. In July 1972, a reported depth of 5 feet could be carried to the basin. There are no services. Daybeacons mark the entrance. There are several marinas, service wharves, and boatyards along the Pascagoula River, where berths, electricity, gasoline, diesel fuel, water, ice, marine supplies, and launching ramps are available. Hull, engine, and electronic repairs can be made, and dry storage is available.

A dredged channel in **Pascagoula (Singing) River** leads from the deep-draft turning basin just below the Louisville and Nashville railroad bridge at Pascagoula to a junction with **Escatawpa (Dog) River,** thence into Escatawpa River through **The Cutoff** for about another 2.5 miles to plants along the river as far as the Mississippi Export railroad bridge. In August 1974, the controlling depth was 12 feet. The channel is marked at critical spots by lights and a daybeacon.

Pascagoula River is navigable to the confluence of **Leaf River** and **Chickasawhay River** about 64 miles above its junction with Escatawpa River. In 1970, the controlling depth was 12 feet to **Caswell Lake** about 18 miles above the junction with Escatawpa River, thence 2 feet to the confluence of the Leaf and Chickasawhay Rivers.

A privately dredged channel leads from the dredged channel in Pascagoula River about 0.3 mile N of U.S. Route 90 highway bridge to a shipyard pier at the SW corner of **Krebs Lake.** The channel is unmarked. In 1969, the reported controlling depth was 12 feet.

The log booms of a plywood and veneer mill are on the SE corner of Krebs Lake. The facility can be reached with local knowledge through a channel marked by private daybeacons.

**Moss Point** is a city on the Escatawpa River about 2 miles above the junction with the Pascagoula River. There are industries in chemicals, rubber, paper products, shipbuilding, fertilizer, seafood processing, and lumber. State Route 63 highway bridge crossing the river about 0.7 mile above the mouth has a swing span with a clearance of 9 feet. (See 117.240 and 117.485, chapter 2, for drawbridge regulations and opening signals.) Above the bridge are a shipyard that builds vessels up to 185 feet and several menhaden processing plants. About 2.6 miles above the mouth, the Mississippi Export railroad bridge has a swing span with a clearance of 5 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) Overhead power cables crossing at the bridge have clearances of 80 feet.

About 0.5 mile N of the highway bridge at Pascagoula, a privately dredged canal, with a reported controlling depth of about 6 feet in 1972, leads from Pascagoula River through **Marsh Lake** to West Pascagoula River. The canal is unmarked.

About 2.5 miles N of the U.S. Route 90 highway bridge at Pascagoula, a cutoff leads from Pascagoula River through **Bayou Chemise** and **West Pascagoula River** to Mississippi Sound. It is marked by a daybeacon at its E entrance and a daybeacon in Bayou Chemise. The controlling depth is about 7 feet. West Pascagoula River is crossed about 0.8 mile above the mouth by a Louisville and Nashville railroad bridge with a fixed span with a clearance of 7 feet, and about 1 mile from the mouth by U.S. Route 90 highway bridge with a fixed span with a clearance of 12 feet. Four overhead power and telephone cables crossing the river between the bridges have a minimum clearance of 12 feet, and the cable above the highway bridge has a clearance of 33 feet. A marina in a basin just N of the E side of the highway bridge has gasoline, diesel fuel, berths, and dry storage for outboards. In July 1972, a reported controlling depth of 10 feet was available at the facility and in the approach to the facility.

**Mary Walker Bayou** enters West Pascagoula River about 0.2 mile N of the highway bridge. Several marinas along the S side of the bay and on the W side of West Pascagoula River can provide gasoline, diesel fuel, berths, and limited marine supplies. A fixed 8-ton marine hoist can handle craft up to 32 feet for hull and engine repairs.

**Charts 11372 (876-SC), 11373 (1267).-Dog Keys Pass** forms a connection between Mississippi Sound and the Gulf at the W end of Horn Island. The pass has a depth of about 13 feet over the bar and is used primarily by local fishing craft. Most vessels entering from the Gulf use Ship or Horn Island Pass in preference to Dog Keys Pass. The entrance is marked by **Dog Keys Lighted Buoy 2** off the W end of Horn Island. Dog Key Pass Lighted Buoy 1, about 1.9 miles SSW of the W end of Horn Island, marks the channel across the bar.

**Isle of Caprice** formerly existed midway between Horn Island and Ship Island. The island was destroyed by a hurricane about 1917, leaving only a 4-inch diameter pipe from an artesian well. In July 1972, this pipe was reported still intact and discharging freshwater. The well is protected by 3-inch diameter pipes with private markers. Only a shoal remains of the former island.

**Little Dog Keys Pass,** about 3 miles W of Horn Island West Light 2, is used by sport fishermen and some fishing craft. In July 1972, depths of 14 feet or more were reported available in the pass, and it was often used in preference to Dog Keys Pass. Private markers mark the channel over the bar and through the pass. In 1967, an unmarked wreck covered 12 feet was reported in Little Dog Keys Pass in about 30°14'10"N., 88°49'51"W.

**Charts 11372 (876-SC), 11373 (1267).-Biloxi** is a city on a peninsula jutting E into Mississippi Sound about 40 miles W of Mobile Bay and 11 miles E of Gulfport. It is an important sport fishing center and resort with a large commercial seafood industry. Hundreds of shrimp and oyster boats operate from the port in the season. Numerous large shrimp and oyster canneries are along the E part of the waterfront on the sound and in Back Bay of Biloxi. Keesler Air Force Base and a large veterans hospital are at the W end of the city. The waterfront on the sound is protected by **Deer Island,** and the harbor in Back Bay of Biloxi is landlocked. The port is accessible from the Gulf through Dog Keys Pass and Little Dog Keys Pass and from the Intracoastal Waterway which passes through Mississippi Sound about 6 miles S of the city. (See chapter 12 for Intracoastal Waterway.) Principal shipments through the port are seafood, building materials, wood products, petroleum products, iron and steel, and machinery.

**Prominent features.**-The tank and radio tower at Ocean Springs, five checkered tanks at **Keesler Field,** the Biloxi Lighthouse, and several large hotels in and W of Biloxi are prominent from offshore. At night the aviation light at Keesler Field is conspicuous. **Biloxi Light** (30°23.7'N., 88°54.1'W.), 61 feet above the water, is shown from a 53-foot white conical tower with black balustrade on the shore in the SW part of Biloxi proper.

**Shipping Safety Fairways.-Vessels bound for Biloxi via Dog Keys Pass should approach the pass through the Biloxi Safety Fairway.** (See 209.135, chapter 2, for limits of fairway.)

Two channels connect Mississippi Sound and the Biloxi waterfront and Biloxi Bay. **Biloxi East Channel,** a dredged channel, leads from a point in Mississippi Sound 2.5 miles N of Dog Keys Pass, through Biloxi Bay E of Deer Island, to U.S. Route 90 highway bridge. In February 1975, the controlling depth was 12 feet. The channel is marked by lights and buoys. **Biloxi Channel,** a dredged channel, leads N from Mississippi Sound W of Deer Island, thence E along the S Biloxi waterfront to a junction with Biloxi East Channel at a point about 1 mile SE of U.S. Route 90 Highway Bridge. In 1973-November 1974, the controlling depth was 6½ feet. The channel is marked by lights and daybeacons.

A privately dredged side channel leads E from Biloxi East Channel, about 0.6 mile SE of U.S. Route 90 highway bridge, to a small-craft basin at **Ocean Springs.** In July 1972, the reported controlling depth was 10 feet. The channel is marked by a light.

The channel into Back Bay of Biloxi, a continuation of Biloxi East Channel above U.S. Route 90 highway bridge, and the Harrison County Industrial Seaway are discussed later in this chapter.

**Anchorages.**-Small craft can anchor off the waterfront north of Deer Island, or in Back Bay of Biloxi where there is excellent anchorage in depths of 5 to 15 feet, soft bottom, and good protection from all directions. An anchorage area for unmanned barges and scows is in Mississippi Sound S of Biloxi. (See 110.194a, chapter 2, for limits and regulations.)

Between Plummer Point and Biloxi the bay is crossed by the new U.S. Route 90 highway bridge with a bascule span having a clearance of 40 feet at the center. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

**Tides.**-The diurnal range of tide at Biloxi is about 1.8 feet.

**Pilotage.**-No regular pilots are stationed at Biloxi.

**Towage.**-The nearest tugs are based at Gulfport. Quarantine and **immigration** officials are at Mobile, and **customs** and **agricultural quarantine** officials at Gulfport serve Biloxi. (See appendix for addresses.) Vessels subject to such inspections usually make arrangements in advance; officials generally board vessels at their berths.

**Quarantine.**-Quarantine laws are enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) The nearest U.S. Public Health **Hospital** is at New Orleans. A **contract physician's office** of the U.S. Public Health Service is maintained at Biloxi. (See appendix for address.) The city has two hospitals and numerous clinics.

The Coast Guard maintains a **documentation office** in Biloxi. **Harbor regulations.**-The harbor is controlled by the Biloxi Port Commission, headed by a Port Director, who establishes regulations. A **harbormaster** enforces the regulations and assigns berths at the small-craft harbor.

**Wharves.**-The S waterfront has many docks. Some of these are private facilities for fishing companies, but several are open to the public. The Biloxi small-craft harbor is a basin protected by breakwaters and located N of the W end of Deer Island. Private lights mark the entrance to the harbor. In July 1972, the reported controlling depth in the basin and the channel leading to it was 10 feet.

**Storm warning signals are displayed** at the small-craft harbor.

**Supplies.**-Gasoline, diesel fuel, water, ice, provisions, and marine supplies are available at Biloxi.

**Repairs.**-Several shipyards are located on the waterfront and in Back Bay of Biloxi. A yard on Back Bay of Biloxi, about 0.4 mile E of Rhodes Point, has a 50-ton mobile hoist that can handle craft up to 60 feet. Boats up to 140 feet are built at Biloxi.

**Small-craft facilities.**-Berths, electricity, gasoline, diesel fuel, water, ice, launching ramps, and marine supplies are available, and hull and engine repairs can be made at small-craft facilities at Biloxi proper, Ocean Springs, and Back Bay of Biloxi.

**Communications.**-The Louisville and Nashville Railroad serves the city with freight service. U.S. Route 90 passes through the city, and State Route 15 leads N to the central part of the State. Scheduled airline service is available at Gulfport Municipal Airport, about 8 miles W of the city. Bus lines and several motor freight lines serve the city.

A channel with dredged sections leads from a junction with Biloxi East Channel at the U.S. Route 90 highway bridge through **Back Bay of Biloxi** and **Big Lake** to the entrance to the Harrison County Industrial Seaway. In February 1975, the controlling depth was 12 feet. The channel is marked by a light, buoys, and daybeacons.

The swing span of a former highway bridge just above U.S. Route 90 highway bridge has been removed, but the approach structures remain and are used for public recreation.

A dredged branch channel leads SW from the channel through the Back Bay of Biloxi about 0.2 mile above U.S. Route 90 highway bridge to a turning basin in **Ott Bayou.** In January 1973, the controlling depth was 9½ feet in the channel and basin. Daymarkers mark the channel.

The L and N Railroad bridge about 0.3 mile above U.S. Route 90 highway bridge has a swing span with a clearance of 4 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) The overhead power cable at the bridge is submerged at the drawspan.

State Route 15 highway bridge crossing the Back Bay of Biloxi at **Shipyard Point** has a swing span with a clearance of 10 feet. The channel is through the N draw. (See 117.240 and 117.245 (a) through (e) and (i)(20-a), chapter 2, for drawbridge regulations and opening signals.) An overhead power cable immediately W of the bridge has a clearance of 89 feet. In 1972, a fixed bridge with a design clearance of 60 feet was under construction about 0.2 mile W of State Route 15 highway bridge; upon completion it will replace the existing bridge. An overhead power cable about 2.7 miles W of State Route 15 highway bridge has a clearance of 84 feet at the main channel and 40 feet elsewhere.

At **Deep Point,** a highway swing bridge has a clearance of 11 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

**Biloxi River** empties into the NE side of Big Lake and is reported navigable for a draft of 6 feet for 6 miles and for a draft of 3 feet for an additional 5 miles. The twin fixed spans of Interstate Route 10 highway bridge, about 3.5 miles above the mouth, have clearances of 40 feet. U.S. Route 49 fixed highway bridge, about 4.3 miles above the mouth, has a clearance of 9 feet; a fixed county highway bridge, about 7.8 miles above the mouth, has a clearance of 4 feet. A powerplant is on the river.

**Tchoutacabouffa River** empties into Biloxi River about 1 mile N of Big Lake from the NE. The river is reported navigable for drafts up to 5 feet to **New Bridge,** about 7.2 miles above the mouth, and for drafts of 3 feet for an additional 6 miles. The twin fixed spans of Interstate Route 10 highway bridge, with clearances of 42 feet, cross the river about 3.5 miles above the mouth. Cedar Lake Bridge, about 4 miles from the mouth, has a swing span with a clearance of 12 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) In 1971, a swing bridge with a design clearance of 5 feet was under construction immediately E of the Cedar Lake Bridge; upon completion it will replace the existing bridge. New Bridge has a fixed span with a clearance of 38 feet. Lamey Bridge, about 3 miles above New Bridge, has a swing span which is reported inoperative; the channel is on the N side of the pivot pier; the clearance is 3 feet.

**Bernard Bayou,** which empties into Big Lake from W, is good for a draft of 8 feet from the entrance at Shallow Point in Big Lake to a junction with Harrison County Industrial Seaway at Gulfport Lake, NNE of Gulfport Municipal Airport. Overhead power cables cross the bayou about 0.5 mile above the mouth and have a least clearance of 64 feet. The highway bridge at Handsboro has a bascule span with a clearance of 12 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

Small-craft facilities about 1.5 miles above the mouth of the bayou can provide berths, gasoline, water, ice, marine supplies, and complete engine and hull repairs. A 110-foot marine railway and a 50-ton fixed lift are also available.

**Harrison County Industrial Seaway,** a canal privately dredged by the Harrison County Development Commission, affords access to industrial areas along the seaway and Bernard Bayou N of Gulfport. The canal leads from a junction with the dredged channel section at the W end of Big Lake through a landcut from Shallow Point on the N side of the entrance to Bernard Bayou for about 2.5 miles, thence through Bernard Bayou and Gulfport Lake for about another 2 miles to a turning basin in the vicinity of Three Rivers Road. In 1969-71, the controlling depth in the seaway was 9 feet with 11 feet in the turning basin. The chan-

nel is marked by private lights. Plans provide for the extension of the seaway farther W to Wolf River and Bay St. Louis at a later date.

About 1.5 miles W of Shallow Point, the Eugene P. Wilkes Bridge at Lorraine Road has a bascule span with a clearance of 29 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) An overhead power cable crossing the seaway 0.4 mile E of the bridge has a clearance of 81 feet. An overhead power cable about 2.8 miles W of the bridge has a clearance of 80 feet.

**Beauvoir**, part of the city of Biloxi and about 6 miles W of Biloxi Bay, has a large resort hotel and a tank which are prominent. A privately dredged channel leads N from Mississippi Sound to a yacht basin in front of the hotel. In 1972, the reported centerline controlling depth was 10 feet in the channel with 6 to 8 feet in the basin. The channel is marked by private lights. A private white light is displayed from a white lighthouse at the basin. Gasoline, diesel fuel, water, ice, marine supplies, and open and covered berths are available at the basin. There are launching ramps and a hoist that can handle craft up to 25 feet for minor hull, engine, and electronic repairs. Radiotelephone watch on VHF-FM Channel 9 (156.45 MHz) is maintained from 0800 to 1700 at the basin. There is a **harbormaster**, and a **dockmaster** assigns the berths.

**Charts 11373 (1267), 11372 (876-SC).-Ship Island Pass** lies immediately W of **Ship Island**, about 50 miles W of Mobile Bay entrance and 11 miles N of the northernmost of the Chandeleur Islands. The pass is approached from the Gulf through a dredged channel about 6 miles long, which is marked by lighted and unlighted buoys.

**Gulfport**, the seat of Harrison County, is a seaport and tourist center. It is about midway between Mobile and New Orleans by rail, and on U.S. Route 49 and 90 highways. Fishing, steel products, chemicals, canning, glass making, and aluminum are some of the city's important industries. Waterborne commerce include forzen meats, bananas, shell, sisal and jute, fertilizers, chemicals, seafood, flour, woodpulp and products, lumber, and scrap iron. A cotton compress is at Gulfport.

**Gulfport Harbor Basin** is a State-owned and controlled harbor about 10 miles NW of Ship Island Pass. The rectangular deepwater ship basin is between two moles at the head of Gulfport Channel. Bert Jones Yacht Harbor, also protected by a mole, is adjacent to the E, and a commercial small-craft harbor is on the W side of the inshore end of the W mole.

**Prominent features.**-On a clear day vessels from the E, bound for Ship Island Pass, usually sight first the trees on the W part of Ship Island, then the light and **Fort Massachusetts**, a semicircular brick fort with sodded parapet, located on the W end of Ship Island. Vessels approaching from S may see Chandeleur Light first.

On the approach to Gulfport, a large hotel halfway between Gulfport and Biloxi and the several water tanks and large buildings in Gulfport are conspicuous. At night the occulting red lights on the tops of several radio towers can be seen from the sound. An aviation light is shown from a 62-foot tower at the municipal airport.

**Ship Island Light** (30°12.7'N., 88°58.0'W.), 84 feet above the water, is shown from a skeleton tower on a concrete block. The light is on the same structure as Ship Island Range Rear Light.

**Chandeleur Light** (30°02.9'N., 88°52.3'W.), 99 feet above the water, is shown from a square pyramidal skeleton tower, brown below the gallery and black above, near the NW end of the northernmost of the Chandeleur Islands. The light presents a good radar target.

**Shipping Safety Fairways.-Vessels should approach Ship Island Pass and Gulfport through the prescribed Safety Fairways.** (See 209.135, chapter 2, for limits of fairways.)

**Channels.-Ship Island Bar Channel** leads for 6 miles NW from the Gulf in a dredged cut to Ship Island Pass; it is marked by lighted and unlighted buoys. **Gulfport Channel** leads 10 miles NW through a dredged cut from the pass through Mississippi Sound to Gulfport Harbor Basin; it is marked by lighted ranges, lights, and lighted and unlighted buoys. Federal project depths are 32 feet for the bar channel and 30 feet for Gulfport Channel and Harbor Basin. (See Notice to Mariners and latest editions of charts for controlling depths.)

A dredged commercial small-craft harbor and entrance channel are just W of Gulfport Harbor Basin. The entrance channel leads NW from Gulfport Channel for about 1.2 miles to the small-craft harbor. In 1971-1974, a reported controlling depth of 8 feet was available in the channel and harbor. The channel is marked by daybeacons, lights, and an unlighted buoy.

**Anchorages.**-Large vessels can anchor outside the bay anywhere W of a line between Chandeleur and Ship Island Lights and have rather smooth water. Just S of the bar the holding ground is good, and bar pilots report good anchorage 0.5 mile S of Ship Island Pass Lighted Bell Buoy 26.

**Ship Island Harbor**, N of Ship Island, is one of the best natural harbors on the Gulf Coast and is easily accessible at all times for vessels with drafts up to 20 feet, but there is swinging room for only one large vessel. Depths in the harbor range from about 20 to 30 feet with a soft bottom.

**Dangers.**-Ship Island was cut into two parts by Hurricane Camille in August 1969. The water between the existing parts is shoal with depths of 2 to 5 feet.

The shoal off the W end of Ship Island at **West Point** is moving W. The channel is dredged frequently, and when shoal water occurs the lighted buoy is moved W to mark the channel. Mariners should exercise caution to keep to the W of this buoy. Mariners are warned not to cut cor-

ners at the bends in the channel. Spoil banks are on either side of Gulfport Channel and W of the commercial small-craft harbor.

**Tides and currents.**-The diurnal range of tide is about 1.7 feet, but the tides are greatly affected by the winds. NE to S winds raise the level of the water, and SW to N winds lower the level. A continued norther makes a current on Ship Island Bar of as much as 4 knots. Current velocities up to 1.5 knots have been measured in Ship Island Pass during normal weather.

**Pilotage** is compulsory for all foreign vessels and U.S. vessels under register in the foreign trade. Pilotage is optional for coastwise vessels over 250 tons that have on board a pilot licensed by the Federal Government. Pilots board vessels in the vicinity of Ship Island Pass Entrance Lighted Whistle Buoy SIP (30°07.0'N., 88°55.8'W.). The pilot boat, a 46-foot motorboat with red hull, white superstructure, and the word PILOT on both sides of the deckhouse, displays a white light over a red light at night. A 24-hour advance notice of time of arrival is requested. Pilots guard VHF-FM channel 16 (156.80 MHz) and use channel 10 (156.50 MHz) as a working frequency. Arrangements for pilots are made in advance through the ships' agents; telephone (601-864-4471).

**Towage.**-Tugs up to 900 hp are based at Gulfport. They monitor and use as a working frequency VHF-FM channel 16 (156.80 MHz), and have portable radiotelephone equipment to communicate with the pilots. Arrangements for tugs are usually made in advance by ships' agents; telephone (601-864-0171). Vessels usually enter or leave under their own power and use tugs only for docking, undocking, and shifting berths.

Customs and **agricultural quarantine** officials are stationed in Gulfport, and quarantine and **immigration** officials are stationed in Mobile. (See appendix for addresses.) Vessels subject to such inspections usually make arrangements in advance; officials usually board vessels at their berths.

**Quarantine** laws are enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) The Public Health Service maintains a **contract physician's office** in Gulfport, and there are hospitals and clinics.

**Customs.**-Gulfport is a **customs port of entry.** Customs officials maintain an office on the 8th floor of the Security Savings and Loan Building in Gulfport.

**Harbor regulations.**-Gulfport Harbor is administered and controlled by the Mississippi State Port Authority at Gulfport. The Port Director is in charge of all operations and assigns berths.

**Speed limit.**-The maximum speed for oceangoing vessels shall not exceed 8 m.p.h. through the channel between Ship Island Bar and the entrance to the Gulfport Harbor, and shall not exceed 5 m.p.h. while passing any wharf, dock, or moored craft.

All craft passing other vessels, boats, barges, scows, etc., in motion, moored or anchored, shall slow down and take every precaution to avoid damage.

**Wharves.**-The deep-draft facilities at Gulfport are on the E and W sides of Gulfport Harbor Basin. The alongside depths for the facilities described are reported; for information on latest depths contact local port authorities. Each of the facilities has rail and highway connections and water connections. All sheds and warehouses are equipped with sprinkler systems, and a fire and security watch is maintained. The port has a cotton compress.

East Pier (30°21.5'N., 89°05.4'W.): 925 feet long; 30 feet alongside; 60,000 square feet covered storage; 10,000 square feet cold storage space; used for general and bulk cargo and sand and gravel.

Banana Handling Berth: immediately NW of East Pier; 515 feet long; 26 feet alongside; gantry cranes and belt conveyor systems, capacity 15,000 stems, boxes, crates, or packages of similar size per hour; banana handling sheds on pier can handle 50 railroad cars or trucks for simultaneous loading.

West Pier (30°21.3'N., 89°05.4'W.): 2,980 feet long; 30 feet alongside; 200,000 square feet covered storage, 207,000 square feet warehouse space, 25,000 square feet cold storage; used for general cargo.

**Supplies.**-Bunker C fuel is available by barge from Mobile or New Orleans. Diesel fuel is available at several commercial wharves or by truck. Freshwater is piped to all berths. Marine supplies of all kinds are available.

**Repairs.**-Gulfport has no shipyard facilities.

**Small-craft facilities.**-The Bert Jones Yacht Basin, in the yacht harbor close E of the Gulfport Harbor Basin, has facilities for yachts and commercial vessels. Berths, electricity, diesel fuel, gasoline, ice, water, launching ramps, and marine supplies are available. There is a 30-ton mobile lift which can handle craft up to 60 feet for hull and engine repairs or storage. In July 1972, the reported controlling depth in the privately dredged channel to the basin was 7 feet. A channel **dockmaster** is on duty at the yacht basin.

**Storm warning signals are displayed.** (See chart.)

**Communications.**-Gulfport has regular steamer connections with Europe, South and Central America, and Far East ports. Banana ships call weekly at the port. The port is served by the Illinois Central and Louisville and Nashville Railroads. Bus and motor freight lines connect the city with all points. The Gulfport Municipal Airport, about 3 miles NE of the port, has regular airline service.

**Charts 11371 (1268), 11372 (876-SC).-Cat Island Channel** and its extension **South Pass,** lying between Cat Island and Isle au Pitre, form the most W connection between the Gulf and Mississippi Sound. The marked channel has a depth of

about 12 feet, but leads to lesser depths in the sound. The passage is little used, except by small local craft; the chart is the best guide. The **current** has an average velocity of 1.5 knots in the channel. Cat Island is wooded nearly its whole length E and W. The E shore of the island extends in a SSW direction for 4.5 miles with Raccoon Spit off the northernmost point, and low and narrow South Spit and Phoenix Spit on the S. A light is off Phoenix Spit.

**Isle au Pitre,** on the S side of Cat Island Channel, is low and marshy with scattered clumps of bushes.

The Intracoastal Waterway leads through the shoals in the W part of Mississippi Sound about 2 miles NW of Cat Island. (See chapter 12 for Intracoastal Waterway.)

**Pass Marianne** is an alternate passage through the shoals extending across the W end of Mississippi Sound; natural depths are 7 to 18 feet. The pass is S of **Tail of the Square Handkerchief Shoal** and **Square Handkerchief Shoal,** and is frequently used by tugs and barges. The channel is marked by lights and buoys. Caution should be exercised when navigating this channel as it is subject to change. In 1966, a depth of 4 feet was reported about 0.3 mile WSW of Merrill Shell Bank Light. **Grand Pass,** about 7 miles S of Merrill Shell Bank Light, connects Mississippi Sound with Oyster Bay; the entrance to the pass is marked by a light.

**Long Beach** is a resort city on Mississippi Sound about 2.5 miles W of Gulfport Harbor. There is some industry in commercial fishing and candy making. **Gulf Park College,** at the E end of the city, has a 1,000-foot pier marked by a light. The buildings and stacks at the college and a white church near the waterfront are prominent. A long mole W of the college pier has partially sheltered small-craft berthage on its W side. In 1972, the breakwater SW of the Mole was being reconstructed. U.S. Route 90 highway passes through the city. Clinics and medical service are available. Buses serve the city.

**Pass Christian** is a city and summer resort 8 miles W of Gulfport on the N shore of Mississippi Sound. A dredged entrance channel leads from Mississippi Sound to a harbor formed by two moles and protected from the S by two breakwaters extending from the moles. In June 1974, the controlling depth was 7 feet in the entrance channel and in the harbor. A light marks the seaward end of the E breakwater. The harbor entrance can be approached from the E or SW; both approaches are marked by lights. A large white church just E of the harbor is prominent.

Pass Christian Yacht Club is at the outer end of the E mole. Fishing vessels unload at the bulkhead of the City Wharf on the E mole. Berths, gasoline, diesel fuel, water, and ice are available in the harbor.

**Storm warning signals are displayed.** (See chart.)

There is some industry in fishing and garment making. U.S. Route 90 highway passes through the city. Clinics and medical services are available. Buses serve the city.

**Henderson Point** is at the W extremity of Pass Christian and on the E side of the entrance to St. Louis Bay. Just N of the point, and between the bridges over the bay, is a small bayou which is connected to Mallini Bayou. A marina is on the N side of the entrance. In 1972, a reported depth of 5 feet could be carried through a privately marked channel to the marina at which berths, gasoline, ice, water, and some marine supplies are available. Craft up to 25 feet can be handled on a trailer for hull and engine repairs, and a 10-ton mobile crane that can handle craft up to 30 feet is available on short notice. Above the marina the channel is crossed by several fixed highway bridges with a minimum width of 10 feet and clearance of 4 feet.

**St. Louis Bay** is an indentation in the N shore of Mississippi Sound, 11 miles W of Gulfport. Depths in the bay vary from 4 to 7 feet and decrease gradually toward the shore. The bottom is soft. Two bridges cross St. Louis Bay, the first, the Louisville and Nashville Railroad bridge has a swing span with a clearance of 13 feet through the W draw, and the second, the four-lane U.S. Route 90 highway bridge, has a bascule span with a clearance of 17 feet at the center. An overhead power cable about 25 yards N of the highway bridge has a clearance of 60 feet except at the drawspan where the clearance is 80 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

**Bayou Portage,** which empties into the E side of St. Louis Bay, is used by small craft as a harbor of refuge during minor storms. The Harrison County Development Commission has dredged a channel from the bay through Bayou Portage to a dredged slip that extends about 0.8 mile SSE to Pass Christian. An industrial area and port is under development on the slip. In August 1970, the controlling depths were 6 feet in the channel and 10 feet in the slip. Private lights and buoys mark the channel. The highway bridge about 1 mile above the mouth of the bayou has a bascule span with a clearance of 11 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) An overhead power cable crossing just E of the bridge has a clearance of 48 feet.

**Wolf River** empties into the E side of St. Louis Bay just above Bayou Portage. A dredged entrance channel leads N from a junction with Bayou Portage Channel for 1.6 miles to the mouth of the river. In May 1974, the controlling depth was 6 feet. The channel is marked by a light and daybeacons.

**De Lisle,** a small village on **De Lisle Bayou** about 1.4 miles above the mouth of the Wolf River, has a fish camp at which berths and ice are available. A natural launching ramp and gasoline are available nearby. The reported controlling depth from the

Wolf River to the yard was about 5 feet in July 1972; local knowledge is advised.

The highway bridge over Wolf River near De Lisle has a bascule span with a clearance of 13 feet. An overhead power cable W of the bridge has a clearance of 88 feet. The highway bridge crossing the river about 4.8 miles upstream has a swing span with a clearance of 9 feet. The channel is through the SE draw. An overhead power cable about 0.3 mile W of the bridge has a clearance of 84 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals for the bridges over Wolf River.)

The dome of a private school at **Shell Beach**, about 3 miles W of De Lisle, is prominent from seaward.

**Jourdan River** empties into the W side of St. Louis Bay. A dredged channel leads W in St. Louis Bay for 1.7 miles to the mouth of the river. In May 1974, the controlling depth was 6 feet. The channel is marked by a light and daybeacons. A small boatyard and marina on **Joes Bayou**, just inside the river entrance, can handle craft up to 38 feet for hull and engine repairs. The channel leading to the yard had a reported controlling depth of 3 feet in July 1972. Boats are also constructed at the yard; open and covered berths and a launching ramp are available.

**Watts Bayou** empties into Jourdan River about 1 mile above the latter's mouth. The controlling depth in the bayou is about 3 feet; local knowledge is advised. A boatyard on the bayou that can handle craft up to about 50 feet has limited covered berths.

**Edwards Bayou** flows into Watts Bayou at the mouth. In July 1972, the unmarked channel leading to the marina about a mile above the mouth had a reported controlling depth of about 6 feet. Berths, gasoline, diesel fuel by truck, water, ice, a launching ramp, and some marine supplies are available. A 25-ton mobile lift can handle craft up to 40 feet for hull and engine repairs.

**Bayou La Croix** enters Jourdan River from the W about 2.9 miles above the mouth. State Route 603 highway bridge crossing the bayou about 1.6 miles above the mouth has a 38-foot fixed span with a clearance of 12 feet. Overhead power cables on either side of the bridge have a clearance of 40 feet.

**Bay St. Louis** is a city and summer resort on the W side of St. Louis Bay. A depth of 7 feet can be carried to within 0.3 mile of the town. The city has a hospital and several clinics. The Louisville and Nashville Railroad has freight service, and through bus service is available on U.S. Route 90 highway, which passes through the city.

The small-craft harbor of the Waveland Yacht Club about 0.4 mile NW of U.S. Route 90 highway bridge is protected by two moles. In 1972, a reported depth of 4 feet could be taken to the harbor. The harbor facilities, including berths and gasoline, are available to club members and friends.

**Bayou Caddy** (see also chart 11367 (878-SC)) empties into Mississippi Sound 7 miles SW of St. Louis Bay. The bayou is approached from the sound through a channel marked by lights and daybeacons. In 1973-January 1975, the channel had a controlling depth of 5 feet to the fuel dock and municipal fish wharf on the N side of the bayou just above the entrance, thence in 1973, 6½ feet to the marina on the S side of a spur channel about 1 mile above the entrance. Gasoline and diesel fuel are available at the fuel dock; berths, gasoline, marine supplies, and a 10-ton mobile hoist that can handle craft up to 35 feet for hull repairs are available at the marina.

**Three Mile Pass** and **Blind Pass** lead to Bay Boudreau from the S part of the extreme W end of Mississippi Sound. The channels are little used; each is marked by a light. **Bay Boudreau** is a shallow body of water enclosed by irregularly shaped, low, swampy islands and other shallow bays.

**Charts 11363 (1270), 11364 (1271), 11361 (1272).-Chandeleur Sound** and **Breton Sound** lie S of Mississippi Sound and N of the Mississippi River Delta; no clear line of demarcation lies between them-Chandeleur is the N of the two sounds.

**Chandeleur Islands**, forming the E boundary of Chandeleur Sound, comprise a narrow, crescent-shaped chain of low islands starting 10 miles S of Ship Island and continuing in a general S-by-W direction for a distance of 20 miles. SW from these islands are **Curlew Island,Grand Gosier Islands,** and **Breton Islands.** The Breton Islands mark the E limit of Breton Sound. Chandeleur Sound offers smoother water than the passage E of the islands to shallow-draft vessels bound from Mississippi Sound to Mississippi River.

The Mississippi River-Gulf Outlet Canal, which enters Breton Sound from the Gulf between Breton Islands and Grand Gosier Islands, is described in chapter 8 with the Mississippi River Channels.

**North Islands, Freemason Islands, New Harbor Islands,** and **Old Harbor Island Shoal** are on the E side of Chandeleur Sound. Only fishermen and trappers frequent these, which are separated from each other by shallow unmarked channels. Protected anchorage for small boats in stormy weather can be found in **Shoalwater Bay, Smack Channel,** and other passages.

Chandeleur Islands, Curlew Island, Grand Gosier Islands, Breton Islands, North Islands, Freemason Islands, New Harbor Islands, and Old Harbor Island Shoal lie within the **Breton Island Wildlife Refuge** and are subject to the rules and regulations prescribed by the U.S. Department of Interior.

**Ostrica Canal** leads into Mississippi River at the village of **Ostrica,** 21.5 miles above Head of Passes. The canal locks are 247 feet long, 40 feet wide, and have depths of 10 feet over the sill. The

canal affords passage from Breton Sound through **Quarantine Bay** and **Bayou Tortillon** to Mississippi River. In January 1974, the controlling depth was 6 feet from the Mississippi River to Quarantine Bay. A cluster of partially submerged pilings is reported in 29°25′15″N., 89°27′00″W., about 1 mile E of the entrance to the channel leading from Breton Sound to Quarantine Bay. The lock is in operation 24 hours a day. The channel leading to the canal and locks is marked by private aids.

The W shore of Breton Sound consists of a network of marshy islands separated by shallow bayous and bays. The land is so low that extremely high tides will submerge it in some sections nearly to the banks of the Mississippi River. Of the several shallow canals leading from the S part of Breton Sound to the river bank, only the Ostrica Canal leads into the river. These canals are used by the large fleet of oyster boats operating in the sound to deliver their catch to canneries and packing houses on the river bank or to highways for trucking to New Orleans, and by oil companies for the development of oil fields. Oil drilling equipment will be found throughout the area. There are numerous unlighted oil well structures in Chandeleur and Breton Sounds and the waters to the W.

The waterways connecting Lake Borgne and Chandeleur Sound via Lake Eloi are discussed under Lake Borgne.

A light (29°37.0′N., 89°29.1′W.) off Mozambique Point marks the N side of the entrance to Black Bay from Breton Sound. A seasonal fog signal is at the light. Another light on the N side of Black Bay marks the entrance to **Bayou Terre aux Boeufs.** In 1972, a reported depth of about 5½ feet could be carried up the bayou to Delacroix; local knowledge is advised. Overhead power cables crossing the waterway have a minimum clearance of 30 feet. **Delacroix** is a small settlement on the waterway about 8 miles S of Lake Borgne. There is a marine lift at Delacroix that can handle craft up to 30 feet. Gasoline, diesel fuel, water, ice, and limited marine supplies may be obtained. From Delacroix, a highway extends to Poydras on the Mississippi, and thence to New Orleans. The marsh lands about Black Bay are used extensively for hunting, trapping, and oil development.

**Charts 11371 (1268), 11367 (878-SC).-Lake Borgne,** the W extension of Mississippi Sound is partly separated from Mississippi Sound by **Grassy Island, Half Moon (Grand) Island,** and **Le Petit Pass Island** and their outlying shoals. Between the islands and shoals are several navigable passages including St. Joe and Le Petit Passes. On the NW shore, Lake Borgne is separated from Lake Pontchartrain by a low marsh through which the Rigolets and Chef Menteur Pass are the principal passages. Lake Borgne is about 23 miles in length, 5 to 10 miles in width, and 6 to 10 feet in depth. The shores of the lake are low, marshy, and sparsely populated. The lake is of importance chiefly as a connecting link for the Intracoastal Waterway. (See chapter 12 for Intracoastal Waterway.) Lake Borgne is tidal, but the tides are small and greatly modified by the winds. The tidal currents through St. Joe Pass have velocities exceeding 1.5 knots at times.

Vessels coming from the E generally enter Lake Borgne through **St. Joe (Grand Island) Pass,** which leads between Half Moon (Grand) Island and **Lighthouse Point (Lower Point Clear).** The channel is marked and is a portion of the Intracoastal Waterway. (See chapter 12 for Intracoastal Waterway.)

**Le Petit Pass,** between Le Petit Pass Island and **Malheureux Point,** is little used.

**Pearl River** empties into Lake Borgne from the N. The river serves as a boundary between the States of Mississippi and Louisiana. Principal commerce on the river is in barge shipments of natural gas and large structures for NASA. A dredged channel leads from N of the Intracoastal Waterway in Lake Borgne for 1.1 miles to the mouth of the Pearl River. In May 1974, the midchannel controlling depth from Lake Borgne to deeper water in the river was 5½ feet. The channel is marked by lights and daybeacons. The Louisville and Nashville Railroad swing bridge, with a clearance of 14 feet, crosses Pearl River at **Baldwin Lodge,** about a mile above the mouth; the channel is through the E draw. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

About 3.5 miles above the mouth, Pearl River joins with **Little Lake Pass,** which leads W to **Little Lake. East Pass,** at the W end of Little Lake, connects the lake and Rigolets. A dredged channel extends from Rigolets ENE through the East Pass, Little Lake, and Little Lake Pass, thence up the Pearl River to a turning basin and slip at the **NASA Missile Test Center** near Gainesville, about 14 miles above the mouth of Pearl River; the controlling depth was reported to be 12 feet in 1964. The channel is marked by lights and lighted and unlighted buoys. U.S. Route 90 highway bridge across the Pearl River at **Pearlington,** 4 miles above the mouth, has a swing span with a clearance of 10 feet through the E draw. About 5.3 miles above this swing bridge, a bascule bridge with a clearance of 73 feet crosses the river; the bascule bridge is kept in a closed position. An overhead power cable just S of the bascule bridge has a clearance of 99 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals of bridges over Pearl River.)

A marina just above U.S. Route 90 highway bridge has berths, electricity, gasoline, water, and a 3-ton hoist; engine repairs can be made.

From the N side of Little Lake, just W of Little Lake Pass, a marked channel leads to **North Pass** and a junction with **West Middle River.** From North Pass an unmarked channel leads W to **East Mouth,** which connects to the mouth of the West Pearl River, thence, through **West Mouth,** to

Rigolets; about 7 feet can be carried over this route to the mouth of West Pearl River, thence about 8 feet to Rigolets.

A highway bridge crossing **East Middle River,** a tributary of **Old Pearl River,** about 3.4 miles above Pearl River has a 45-foot fixed span with a clearance of 11 feet; an overhead power cable is at the bridge. A highway bridge crossing **Middle River,** a tributary of Old Pearl River, about 3.9 miles above Pearl River has a fixed span with a clearance of 10 feet; an overhead power cable is at the bridge. A highway bridge crossing West Middle River about 5 miles above North Pass has a fixed span with a clearance of 10 feet; an overhead power cable is at the bridge.

**West Pearl River** empties through West Mouth into the E end of Rigolets. A dredged channel leads from the mouth of West Pearl River to **Bogalusa,** La., a distance of about 50 miles; three locks are each 65 feet wide and 310 feet long, with 10 feet over the sill. In June 1972, the controlling depth was 7 feet. About 5 miles above the junction of East Mouth and West Mouth there is a vertical lift bridge with a clearance of 10 feet down and 50 feet up; the overhead cable 1.9 miles above this bridge has a clearance of 55 feet. At **Gauss Bluff,** about 11 miles above the mouth, the twin fixed spans of Interstate Route 10 highway bridges with clearances of 35 feet cross the river. Near the town of **Pearl River,** 19 miles above the mouth, there are three bridges; the first two are the twin fixed spans of the Interstate Route 59 highway bridge with clearance of 35 feet. About 200 yards farther upstream, the Southern Railroad bridge has a swing span with a clearance of 7 feet. (See 117.240, 117.245 (a) through (e) and (i)(21), and 117.540, chapter 2, for drawbridge regulations and opening signals.) The overhead power cables at the railroad bridge have clearances of 60 feet.

**Rigolets** is a deep passage 7 miles long and about 0.4 mile wide connecting Lake Borgne and Lake Pontchartrain. Depths range from 20 to 60 feet in the passage bounded by low and marshy shores. The entrance from Lake Borgne is 8 miles W of St. Joe Pass. Two swing bridges cross Rigolets. The first, the Louisville and Nashville Railroad bridge about 0.4 mile W of **Catfish Point** in Lake Borgne, has a clearance of 11 feet; navigation is through the E draw. The second, about a mile E of Lake Pontchartrain, is U.S. Route 90 highway bridge that has a clearance of 14 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

**Currents** are very irregular and greatly influenced by winds. They set with great velocity through Rigolets at times, and especially through the draws of the bridges. Velocities of 2.5 knots off West Rigolets Light and 3.8 knots at the railroad bridge have been observed. At the railroad bridge westerly currents set WSW onto the fender on the SW side of the draw, and easterly currents set E by N onto the fender on the NE side. The current has an average velocity of 0.6 knot. The bridge should not be approached closely until the draw is opened, and then only with caution.

Good anchorage for small craft is available in **Blind Rigolets** either N or S of the Intracoastal Waterway crossing. Depths of 12 feet or more are available for vessels entering Blind Rigolets via the Intracoastal Waterway. The Louisville and Nashville Railroad bridge over Blind Rigolets, N of the Intracoastal Waterway, has a fixed span with a clearance of 11 feet; the overhead power cable, 250 feet N of the bridge, has a clearance of 25 feet.

**Fort Pike,** an old circular brick fort with sodded top, is just inside the W entrance to Rigolets.

Small-craft facilities on **Fort Pike Canal,** E of the fort, and on **Geogheagan Canal,** NE of the fort, can provide berths, electricity, gasoline, diesel fuel, water, ice, storage, launching ramps, and hull, engine, and electronic repairs. The largest mobile hoist, on the NW side of Geogheagan Canal just above the entrance, can handle craft up to 68 feet.

In July 1972, the reported controlling depths were 4 feet in Fort Pike Canal and 8 feet in Geogheagan Canal.

**Lake St. Catherine** can be reached through Fort Pike Canal or through a natural unmarked channel in **Sawmill Pass.** The lake has numerous oil well structures.

**Chef Menteur Pass,** a connecting passage between Lake Borgne and Lake Pontchartrain, is located about 10 miles SW of Rigolets. The pass is about 6 miles long and 0.2 mile wide. There is a considerable range in depths in the pass with shallow water off the entrances. The pass, used by pleasure and fishing craft, is usually entered through the Intracoastal Waterway. A light marks the entrance from Lake Borgne, and another light marks the entrance from Lake Pontchartrain; two lights mark the Intracoastal Waterway crossing. A new Intracoastal Waterway alinement channel, completed in 1972, crosses Chef Menteur Pass 1 mile SE of the original Intracoastal Waterway crossing. A light and daybeacon mark the new crossing. In 1968, pilings were reported near the Lake Pontchartrain entrance to Chef Menteur Pass, about 400 yards and 600 yards NW of the entrance light. Two swing bridges cross Chef Menteur Pass. The Louisville and Nashville Railroad bridge has a clearance of 10 feet. The U.S. Route 90 highway bridge, crossing 0.3 mile NW of the railroad bridge, has a clearance of 11 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) The town of **Chef Menteur** is between the bridges. A large spherical tank 0.4 mile NW of the highway bridge is conspicuous.

Several small-craft facilities are on both sides of the pass from the highway bridge N for about 1 mile. Berths, electricity, gasoline, diesel fuel, water, ice, storage, launching ramps, and marine supplies are available, and hull and engine repairs can be made. The largest mobile hoist, at a

boatyard about 0.9 mile N of the highway bridge, can handle craft up to 36 feet.

**Bayou Sauvage** is an important waterway leading about 2.7 miles W from Chef Menteur Pass about 0.3 mile NW of the highway bridge. In July 1972, depths of 12 feet were reported in the bayou. There are fish camps, marinas, and a boatyard and shipyard on the bayou. Several oil companies maintain marine bases on the bayou. A floating drydock can handle vessels up to 850-ton displacement, 12-foot draft, and 70-foot beam for general repairs. The shipyard builds steel tugs and crew boats up to 228 feet. Electronic repairs can be made. Gasoline, diesel fuel, water, ice, and marine supplies are available.

**Charts 11371 (1268), 11369 (1269), 11364 (1271).-Bayou Bienvenue** empties into the W side of Lake Borgne about 5 miles SW of Chef Menteur Pass. The bayou connects Lake Borgne with the Mississippi River-Gulf Outlet Canal, and thence leads W for about 6.3 miles. In November 1974, the controlling depths were 3 feet across the lake bar, thence 7 feet to the Mississippi River-Gulf Outlet Canal, and thence 7 feet for about 2 miles to State Route 47 highway bridge. The bridge has a 17-foot fixed channel span with a clearance of 3 feet.

**Bayou Dupre** empties into the SW end of Lake Borgne at **Martello Castle,** about 3.5 miles SSE of Bayou Bienvenue. A dredged channel leads from Lake Borgne into and through Bayou Dupre and **Lake Borgne Canal** to the higway bridge at Violet. A levee has been built through the abandoned lock which connected the Mississippi River with Lake Borgne at **Violet.** In November 1974, the controlling depths were 5½ feet over the bar in Lake Borgne, thence 7 feet to the highway bridge at Violet. An overhead cable, with a clearance of 60 feet, crosses about 1.2 miles E of Violet. Petroleum products and fish are the principal commerce on the bayou. Shrimp fishermen report that the canal is difficult to navigate during winter low water. A light and daybeacons mark the entrance to the bayou.

**Bayou Yscloskey** empties into the southernmost part of Lake Borgne at **Shell Beach,** a small settlement on the shore of the lake. A dredged channel leads from Lake Borgne to the mouth of Bayou Yscloskey. In November 1974, the controlling depth was 3 feet. The channel is marked by lights and daybeacons. From the mouth of the bayou, the channel is privately maintained for 2 miles to Bayou la Loutre at the settlement of **Yscloskey.** In November 1974, the controlling depth was 5 feet. Overhead power cables crossing Bayou Yscloskey have a minimum clearance of 30 feet. Gasoline, diesel fuel, water, ice, and limited marine supplies are available on the bayou. From Yscloskey, **Bayou la Loutre** flows SE for 25 miles to Eloi Bay (chart 11363 (1270)). The dredged channel in the bayou is privately maintained from Yscloskey to Hopedale, a small settlement 3 miles SE. In November 1974, the controlling depth was 4 feet. The bridge over Bayou la Loutre at Yscloskey has a vertical lift span with a width of 45 feet and clearance of 2 feet down and 53 feet up. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) An overhead power cable crossing at Hopedale has a clearance of 68 feet. **Hopedale** has several wharves at which gasoline, diesel fuel, water, ice, and marine supplies are available. A small boatyard at Hopedale can handle craft up to 40 feet. Repairs are normally made by the boat owners.

From Hopedale, Bayou la Loutre Channel is a Federal project. In 1974, controlling depths were 4 feet to Bayou St. Malo, thence 3½ feet to and through **Bayou Eloi** to deep water in **Lake Eloi.** A light marks the crossing of the Mississippi River-Gulf Outlet Canal, and lights and daybeacons mark the entrance to Bayou Eloi in Lake Eloi.

**Bayou St. Malo,** a dredged channel, leaves Bayou la Loutre 5 miles E of Hopedale and flows NW for 5 miles to Lake Borgne. Principal traffic on the waterway consist of commercial fishing boats, oil well equipment, and support vessels. In November 1974, controlling depths were 3½ feet to Lake Borgne, thence 2½ feet in the channel across the bar. A light marks the bar channel.

**Chart 11369 (1269).-Lake Pontchartrain,** a freshwater lake roughly elliptical in shape, is 36 miles long, 22 miles wide at the widest part, 10 to 16 feet deep, and lies N of the Mississippi River at New Orleans. The lake connects with the Mississippi River through the Inner Harbor Navigation Canal; with Lake Borgne through Rigolets and Chef Menteur Pass; and with Lake Maurepas through Pass Manchac. Considerable commerce is carried on Lake Pontchartrain, the principal items being sand and gravel, shell, stone, petroleum products, lumber, cement, chemicals, steel products, and foodstuffs.

The periodic tide is negligible, but the variation in the water level due to winds has an extreme range of 3.5 to 4 feet. It is reported that the surface of the lake is lowered at least 2 feet during the winter when NW winds prevail.

Three causeways cross the E end of Lake Pontchartrain. U.S. Interstate Route 10 highway causeway, about 3.5 miles W of Rigolets and crossing between **Point aux Herbes** and **Howze Beach,** has a bridge with a fixed span over the navigation channel about 1.2 miles from its NE end with a clearance of 65 feet. U.S. Route 11 highway causeway, W of U.S. Interstate Route 10 highway causeway and crossing from Point aux Herbes to **North Shore,** has two bascule bridges; one, about 1 mile SW of North Shore, has a clearance of 13 feet; the other, about 0.4 mile NE of Point aux Herbes, has a clearance of 12 feet. The overhead power cable just W of this bridge has a clearance of 94 feet. The Southern Railway causeway, W of

U.S. Route 11 highway causeway and crossing between **South Point** and North Shore, has two swing span bridges; one, about 1 mile SW of North Shore, has a clearance of 2 feet; the other, about 1.2 miles NE of South Point, has a clearance of 1 foot. The overhead power cable just W of this bridge has a clearance of 12 feet but is submerged at the channels. (See 117.240 and 117.245 (a) through (e) and (i)(23-a), chapter 2, for drawbridge regulations and opening signals.)

Small-craft facilities at **Grand Lagoon**, at the N end of U.S. Interstate Route 10 highway causeway, and at the S end of this bridge can provide berths, gasoline, diesel fuel, water, ice, launching ramps, and some marine supplies.

**Lake Pontchartrain Causeway**, twin toll highway bridges, extends 20.9 miles across Lake Pontchartrain from Indian Beach on the S shore to Lewisburg on the N shore. Five bridge openings, four twin fixed and one twin bascule, are at intervals of about 3.5 miles along the causeway. The first three openings N from Indian Beach are crossed by twin fixed bridges with clearances of 22 feet, 50 feet, and 22 feet, respectively. The next opening is crossed by twin bascule spans with clearances of 42 feet, and the northernmost opening is crossed by a twin fixed bridge with a clearance of 22 feet. (See 117.240 and 117.245 (a) through (e) and (i)(23-b), chapter 2, for drawbridge regulations and opening signals for the bascule span.)

A pipeline crosses the lake beginning at a point in the vicinity of **Bayou Piquant** and extends in a NE direction to Mandeville. Private lights and unlighted buoys mark the pipeline.

**Middle Ground** is the shoal portion of Lake Pontchartrain near Rigolets. A dredged channel extends across the NE part of Middle Ground between Rigolets and deeper water in the vicinity of U.S. Interstate Route 10 fixed bridge. In 1973, the controlling depth was 7 feet. The channel is marked by lighted ranges and buoys.

**Bayou Bonfouca**, which empties into Lake Pontchartrain 3 miles NW of the Southern Railway causeway N swing bridge, is the approach to the town of Slidell. There is some waterborne commerce in shell, sand, and gravel. A dredged channel leads for about 6 miles from deep water in Lake Pontchartrain to Slidell. In August-September 1974, the controlling depth was 8 feet to the highway bridge at Slidell. The channel across the bar is marked by lights and daybeacons. The highway bridge at Slidell has a swing span with a clearance of 2 feet through the W draw. The bridgetender lives near the bridge and will open on signal, but there may be a slight delay. In 1975, a highway swing bridge with a design clearance of 6 feet was under construction at the site of the existing bridge. When completed it will replace the existing bridge. The overhead power cable at the bridge has a clearance of 58 feet. (See 117.240 and 117.540, chapter 2, for drawbridge regulations and opening signals.)

**Slidell** is a town on U.S. Route 11 highway and the Southern Railway leading to New Orleans. A well-equipped shipyard has facilities for construction or repair of steel or wooden vessels including a commercial graving dock 350 feet long, 70 feet wide, with 20 feet over the sill, two marine ways that can handle craft up to 225 feet, and a 75-ton floating crane. Tugs, barges, and diving equipment are available for towing or salvage work. Other facilities at the yard include several loading slips and a railroad siding. Berths, gasoline, diesel fuel, ice, water, and a 2-ton fixed lift are available at a marina on the W side of the river just below the highway bridge.

**Lacombe Bayou** empties into Lake Pontchartrain 4.5 miles W of Bayou Bonfouca. A dredged channel leads from the entrance bar in Lake Pontchartrain to a fish hatchery about 6.2 miles above the mouth of the bayou. In September 1974, the controlling depths were 8 feet across the bar, thence in April 1974, 6 feet to Mile 6.6, thence in May 1973, 2½ feet for about 1.2 miles. The entrance channel is marked by lights and a daybeacon.

The Gulf, Mobile, and Ohio Railroad bridge about 4.5 miles above the mouth and U.S. Route 190 highway bridge at **Lacombe** have swing spans with a minimum channel width of 45 feet and clearances of 5 feet. (See 117.240 and 117.245 (a) through (e) and (i)(23), chapter 2, for drawbridge regulations and opening signals.) Overhead power cables crossing at the bridges have a minimum clearance of 60 feet. Commerce on the bayou includes shipments of shell, sand and gravel, and drilling equipment. A boatyard on the E side of the bayou just below the railroad bridge builds steel workboats. The bayou has several fish camps and a seaplane base.

**Mandeville** is a summer resort on the N shore of Lake Pontchartrain 20 miles N of New Orleans. Many of the boat landings on the N shore are in ruins. A protected landing is in **Bayou Castine.** The depth over the bar is about 5 feet. Private buoys mark the jettied entrance to the bayou.

A municipal wharf at which berths are available is on the W side of the entrance. A marina and boatyard on the bayou has a 8-ton crane that can handle craft up to 35 feet for general repairs or storage. Berths, electricity, water, and marine supplies are available. In 1973, the basin had depths of 5 feet.

**Tchefuncta River** flows into Lake Pontchartrain about 21 miles N of New Orleans. Commerce on the river is in shell and steel products. A dredged channel leads from the 10-foot depth in Lake Pontchartrain for about 12.2 miles up Tchefuncta River and its tributary, **Bogue Falaya,** to the town of **Covington,** La. In September 1974, the controlling depths were 9½ feet across the bar, thence 10 feet for 9.2 miles, thence depths diminishing from 7 feet to 4 feet in the next 3.8 miles. The entrance is marked by a light, a lighted range, and daybeacons. U.S. Route 190 highway bridge

crossing the river at Madisonville has a swing span with a clearance of 1 foot. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) The overhead power cable at the bridge has a clearance of 106 feet. An overhead power cable with a clearance of 85 feet crosses the river about 6 miles above the bridge at Madisonville.

The twin fixed spans of Interstate Route 12 highway bridge with a clearance of 30 feet cross the river about 9.4 miles above the mouth.

Tows through the bridges are limited to one barge. The towing vessel must be made up rigid, astern of the barge, and the barge shall be pushed through the draw at dead slow speed and under full control.

**Madisonville,** a town 1.5 miles up Tchefuncta River, has berths at public landings above and below the W side of the bridge. Two shipyards build commercial vessels and barges, and another repairs company-owned dredging equipment. A boatyard, on the E side of the river about 1.5 miles above the bridge, can handle work and pleasure craft up to 80 feet for hull and engine repairs. There are three marinas above the highway bridge. Berths, electricity, gasoline, diesel fuel, water, ice, marine supplies, and launching ramps are available.

An overhead power cable extends generally around the perimeter of the W and SW part of Lake Pontchartrain, from the shore near Madisonville to a point about 6.4 miles W of New Orleans. Clearance is 40 feet throughout except for 60 feet where the cable crosses over the entrance to the bar channel to Tangipahoa River, and 90 feet over the entrance to Pass Manchac. Private lights partly mark the cable.

**Tangipahoa River** is a narrow stream flowing into Lake Pontchartrain 6 miles SW of Tchefuncta River. A dredged channel leads from Lake Pontchartrain across the bar to the river mouth. In September 1974, the controlling depths were 5 feet over the bar, thence in April 1974, 10 feet for 2.6 miles above the mouth, thence depths diminishing from 8 feet to 2 feet for the next 7.8 miles. Lights and daybeacons mark the entrance channel. Gasoline, ice, groceries, and meals are available at Lee Landing, about 6 miles above the river mouth. There are numerous overhead power cables, with minimum clearance of 60 feet, over Tangipahoa River up to Lee Landing.

**Pass Manchac** is a passage 5.5 miles long connecting Lake Pontchartrain with Lake Maurepas. Principal commerce is in shell and petroleum products. Depths in the pass range from 26 to 54 feet, but the approaches in both lakes, across long bars, restrict navigation to drafts of about 5 feet. From Lake Pontchartrain there are two approach channels, **North Channel** and **South Channel.** The E side of the entrance to each is marked by a light. Both lead to Pass Manchac Light on the N point at the E end of the pass. In September 1974, the controlling depths were 5 feet over the bar in North Channel and 7 feet over the bar in South Channel.

Once over the bar, midchannel courses should be followed through Pass Manchac.

At the W end of the pass, a marked northerly channel and an unmarked southerly channel separated by a shallow middle ground lead into Lake Maurepas. In September 1974, the controlling depth in the N channel was 5 feet, thence in 1972 the controlling depth in the S channel was 5 feet.

Overhead power cables crossing over the pass about 0.3 mile and 2 miles from the E entrance have clearances of 90 feet and 76 feet, respectively. Two bridges and the remains of two former bridges cross the W end of the pass. The easternmost bridge, the Illinois Central Railroad bridge, has a bascule span with a clearance of 56 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) An overhead power cable at the bridge has a clearance of 64 feet. Immediately W of the Illinois Central Railroad bridge are the remains of the former railroad and highway bridges; the center portions of these bridges have been removed. Immediately W of the remains of the former bridges is U.S. Interstate Route 55 fixed highway bridge with a clearance of 51 feet.

Gasoline, diesel fuel by truck, water, ice, and some marine supplies are available at a wharf just E of the N end of the U.S. Interstate Route 55 highway bridge.

**Lake Maurepas,** lying W of Lake Pontchartrain, is 11.5 miles long in a NE and SW direction, and from 4 to 8 miles wide. Depths range between 7 to 12 feet, but numerous submerged tree stumps are reported along the lake shore. Strangers are advised to keep at least a mile offshore and to approach the entrances to the tributaries with caution. No cities or towns are along the lake shores, which are low and thickly wooded. The lake is of little commercial importance except as the approach to Tickfaw and Amite Rivers, which have some trade to New Orleans.

**Tickfaw River** flows into the N end of Lake Maurepas about 3.5 miles NW of Pass Manchac. The entrance is marked by a light and a daybeacon on the W side of the mouth. A large shoal extends S of the light on the W side of the entrance, and stumps are on the E side. In September 1974, controlling depths were 5 feet over the bar, thence 13 feet to the junction with Blood River, thence 6 feet for the next 8.9 miles. Above this point the river is blocked by fallen trees. State Route 22 highway bridge crossing the river about 6.2 miles above the mouth, just below the junction with Blood River, has a swing span with a channel width of 44 feet but no clearance. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) An overhead power cable crossing just W and parallel to the swing bridge has a clearance of 70 feet. A marina just below the S side of the bridge has berths, gasoline, diesel fuel, ice, and marine supplies.

**Natalbany River,** a tributary of Tickfaw River, in May 1974, had a controlling depth of 6 feet for about 3.5 miles, thence 5 feet to the highway bridge at **Springfield,** about 8.3 miles above the mouth.

**Ponchatoula River,** a tributary of Natalbany River, joins that river about 3.3 miles above the mouth. In May 1974, the controlling depth was 6 feet for 3.1 miles; the river is blocked by fallen trees at this point. State Route 22 highway bridge at **Wadesboro** has an 18-foot fixed span with a clearance of 4 feet.

**Blood River,** a tributary of Tickfaw River, joins that river 6.3 miles above the mouth. In September 1974, controlling depths were 9 feet for 3 miles, thence 3½ feet for about another 0.3 mile. The Blood River has several small marinas about 0.9 mile above its junction with the Tickfaw River at **Warsaw Landing.** Berths, gasoline, and launching ramps are available.

Principal shipment on Tickfaw, Natalbany, Pontchatoula, and Blood Rivers is shell.

**Amite River** empties into Lake Maurepas 8 miles W of Pass Manchac. The entrance is marked by a light. Principal shipment on the river is shell.

In entering Amite River, pass well to the E of the light; submerged stumps are reported in an area extending 0.4 mile S of the light and up to 0.4 mile offshore. In September 1974, the controlling depth across the bar was 4 feet with depths of 6 feet or more to the junction with its tributary Bayou Manchac about 31 miles above the mouth. Above a point about 12 miles above the mouth there are overhanging trees and snags. Overhead power cables crossing Amite River about 0.1 mile, 2.6 miles, and about 3.0 miles above the mouth have clearances of 70 feet, 60 feet, and 60 feet, respectively. Three highway bridges cross the river between the mouth and Port Vincent, about 27 miles above the mouth. The bridge at **Clio,** about 5 miles above the mouth, has a swing span with a width of 40 feet in the N draw and a clearance of 4 feet. In July 1972, a new swing bridge with a design width of 60 feet and a clearance of 4 feet was under construction about 0.1 mile below the bridge at Clio. There is a wharf just below the bridge at which gasoline, limited berthage, and water are available. The bridge at **French Settlement,** about 19 miles above the mouth, has a swing span with a clearance of 15 feet. An overhead power cable at this bridge has a clearance of 60 feet. Another overhead power cable crosses the river about 27.6 miles above the mouth; clearance is 70 feet. The bridge at **Port Vincent** has a swing span with a clearance of 7 feet. (See 117.240, 117.245 (a) through (e) and (i)(25), and 117.540, chapter 2, for drawbridge regulations and opening signals for bridges crossing Amite River.)

Port Vincent has a marina with berths, gasoline, and a marine railway that can handle craft up to about 35 feet for hull and engine repairs. Launching ramps are on either side of the river above the highway bridge.

**Bayou Manchac** has depths of about 4 feet from the entrance for about 1.7 miles. Caution is advised above this point as snags are reported in the bayou.

Bayou Manchac is crossed by two highway bridges and a railroad trestle. The bridge at **Hope Villa,** about 5.8 miles above the mouth of the bayou, has a fixed span with a clearance of 11 feet. The Airline Highway (U.S. Route 61) bridge, about 6.5 miles above the mouth, has a fixed span with a width of 30 feet and a clearance of 6 feet, and is at the head of navigation in the bayou. The Louisiana and Arkansas Railroad trestle is about a mile above the Airline highway bridge.

**Blind River** enters Lake Maurepas 5.7 miles S of Amite River. In May 1974, the controlling depths were 4 feet over the bar, thence 8 feet to the Airline Highway which is the head of navigation. A light marks the S side of the entrance to the river. Numerous overhead power cables with a least known clearance of 66 feet cross the river.

The **Bonnet Carre Floodway** is located on the SW side of Lake Pontchartrain. When the spillway is in operation, as a result of high stages of the Mississippi River, vessels in the vicinity of the discharge end are cautioned to be on the lookout for possible logs or stumps that may enter the lake and should give that end a wide berth.

The city limits of New Orleans extend from Lake Pontchartrain to the Mississippi River. Pleasure resorts and suburbs are on the lake front. A concrete seawall is along the S shore of the lake from the protected yacht harbor about 2 miles E of the Lake Pontchartrain Causeway to Lakefront Airport. The protected yacht harbor, which is entered from E, is just E of the New Orleans city limits.

The **Municipal Yacht Harbor** is the outer basin, which has direct access to the lake. The Southern and the New Orleans Yacht Clubs, and the New Orleans Power Squadron are in the Municipal Yacht Harbor. There are numerous private beach homes with covered boat slips on the breakwater. The **Orleans Marina,** owned and controlled by the Levee Board, is the inner basin which has access to the lake through **New Basin Canal.** In August 1972, the controlling depth in the canal and basins was reported to be 12 feet. There are several boatyards in Orleans Marina and several marinas along the E bank of New Basin Canal. There are cranes and lifts that can handle craft up to 85 feet for hull and engine repairs, or open or covered dry storage. Electronic repairs can be made. Berths for vessels up to 100 feet, electricity, gasoline, diesel fuel, water, ice, marine supplies, and launching ramps are available.

Lights mark the entrance to the harbor. **New Canal Light** (30°01.6′N., 90°06.8′W.), 52 feet above the water, is shown from a white square tower atop the Coast Guard station on the S side of the entrance; a fog signal is at the light. **Storm warning signals are displayed.** (See chart.)

**Pontchartrain Beach,** a pleasure resort, is about 3 miles E of the Municipal Yacht Harbor. Two 130-foot floodlighted towers are conspicuous landmarks.

**Measured course.**-A measured statute mile on the bearing **084°15′-264°15′** is off Pontchartrain Beach.

The Lake Pontchartrain entrance to the Inner Harbor Navigation Canal is just E of Pontchartrain Beach. The aerolight at the Lakefront Airport is E of the entrance. Floodlighted towers at **Lincoln Beach Park** , 4 miles NE from the airport, are good landmarks.

# 8. MISSISSIPPI RIVER

This chapter describes the Mississippi River from the delta passes at the Gulf of Mexico to Baton Rouge, 217 miles via Southwest Pass, 211 miles via South Pass, above the Gulf. Also described are the deepwater ports of New Orleans and Baton Rouge, as well as the facilities at the many small communities along the river.

**Note: The following abbreviations are used in this chapter: (AHP) means above Head of Passes; and (ACS) means above Canal Street.**

**Charts 11360 (1115), 11340 (1116).-Mississippi River** empties into the N central part of the Gulf of Mexico through a number of mouths or passes which, taken together, form the delta of the river. The river and its tributaries form the largest network of navigable waters in the world. The two principal passes, South Pass and Southwest Pass, are about 1,600 miles from New York, 500 miles from Key West, 300 miles E of Galveston, and 440 miles E of Corpus Christi. The river is the access to the Ports of New Orleans and Baton Rouge, and the numerous cities in the central part of the United States located in the Mississippi River Valley and along its tributaries, the Ohio, Missouri, Red, Tennessee, and other rivers flowing into it. From the mouth, at the entrance to Southwest Pass, it is about 1,600 miles to Minneapolis, Minn., 1,700 miles to Pittsburgh, Pa., 1,460 miles to Knoxville, Tenn., and 1,330 miles to Chicago via the Illinois Waterway. (See the publication "Distances Between United States Ports", for more detailed information.)

New Orleans can also be reached by the more direct deep-draft route through the Mississippi River-Gulf Outlet Canal, about 30 miles N of South Pass. The outlet canal extends from deepwater in the Gulf to the junction with the Inner Harbor Navigation (Industrial) Canal at New Orleans.

The shape of the delta is somewhat like the foot of a bird, with its four toelike extensions protruding into the Gulf. The passes consist of narrow-banked deposits of sand and clay brought down by the river current which continuously adds them to the seaward margins of the delta. In this manner the delta is being built seaward at an estimated average rate of 300 feet a year. Numerous bays between the passes are changing through wave and tidal action and filling up with the immense amounts of material carried down by the river. The upper half of **Garden Island Bay** has been filled in so that now it is a marsh.

**Prominent features.**-The most conspicuous objects, when approaching the passes, are the lights, which are easily recognized. Southwest Pass Entrance Light (28°54.3'N., 89°25.7'W.), 85 feet above the water is shown from a red tower on a white dwelling on piles near the end of the E jetty. A radiobeacon, radar transponder (Racon), and a fog signal are at the light. The Racon transmits Morse Code "K". (See Light List for operating details.) This particular station also is equipped for special radio-direction-finder calibration. (See Light List for operational information.) **East Jetty End Light** (chart 11361 (1272)), 50 feet above the water, is shown from a red triangular daymark on a red skeleton tower on piles about 100 yards SW. A fog signal is at the light. A lighted whistle buoy (Sea Buoy) is 1.6 miles S of the E jetty.

**South Pass Range Rear Light** (29°00.9'N., 89°10.0'W.), 108 feet above the water, is shown from a pyramidal skeleton tower, enclosing a cylindrical stair well and dwelling, painted white below the gallery and black above. The light is located on the W side of the pass about 2.2 miles from the outer end of the jetties. A radiobeacon and fog signal are at South Pass West Jetty Light, near the outer end of the W jetty at the mouth of the pass. A lighted whistle buoy (Sea Buoy) is 1.5 miles SE of the jetty light.

The numerous oil well structures in **East Bay**, some of which extend about 3 miles SE of a line between the jetties at South and Southwest Passes, are also prominent. (See chart 13361 (1272).)

**Anchorages.-Vessels should anchor in the South Pass Anchorage, NE of South Pass Light.** (See 209.135, chapter 2.)

**Mississippi River-Gulf Outlet Approach Lighted Horn Buoy N.O.** (29°26.4'N., 88°56.9'W.), replacing New Orleans Lightship, is a large navigational buoy (LNB) about 2.5 miles ENE of the entrance to the Mississippi River-Gulf Outlet Canal. The buoy is painted red, shows a flashing white light 40 feet above the water, and is equipped with a fog signal, a marker radiobeacon, and a radar transponder (Racon). The Racon transmits Morse Code "N". (See Light List for operating details.) The buoy is about 29 miles NNE of South Pass and about 40 miles NE of Southwest Pass.

There are numerous oil well structures in the vicinity of the entrance to the canal, and the dredging ranges for the channel are prominent. (See chart 11363 (1270).)

There are numerous oil well structures off the Mississippi River Delta off the entrance to the passes and in East Bay which can be seen for some distance offshore. Smoke from burning gas from some of these wells is seen from far offshore.

The discolored water discharge from Mississippi River usually provides mariners with their first in-

dication that they are approaching land. However, this is not a sure indication; during high-river stages and with N winds the discolored water will be encountered in some directions 60 miles or more from land, and at times the water will appear broken from 15 to 20 miles from the passes. The land near the entrances to the passes is low marsh covered with tall, coarse grass and weeds.

**Boundary lines of inland waters.**-The lines established from Mobile Bay to Mississippi Passes, Mississippi River, and Mississippi Passes to Sabine Pass, are described in **82.95, 82.100**, and **82.103**, chapter 2.

**Special Notices.**-The Corps of Engineers, New Orleans District, have promulgated the following through navigation bulletins to all interested parties:

**Mississippi River-Gulf Outlet Canal.**-Use of the outlet canal by ships and other commercial and pleasure craft is continuing to increase. The hazards existing to a small-boat operator on this waterway cannot be over emphasized.

It is understood, however, that ships must maintain sufficient headway at all times in order that the vessel can be controlled. Consequently, small-craft operators should approach and pass ships with extreme caution and with one thought in mind, the safety of their own vessel and its occupants.

As a large ship moves in the waterway a wave is pushed ahead. As it comes abreast of a given point a suction effect is created that abruptly drops the water level in the channel and the water is drawn off the banks of the waterway. The violence of the reaction depends on the speed and draft of the ship.

As the ship passes, the displaced water rushes back toward the banks and could possibly capsize or throw a small boat onto the bank. Shortly after the ship has passed, waves cause severe agitation along the banks.

**Locking Procedures for all locks in the New Orleans Engineer District.**-When a sufficient backlog of vessels exists, and water differential and other conditions make such procedure advantageous, a maximum of four successive lockages will be made alternately from each direction. However, should the fourth lockage in either direction be a long tow requiring two lockages, a fifth lockage will be made for the second section of the long tow.

For the successive lockage procedure to be successful and in order to conserve lockage time, radios on vessels must be kept tuned to the lock frequency to receive instructions and move up promptly when called by the lock operator. The lockmaster will coordinate movement and arrangement of tows and other vessels and direct such procedures in the movement and lockings as conditions may warrant in order to obtain maximum and efficient usage of the lock.

**Note:** Special Notices affecting locking procedures in the New Orleans Engineer District and navigation on the Mississippi River and Mississippi River-Gulf Outlet Canal are issued by the Corps as conditions warrant. These special regulations, in addition to those mentioned above and elsewhere in this chapter, announce new, and/or changes to existing regulations. Mariners are advised to contact the local office of the Corps of Engineers to obtain the latest information.

**Shipping Safety Fairways.-Vessels should approach the Mississippi River-Gulf Outlet Canal, Southwest Pass and South Pass (Mississippi River) through the prescribed Safety Fairways.** (See 209.135, chapter 2, for limits of fairways.)

**Channels.**-The improved ship channels into Mississippi River are through Southwest Pass and South Pass. Several minor passes can be used only by small craft. A Federal project provides for a 40-foot channel over the bar and through Southwest Pass and a 30-foot channel over the bar and through South Pass, to Head of Passes. The project is under constant maintenance dredging. The project further provides for a 40-foot channel from Head of Passes to New Orleans; thence 40 feet from New Orleans to Baton Rouge. The channels are well marked. Contact the New Orleans District, Corps of Engineers, for controlling depths. The office is at the foot of Prytania Street, New Orleans; telephone (865-1121). (See appendix for mailing address.)

**Note.**-The Associated Branch Pilots, Port of New Orleans, advised that South Pass has a recommended draft limit of 25 feet. The pilots further advised that a recommended deadweight tonnage limit of 21,000 d.w.t. and/or 25 feet is in effect for ships using South Pass. The deadweight tonnage limit is recommended because ships of large tonnage do not steer well. The tonnage limit is subject to a larger limit as the draft limit deepens.

Southwest Pass has a recommended draft limit of 36 feet. There is no limit on deadweight tonnage for ships using Southwest Pass.

**Mississippi River-Gulf Outlet Canal** is a 66-mile-long deepwater channel that extends NW from deep water in the Gulf of Mexico to the Inner Harbor Navigation (Industrial) Canal at New Orleans. The Federal project provides for an entrance channel 38 feet deep for 8.3 miles to the entrance to Breton Sound between Grand Gosier Islands and Breton Islands, thence 36 feet deep across Breton Sound NW for 20.2 miles where it enters a landcut (at Mile 29.5), thence 36 feet through the landcut for 32.5 miles where it joins the Gulf Intracoastal Waterway at Mile 13.7, thence through the waterway for about 5 miles to a turning basin at its junction with the Inner Harbor Navigation (Industrial) Canal at New Orleans. The approach to the landcut is protected by stone retention dikes on both sides of the channel; the NE dike is about 2.6 miles long, and the SW dike is about 5.5 miles long. The

channel is well marked with aids. (See Notice to Mariners and latest editions of the charts for controlling depths.)

Unpredictable tidal currents may be encountered at places along the Mississippi River-Gulf Outlet Canal. Until such time as surveys are made to determine the actual tidal current conditions, exercise caution when transiting the waterway.

**Bridges.**-There are no bridges or cables across the Mississippi River below New Orleans. One bridge and two cables cross the Mississippi River-Gulf Outlet Canal below the junction with the Inner Harbor Navigation Canal at New Orleans. The **Paris Road Bridge** (State Route 47), a fixed bridge with a clearance of 135 feet, is about 4.3 miles E of the junction with Inner Harbor Navigation Canal. The overhead power cables across the canal, near the Paris Road Bridge, have a minimum clearance of 170 feet. (See 117.555, chapter 2, for general rules and regulations for the operation of drawbridges over the Mississippi River and its navigable tributaries and outlets.)

**Anchorages.-Vessels should anchor in Southwest Pass Anchorage SE of the entrance to Southwest Pass, South Pass Anchorage NE of the entrance to South Pass, or in the Mississippi River-Gulf Outlet Canal Fairway Anchorages E and N of Mississippi River-Gulf Outlet Approach Lighted Horn Buoy N.O.** (See 209.135, chapter 2, for limits and regulations.)

In heavy weather craft in the vicinity of South Pass seek refuge in the pass, and in emergencies boats may tie up to the Coast Guard wharf at South Pass Light.

Vessels may anchor off South Pass and Southwest Pass as appropriate, weather permitting.

There is a 4.5-mile-long anchorage area off the W side of the Mississippi River opposite Pilottown for vessels which cannot proceed to sea because of fog at the Gulf entrances to the passes, or are unable to proceed upriver for the same or any other reason. (See 110.195, chapter 2, for description of anchorage areas at Pilottown and New Orleans.)

**Dangers.**-An area bounded by latitude 28°20′N., to latitude 28°30′N., between longitude 88°50′W., and longitude 89°00′W., has been established as a dumping ground for ammunition and explosives.

A shoal with depths of 8 to 15 feet extends along the W side of the approach channel to Southwest Pass for about a mile beyond the end of the W jetty. The position of this shoal and its depths are rather constant except for changes during and after high-river stages in the spring.

A shoal with depths of 2 to 17 feet extends along the W side of the entrance to South Pass. Vessels should not close the passes before the pilot boards.

**Flocculation,** locally known as **Slush,** is a living mass of jellied material, or muck, deposited in the lower part of the Mississippi, during low stages of the river. It consists of the suspended material which, after being carried downstream by the current, comes into contact with the relatively still salt water which backs into the passes. This muck has been observed to be as much as 10 to 15 feet deep. It remains where deposited until flushed out during high-water stages of the river. Although slowed down by this muck, deep-draft vessels are able to pass through it. Accordingly, and because it will be flushed out during high-water stages, the Corps of Engineers do not consider it necessary to remove the material during low stages.

**Sand waves,** the material brought down during high stages, on the contrary, is of a sandy nature such that, if not removed, builds up bars and reduces controlling depths. These sand bars or waves are dredged out during high stages.

**Mud lumps** are the small oval-shaped mounds or islands no more than 8 feet high which are peculiar to the Mississippi River delta. They are caused by upward forces of the static pressure exerted by sedimentary deposits accumulating underneath; most of them never rise above the surface but remain as subsurface mounds. Their cores of plastic clay may arise from depths as much as 300 to 500 feet. Fissures or cracks develop in the islands, through which mud, gas, and salt water discharge and often build up low flat cones. In South and Southwest Passes, which have been jettied, there are arcs of mud lumps outside of and parallel with the peripheries of the bar deposits. In natural passes, the mud lumps are affected by submerged natural levees as well as by the bar deposits. Generally, the lumps appear within only a few weeks' time and, unless affected by succeeding periods of uplift, will wash away within a few years or be overrun by the encroaching marshland.

**Tides.**-In the passes the tide has generally but one high and one low water in 24 hours, the diurnal range varying from 0.9 to 1.4 feet. At New Orleans the range of tide during low-river stages averages about 0.8 foot. There is no periodic tide at high-river stages.

**Current off the Passes.**-Currents in the Gulf of Mexico are discussed in chapter 3. The currents are variable in direction and velocity depending to a great extent upon the velocity and direction of the wind, and near the entrance to the passes upon the stage of the river.

A vessel on the course from Dry Tortugas to the Mississippi River generally will encounter an opposing or SE current for a distance of about 300 miles after leaving Dry Tortugas. For the last 125 miles before reaching the mouth of the river the current will usually set between N and E.

During a light S wind a NE set of 2.2 knots has been observed 13 miles SE of South Pass entrance, and at the same time there was an E set of 0.5 knot at the lighted whistle buoy off the entrance.

At Southwest Pass entrance midchannel lighted whistle buoy the current is due chiefly to the discharge of the river. In general it sets SW and its velocity varies from 0 to 4 knots, the average being

about 1.7 knots. At times, however, there is said to be a SE current of nearly a knot at this location.

**Currents in the river**.-The current due to the tide is not strong at any point, and for purposes of navigation it is rarely taken into account. The average date of high-river stage occurs in April and of low-river stage in October. At New Orleans the extreme difference between high and low stages of the river is 20 feet, the mean difference is about 14 feet. Zero on the Carrollton gage is Mean Sea Level. The current velocity in the river varies greatly from time to time, depending upon the stage of the river; at New Orleans, the cross-sectional velocity may be as much as 5 knots at high stages and less than 1 knot at low stages.

At several places in the lower part of the river countercurrents or eddies often are found near the banks and, if taken advantage of, can greatly assist vessels bound up the river.

At South Pass outside the jetties the current from the river frequently has a W set. At Southwest Pass it sets straight out from between the jetties, thence spreading out fan shaped, with slightly greater velocity to W.

**Weather**.-From November to March, fog may be encountered anywhere from 60 miles off the passes to the city of New Orleans. S and E winds bring it in, and N and W winds clear it away. (For additional weather information see Weather under Port of New Orleans.)

**Storm warning display** locations are listed on the NOS charts and shown on the Marine Weather Services Charts published by the National Weather Service.

**Routes**.-Approaching the mouth of the river from Florida Straits, deep-draft vessels usually set a course direct for the entrance to the shipping safety fairways off the passes or the Mississippi River-Gulf Outlet Canal from a position 10 or 12 miles SW of Dry Tortugas Light on Loggerhead Key. Low-powered vessels of moderate draft sometimes pass N from Florida Straits through Rebecca Channel, to the W of Rebecca Shoal Light, and for 200 miles set a course 10° to 20° N of the course to the passes of the river, and then change course for the entrance to the safety fairways off the passes or the Gulf Outlet Canal. This keeps them out of the strongest part of the Gulf current.

Going to the Straits of Florida, a course usually is set for a point 10 or 12 miles SW of Dry Tortugas.

Since in either direction soundings are of little value in determining position, observations should be relied upon. The currents vary considerably, so that even with the closest navigation a vessel bound for South Pass may make a landfall at Pass a Loutre, or Southwest Pass.

Vessels bound to Southwest Pass sometimes fall W of the Mississippi River delta, a situation which the mariner can quickly ascertain by soundings. The water shoals much more gradually along this part of the coast than off the delta.

Approaching South Pass, a vessel uncertain of her position can set a course so as to pick up the 20-fathom curve from 5 to 20 miles NE of the lighted whistle buoy off South Pass and then follow the curve SW to the entrance to the safety fairway. During thick weather, vessels might ground NE of South Pass and N of Southwest Pass, because of infrequent sounding. Due consideration should be given to the possible occurrence of mud lumps.

Vessels approaching South Pass or Southwest Pass should become fairly certain of their positions in any weather by using radar or radio bearings in conjunction with soundings. A radiobeacon is at the entrance to each pass.

In thick or foggy weather, Southwest Pass is more accessible and more easily navigated than South Pass because the former's channel is marked better, has greater width, and is nearly straight. Furthermore, a vessel is not set off course to the same extent by currents at the entrance.

**Pilotage** is compulsory at the bar and on the river for all foreign vessels and U.S. vessels under register in foreign trade. Pilotage is optional for coastwise vessels that have on board a pilot licensed by the Federal Government. There are three pilot associations: the Associated Branch Pilots for the bar from sea to Pilottown; the Crescent River Port Pilots for the river between Pilottown and New Orleans; and the New Orleans-Baton Rouge Steamship Pilots for the river between New Orleans and Baton Rouge. On the Mississippi River-Gulf Outlet Canal, the Associated Branch Pilots take vessels from the entrance to Light 98, about 33 miles above the entrance, where they are relieved by the Crescent River Port Pilots, who take vessels on to New Orleans.

**Note**.-The Associated Branch Pilots, Port of New Orleans, advised that South Pass has a recommended draft limit of 25 feet. The pilots further advised that a recommended deadweight tonnage limit of 21,000 d.w.t. and/or 25 feet is in effect for ships using South Pass. The deadweight tonnage limit is recommended because ships of large tonnage do not steer well. The tonnage limit is subject to a larger limit as the draft limit deepens.

Southwest Pass has a recommended draft limit of 36 feet. There is no limit on deadweight tonnage for ships using Southwest Pass.

Pilots for South Pass and Southwest Pass board vessels in areas up to 3 miles off the sea buoys at the passes, depending on the weather. Pilots for the Mississippi River-Gulf Outlet Canal board vessels in the vicinity of Mississippi River-Gulf Outlet Approach Lighted Horn Buoy N.O. (29°26.4'N., 88°56.9'W.). The **Associated Branch Pilots** have 65-foot diesel-powered tenders with red hulls and white housing. They fly the International Code flag "P" and are equipped to handle radio traffic on VHF-FM channels 6 (156.30 MHz), 9 (156.45

MHz), 13 (156.65 MHz), and 16 (156.80 MHz). VHF-FM channel 9 is the working channel. There is a pilot station at Southwest Pass off the West Jetty about 2 miles inside the entrance. There is a pilot station at South Pass at a small settlement on the W side about 0.5 mile above the ends of the jetties. Both pilot stations are equipped to handle radio traffic on 2182 kHz, 2738 kHz, and the same VHF-FM channels as the pilot boats. They have radiotelephone communication with the pilot office in New Orleans. Pilots may be obtained by making a signal off the bar, as both pilot stations maintain lookouts, or on advance notice by telegraph, radio, or radiotelephone through the New Orleans Marine Operator, telephone (504-522-5233), or through the ships' agents. Vessels are boarded and taken in day or night. All bar pilots carry portable radiotelephones.

The pilots for the river between Pilottown and New Orleans board vessels off Pilottown about 2 miles above Head of Passes Light. The pilot station, on the E side of the river at Pilottown, maintains a lookout and is equipped to handle radio traffic on VHF-FM channels 9 (156.45 MHz) and 16 (156.80 MHz) and also monitors 2182 kHz. The pilot station has radiotelephone communication with the river pilot's office in New Orleans. The **Crescent River Port Pilots** have fast motorboats painted white with the names RIVER PILOTS or CRESPILOT in black on the sides. They fly the International Code flag "P" and are equipped to handle radio traffic on VHF-FM channels 9 (156.45 MHz) and 16 (156.80 MHz). The Crescent River Port Pilots take vessels from Pilottown upriver to New Orleans and from Light 98 on the Mississippi River-Gulf Outlet Canal to New Orleans. On the canal, pilots board vessels from a private launch at Light 98. If vessels are continuing above New Orleans, the Crescent River Port Pilots will notify the New Orleans-Baton Rouge Pilots. Pilots can be obtained by prior notice by telegraph, radio, or radiotelephone through the New Orleans Marine Operator, telephone (504-525-2174), or through the ships' agents. All Crescent River Port Pilots carry portable radiotelephones and are in communication with other vessels on the river and canal.

The **New Orleans-Baton Rouge Steamship Pilots** usually board vessels continuing upriver off **The Point.** The pilot station is at Arabi on the E side of the river about 1.4 miles below the Inner Harbor Navigation (Industrial) Canal. All the upriver pilots carry portable radiotelephones and communicate with other vessels on the river. Their working frequency is VHF-FM channel 13 (156.65 MHz). They can be obtained by notifying the Crescent River Port Pilots at Pilottown, by prior notice by telegraph, radio, or radiotelephone through the New Orleans Marine Operator, telephone (504-525-5247), or through the ships' agents.

**Towage.**-Tugs of about 2,400 hp are normally used for assisting in docking, undocking, towing in the harbor and canals, and towing to sea. Tugs of up to 4,500 hp are available. Two tugs must be employed on all towing to and from the drydocks and should be employed on all ships towed around Algiers Point when the traffic lights are operating, and by large vessels going through the Inner Harbor Navigation Canal. The tugs are equipped to handle radio traffic on VHF-FM channel 13 (156.65 MHz). There are two diesel-powered fireboats in the harbor.

**Quarantine** on the river is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) A 4,000-foot **quarantine anchorage** is on the W side of the river at New Orleans, about 2 miles E of the Inner Harbor Navigation (Industrial) Canal. The upper end is marked by a quarantine anchorage sign. The quarantine station is at the New Orleans National Airport, and officials maintain regular service for marine inspections from 0600 to 1800. Outside of these hours, vessels may be boarded on request, but a charge is made for services. Quarantine clearance is granted by the New Orleans station for all vessels destined to all ports on the Mississippi River or to ports reached via the Mississippi River. Vessels are cleared either in the quarantine anchorage or at the dock. A U.S. Public Health Service **hospital** is at New Orleans. (See appendix for address.)

**Agricultural quarantine** is enforced in accordance with regulations established by the Animal and Plant Health Inspection Service of the U.S. Department of Agriculture. Officials making inspections for the ports on the Mississippi River, from the mouth to Gramercy, have an office at the U.S. Customhouse in New Orleans. (See appendix for address.) Vessels are inspected at anchor and alongside the docks. Arrangements are usually made through the ships' agents.

**Customs.**-New Orleans and Baton Rouge are ports of entry. Vessels are generally boarded at berth; however, arrangements can be made for boarding anywhere within the port limits. (See appendix for address.)

**Immigration and Naturalization.**-The Immigration and Naturalization Service maintains a district office and a port of entry at New Orleans and services at the port facilities at Avondale, Belle Chasse, Braithwaite, Chalmette, Destrahan, Gretna, Harvey, Marrero, Norco, Port Sulphur, St. Rose, and Westwego. There is an office at Baton Rouge for processing vessel crew arrivals. (See appendix for address.)

**Coast Guard.**-The **Captain of the Port** maintains an office in New Orleans. **Marine inspection** and **vessel documentation** offices are at New Orleans. (See appendix for addresses.)

**Harbor regulations.**-Federal regulations for navigation of the river are given in 207.200, chapter 2.

**Supplies.**-An unlimited supply of ship stores, marine supplies, and provisions can be obtained at

New Orleans. Water is available at all piers and wharves. Bunker C fuel oil and diesel fuel can be supplied at the oil terminals or from tank barges while vessels are alongside the wharves.

**Repairs.**-New Orleans has facilities for all types of above- and below-water hull and engine repairs. The largest floating drydock has a capacity of 18,000 tons for a length of 635 feet. Shipbuilding and ship repair plants are well equipped with machine shops and foundries. Floating cranes up to a capacity of 600 tons are available. There are smaller drydocks, marine railways, and boatyards for repair of medium and small craft.

**Salvage facilities.**-Equipment necessary for heavy salvage work at sea or in the port is available at New Orleans, including floating derricks, dredges, barges, pumps, diving equipment, and ground tackle. Oil salvage barges are at the shipyard at Avondale and Baton Rouge.

**Chart 11361 (1272).-Southwest Pass,** the westernmost of the passes of the Mississippi, is 18 miles WSW of South Pass entrance and 295 miles E of Galveston entrance. The pass has been improved by the construction of jetties on both sides at the entrance.

Near the ends of the jetties the depths are somewhat changeable, although there appears to be deep water in the Gulf from nearly every direction up to within 2 miles of the entrance.

The approach to Southwest Pass is marked by a lighted whistle buoy, 1.6 miles S from the jetty ends. From the buoy to abreast of Southwest Pass Entrance Light Station, the channel is marked by lighted buoys on the W side of the channel and by a lighted range. Other lighted ranges continue from the first range. Lights marking the channel are off some of the spur dikes extending channelward from along the inner bulkhead of the jetties.

A **dumping ground** is located in the waters of the Gulf of Mexico about 3.5 miles W of the entrance to Southwest Pass. (See 205.80 (a) and (b)(8), chapter 2, for limits and regulations.)

A **prohibited dumping ground** is located at the mouth of Southwest Pass and extends seaward to the 40-fathom curve. (See 205.80 (a) and (c)(4), chapter 2, for limits and regulations.)

Depths in Southwest Pass Entrance are subject to some change, but the current, so far as is known, can be depended upon to set nearly straight out from between the jetties. Spur dikes have been constructed channelward from the jetties.

Federal project depth is 40 feet. Contact the New Orleans District Office, Corps of Engineers, for controlling depths; the office is located at the foot of Prytania Street, New Orleans; telephone (504-865-1121).

**Note.**-The Associated Branch Pilots, Port of New Orleans, advise that Southwest Pass has a recommended draft limit of 36 feet.

In the pass the sides are a sufficient guide. Lights are on both sides, and a lighted range for entering the pass is at its head. There are numerous wharves, most of which are for transferring petroleum products from ship to barge, on both sides of the pass. Most of these wharves are marked by privately maintained lights. There is a Coast Guard light station with a wharf and helipod on the E side of the pass at the entrance.

**Burrwood** is on the SE bank 5 miles above the jetties. There is a U.S. Corps of Engineers District Reservation, with several wharves and warehouse on the E side about 4.3 miles above the entrance.

**South Pass,** one of the three important commercial entrances to the Mississippi River from the Gulf, lies 425 miles NW of Dry Tortugas and 90 miles SW of Mobile Bay entrance. The pass has been improved by the construction of jetties on both sides of the entrance. Immediately outside the entrance the depths are subject to considerable change, due to the large amount of sediment brought down by the strong river currents; but at a distance of 2 miles out from the end of the jetties the depths are more dependable, and over 10 fathoms can be found in any E or S direction.

A **dumping ground** is located in the waters of the Gulf of Mexico about 10 miles ENE of the entrance to South Pass. (See 205.80 (a) and (b)(7), chapter 2, for limits and regulations.)

A **prohibited dumping ground** is located at the mouth of South Pass and extends seaward to the 40-fathom curve. (See 205.80 (a) and (c)(3), chapter 2, for limits and regulations.)

Federal project depth is 30 feet. Contact the New Orleans District Office, Corps of Engineers, for controlling depths; the office is at the foot of Prytania Street, New Orleans; telephone (504-865-1121).

**Note.**-The Associated Branch Pilots, Port of New Orleans, advise that South Pass has a recommended draft limit of 25 feet. They further advise that a recommended deadweight tonnage limit of 21,000 d.w.t. and/or 25 feet is in effect for ships using South Pass. The deadweight tonnage limit is recommended because ships of large tonnage do not steer well. The tonnage limit is subject to a larger limit as the draft limit deepens.

The entrance approach is marked by a lighted whistle buoy, 1.5 miles SE of the end of the jetties, and by a lighted bell buoy marking the shoal ground lying between 0.2 and 0.5 mile off the end of the jetties on the W side of the channel. This dangerous shoal has depths of 2 to 17 feet over it. The lighted bell buoy marks the E portion of the shoal. Except for changes during and after high-river stages, the position of this shoal and depths on it are fairly constant. This shoal, coupled with strong river currents, makes navigation of South Pass difficult for strangers. A bend in the channel near Head of Passes also adds to the difficulty. Depths in the channel at the entrance to South

Pass are subject to frequent change. Strangers are advised to take a pilot. The current has considerable velocity, which tends to carry a vessel upon the shoal on the W side of the channel.

A Coast Guard station with a small T-head wharf and protective jetties is on the SW side about 0.5 mile above the entrance. A larger Coast Guard wharf and a light station are on the SW side about 2.2 miles above the entrance.

**Routes.**-Stand in for the lighted whistle buoy and bring the South Pass West Jetty Lighted Range on the bearing **297°**. Steer this range, passing to the NE of the lighted bell buoy and about 250 to 300 feet to the W of the end of the E jetty which is marked by a light and fog signal. The current will strike the vessel on the starboard bow as the end of the E jetty is approached. The vessel should be headed to meet the current, and by the time she is abreast the E jetty she should be heading fair between the jetties. The South Pass Range bearing 315° marks the deep water between the ends of the jetties.

When in the pass the banks are a sufficient guide, care being taken to keep about midway between them. Several lights are on the E and W sides, and a lighted range for entering the pass is at its head.

The passes begin to converge at Head of Passes, a point 12 to 17 miles, respectively, above the mouths of South and Southwest Passes. The perimeter of the delta around the most widely divergent passes is about 35 miles.

**Head Range Channel** leading from the head of Southwest Pass into the river is part of the 40-foot Federal project for the pass and river. **Cypress Range Channel** leading from the head of South Pass into the river is part of the 30-foot Federal project for South Pass. Dredging is necessary to maintain both channels to near project depths. Contact the New Orleans District Office, Corps of Engineers, for controlling depths; the office is at the foot of Prytania Street, New Orleans; telephone (504-865-1121). Lighted ranges mark the two channels, and lights mark the jetties at the head of the passes.

At **Head of Passes,** three of the river's important passes come together; South Pass, Southwest Pass, and Pass a Loutre. This point of confluence is at **Head of Passes East Jetty Light 14** (29°09.1'N., 89°15.0'W.). From this point, measurement is made of all distances on the river S or below the mouth of the passes, and N or above Head of Passes (AHP) to Cairo, Ill. About 0.4 mile below the light on the W side of South Pass is Head of Passes Light Station Coast Guard wharf.

**Pass a Loutre** and its branches, **Southeast Pass, North Pass, Northeast Pass,** flows E into the Gulf. These passes are deep from the Head of Passes to within a short distance of the Gulf, but the mouths are obstructed by bars. Small local craft occasionally use these passes, but strangers should avoid them. Pass a Loutre and North Pass have depths of about 7 feet over the bars; the others are much shallower. North Pass is marked by a lighted bell buoy. Pass a Loutre is marked by a lighted whistle buoy and Southeast Pass by a buoy.

An abandoned lighthouse, a 76-foot black and white spirally banded tower, is on the N side of Pass a Loutre, 2 miles inside the entrance. Another abandoned lighthouse, a grayish-white tower, is 1.5 miles W of the entrance to Northeast Pass.

The marsh lands from Main Pass southward are used extensively for hunting and oil operations; some oyster camps are located in the **Redfish Bay** area.

From Head of Passes to New Orleans, the river has a least width of 600 yards and a clear unobstructed channel with depths of from 31 to 194 feet. There are a few shoals along the river banks. The outer limits of a shoal on the E side of the river, 8.2 miles above Head of Passes, is marked by a lighted buoy. On both sides of the river the land is dry, and in the lower reaches it is covered mostly with coarse grass and willows.

Above Bohemia on the E side and The Jump on the W, levees prevent overflow at high water. Below Bohemia, a 10-mile break in the levee permits flood waters to move E into the Gulf. On both sides of this break are levees extending from the river to the Gulf, to prevent the flooding of adjacent land. Below this break the levee continues to Baptiste Collette Bayou.

The land back of the levees on the E side, formerly laid out in sugar and rice plantations, now is given over to pasturage and market gardens. Orange groves are back of the levees on the W side. New Orleans is reached by river boats and also by railroads and highways which extend down the W side to Venice (The Jump) and down the E side to Bohemia, 9 and 39.5 miles, respectively, above Head of Passes.

**Caution during high stages of the river.**-Vessels navigating the Mississippi River at flood stages, when passing habitations or other structures, partially or wholly submerged and subject to damage from wave action, shall proceed slowly and keep as far away from such structures as circumstances permit, and shall also proceed slowly when passing close to levees.

Under these conditions, between Baton Rouge and The Jump, mariners are directed to steer a course as close as possible to the center of the river and to proceed at a speed sufficiently slow so that levees and revetments will not be endangered by wave wash. Careful observation by mariners of the effects of the vessel's wash is a vital element in this control.

Strong currents and shifting eddies in the vicinity of Algiers Point will be encountered during high stages of the river. These conditions may make hazardous the operation of a tow which could normally be handled with ease. It is accordingly requested that operators and masters exercise

every precaution when operating in the area controlled by the New Orleans Harbor traffic lights. Size of tows and tugs should be considered in view of conditions which may be expected.

The river is well marked with lights, and for the most part the banks are sufficient guides. The distance from Head of Passes to New Orleans is 82.5 miles.

**Pilottown** is a small village on the E side of the river 1.7 miles (AHP). Vessels, inbound from sea, drop the bar pilot and pick up the river pilot, and outbound in reverse. A wingdam about 1.4 miles above Head of Passes is marked by a light and fog signal. The pilots' wharf about 1.7 miles above Head of Passes, a wingdam, and the lookout tower inshore on the E side are marked by privately maintained lights. A 400-foot oil transfer berth and storage area with four large tanks is on the E side about 0.4 mile N of the Pilottown wharf.

**Cubits Gap** is an opening on the E side of the river 3 miles above Head of Passes, at which **Raphael Pass,** Main Pass, **Octave Pass,** and Brant Bayou meet and connect with the river. These passes are navigable for small craft, but Main Pass is the only one having a navigable connection with the Gulf. A sill of willow brush weighed down by rocks has been laid across the entrance to each of these passes. With local knowledge, certain spots along the sills may be crossed by drafts of 5 to 9 feet.

**Cubits Gap Light,** on the SE side of the gap, is shown from a red triangular shaped daymark on a 50-foot skeleton tower; a seasonal fog signal is at the light.

**Main Pass** has reported depths of about 4 feet over the bar at the Gulf entrance, and about 9 feet over the sill at the river entrance at Cubits Gap. This pass is used considerably by fishing vessels and oil companies operating in Chandeleur and Breton Sounds.

The buildings of the Department of Interior's Delta National Wildlife Refuge and a lookout tower at the old quarantine station on the E side just above the gap are conspicuous.

**The Jump** is an opening on the W side 9.2 miles above Head of Passes, where Grand Pass and several smaller passes connect with the river. There is a sill across the entrance at a depth of about 15 feet and a depth of about 4 feet can be carried through the pass into the Gulf.

**Venice** is a fishing and marine repair center on the W side of Grand Pass just inside The Jump. Oil companies have service and repair bases, and drilling mud pipe and equipment are loaded here for the offshore drilling rigs in the Gulf. A shipbuilding and repair yard has marine railways, the largest of which can handle craft up to 65 feet for hull and engine repairs or storage. Large cranes are available and oil well platforms are built at Venice. Gasoline, diesel fuel, water, ice, provisions, marine supplies, open and covered berthage and ramps are available at marinas and boatyards at The Jump. A Corps of Engineers wharf is on the W side just N of The Jump. Wharves and small-craft landings are at Venice on Grand Pass and on the W side of the river between Venice and Boothville. Bus service is available to New Orleans from Venice on State Route 23, which runs along the W side behind the levee.

**Boothville** is a small town on the W side of the river about 14 miles (AHP). A public wharf 100 feet long is 12.8 miles (AHP). An oil transfer wharf is just above Boothville about 16.2 miles (AHP).

**Olga** is a small town on the E side of the river, 14.3 miles (AHP). Some supplies may be obtained. From behind the levee, a canal leads to Grand Bay where there are numerous oyster camps.

**Chart 11364 (1271).-Fort Jackson** is on the W side of the river at the bend in the river about 16.7 miles (AHP). Here the river takes a SW trend for about 2 miles, then trends WNW.

**Fort St. Philip** on the N bank of the bend opposite Fort Jackson has a public wharf.

**Ostrica** is a small village on the N side of the river about 21.5 miles (AHP). The State-owned **Ostrica Canal,** which connects the river with Quarantine Bay, enters the river 21.7 miles (AHP). (See chapter 7 for a description of the canal and locks.) Above Ostrica at 22.3 miles (AHP), there is an oil storage terminal with four oil transfer wharves. At 23.2 miles (AHP), there are an oil transfer barge wharf and an oil transfer tanker wharf. Another barge wharf is 23.9 miles (AHP).

**Buras** is a small town and fruit shipping center on the S side of the river about 22.0 miles (AHP). Two oil transfer berths and a public wharf are at Buras. A water tank is prominent.

**Empire** is a town on the W side of the river about 25.4 miles (AHP). A tank and a church spire are prominent. **Empire Canal** leads from the river at Empire to the Gulf W of the river. The canal, lock and dam, and the port facilities on the canal at Empire are described in chapter 9. A pile cluster mooring and oil transfer berth is at **Nairn** on Sixtymile Point about 28 miles (AHP).

At **Daisy,** on the N side of the river about 30.6 miles (AHP), there is an oil transfer wharf with pile cluster moorings. The wharf is marked by privately maintained lights. A ferry operates from the wharf to a smaller wharf opposite Daisy on the S side about 30.8 miles (AHP).

**Home Place,** a town on the S side of the river 33 miles (AHP), has an oil transfer barge wharf and drilling mud loading berths.

**Port Sulphur** is on the W side of the river about 33.6 miles (AHP). The loading towers, two tanks, and conveyor galleries of the sulfur plant are very conspicuous. A 1,250-foot ship wharf and a 950-foot barge wharf are equipped to handle bulk and liquid sulfur. The wharves are marked by privately maintained lights.

Oil-handling berths are on both sides of the river at **Nestor** about 35 miles (AHP). The wharf on the

E side of the river is marked by a privately maintained light.

An oil transfer wharf is on the W side of the river just above **Potash,** 34.9 miles (AHP).

**Bohemia** is a small village on the E side of the river about 38.7 miles (AHP). State Route 39 leads along the E side of the river behind the levee from Bohemia to New Orleans.

**Pointe a la Hache,** 42 miles above Head of Passes and about 40 miles below New Orleans, is the seat of Plaquemine Parish which embraces most of the lower Mississippi River. Gasoline, water, and some marine supplies can be obtained in the town. The courthouse clock tower, a water tank, and a microwave tower are very prominent. A ferry crosses the river at Pointe a la Hache. An oil transfer wharf is 0.6 mile above the ferry landing. On the W side of the river, opposite Pointe a la Hache about 42.5 miles (AHP), there are a water intake and barge wharf and an oil transfer wharf. The wharves are marked by privately maintained lights.

An oil transfer wharf is at **Davant** on the N side of the river about 45 miles (AHP). The wharf is marked by a privately maintained light. An oil transfer wharf is at **Junior** on the S side about 47.3 miles (AHP).

A bulk material transfer wharf is at **Harlem,** on the N side about 48.3 miles (AHP). The wharf has 1,892 feet of vessel berthing space and 1,908 feet of barge berthing space. Depths of 50 feet are reported to be alongside the vessel berths. Barge and ship unloading towers and conveyors are conspicuous. The wharf is marked by privately maintained lights.

The ruins of a 1,200-foot L-shaped coal transfer wharf are on the S side of the river at **Myrtle Grove** about 49 miles (AHP). The elevator and conveyor gallerys on the pier are conspicuous. A grain elevator and offshore wharf are on the S side of the river about 53.4 miles (AHP). The wharf has 945 feet of berthing space with depths of 40 feet reported alongside. A conveyor and vertical spout system can load 2,000 tons of grain per hour. The wharf is marked by privately maintained lights.

An offshore barge wharf and an offshore oil transfer tanker wharf are at **Alliance** on the S side of the river at 54.3 and 54.9 miles (AHP). The barge wharf has 685 feet of berthing space with dolphins and a conveyor and pipeway for handling coke. The oil transfer tanker wharf with mooring dolphins allows 1,085 feet of berthing space with depths of 40 feet reported alongside. Transfer barges berth on the backside of the tanker wharf. The dolphins and wharf are marked by privately maintained lights.

A floating chemical and oil products wharf, consisting of a barge with mooring dolphins, is on the W side of the river at **Oak Point** about 63.0 miles (AHP). The wharf has 250 feet of berthing space with depths of 35 feet reported alongside. The mooring dolphins are marked by privately maintained lights. A seatrain terminal wharf, with depths of 35 feet reported alongside, is on the W side of the river above Oak Point about 64.6 miles (AHP). A 150-ton loading gantry is conspicuous at the wharf.

**Belle Chasse** is on the W side of the river about 65.6 miles (AHP). A T-shaped molasses handling wharf here has 250 feet of berthing space with depths of 35 feet reported alongside. The wharf is marked by a privately maintained light. A ferry crosses the river from Belle Chasse to **Scarsdale** on the E side of the river. The ferry landings are marked by privately maintained lights.

**Port Nickel** is on the E side of the river about 66.5 miles (AHP). A 50-foot T-head wharf with mooring dolphins has 330 feet of berthing space. The unloading conveyor galleries and the stack and buildings of the nickel plant are conspicuous.

**Braithwaite,** on the S side of the river about 68.8 miles (AHP) just above **English Turn Bend,** has a large fertilizer plant with a large gray stack. A marginal wharf has 650 feet of berthing space with 50 feet alongside. A railroad spur of the Southern Railroad leads to the wharf.

Temporary anchorages in this part of the river are off the N side of the river opposite Braithwaite, and off the W side of the river opposite Violet. (See 110.195, chapter 2, for anchorage regulations.)

**Violet** about 72.8 miles (AHP) is on the E side of the river at the head of Lake Borgne Canal. The lock which formerly gave access to the Mississippi River is no longer operable as the canal has been blocked by the levee.

**Meraux,** on the N side of the river about 75 miles (AHP), has an oil refinery with facilities for receipt of crude oil by barge and shipment of petroleum products by tanker and barge. The tall stacks and cracking towers of the refinery are prominent.

**Algiers Alternate Route** and **Algiers Lock,** on the S side of the river about 76.4 miles (AHP), connect the Mississippi River with an extensive network of inland waterways W of New Orleans. The route is an alternate route of the Intracoastal Waterway leading W of New Orleans. (See chapter 12 for description of canal and lock.)

**Chalmette,** on the N side of the river about 77.2 miles (AHP), has several large oil refineries and an aluminum plant. The stacks and cracking towers of the refineries and the aluminum plant are conspicuous. Several wharves between mile 76.7 and mile 77.4 (AHP) are used for the receipt and shipment of petroleum products and for bunkering vessels. (See Wharves under Port of New Orleans for descriptions.)

A ferry crosses the river from Chalmette to Algiers on the S side.

**Chalmette Slip** indents the N side of the river at about 78.5 miles (AHP). Chalmette National Monument, a tall white obelisk, is conspicuous close E of the slip. Berthing for deep-draft cargo vessels is

available on the E and W sides of the slip. (See Wharves under Port of New Orleans for description.)

The New Orleans general anchorage about 2 miles long is off the S side of the river opposite Chalmette Slip, and the quarantine anchorage about 0.7 mile long is just above it.

**Arabi,** a suburb of New Orleans, is on the N side of the river just W of Chalmette. A deep-draft wharf and two smaller wharves are at a large sugar refinery; one wharf is used by ship service boats and the other by a private stevedoring company. (See Wharves under Port of New Orleans for description.)

Just W of the sugar refinery wharf, at the ship service boat wharf, is the landing for the pilot boat. The upriver pilots board vessels off the landing in the section of the river known as **The Point**. Here vessels bound for destinations above New Orleans discharge the river pilot and take on board the New Orleans-Baton Rouge Steamship Pilot, or upriver pilot.

On the S side of the river opposite Chalmette and Arabi at **Algiers** are barge moorings, towing company wharves, the large floating drydocks of a large ship repair firm, the U.S. Naval Station, and other towing company wharves and barge moorings.

The Inner Harbor Navigation (Industrial) Canal entrance is on the N side of the river about 80.3 miles (AHP). The Intracoastal Waterway enters the river through the canal. There are numerous industries along both sides of the Inner Harbor Navigation Canal, including shipbuilding and ship repair yards, cement and concrete mixing plants, chemical, fertilizer, steel fabrication, glass making, instant coffee, and drilling mud manufacturing plants, boatyards, shipwrecking and salvage yards, oil well and dredging company supply bases, and shell-handling wharves.

The vessel is now approaching the loop in the river that encompasses the city of New Orleans on three sides, and ahead are the numerous tall buildings in the main part of the city. Most of the commercial wharves of the Port of New Orleans are on both sides of the river in this section.

**Charts 11369 (1269), 11368 (497).-Port of New Orleans** is one of the largest ports in the United States. It is located on both sides of the Mississippi River with its lower limit about 70 miles (AHP), and its upper limit about 100 miles (AHP). The limits of the port encompass the parish of Orleans and the river frontage of the parishes of St. Bernard and Jefferson. This includes the city of New Orleans, the towns and communities of Violet, Meraux, Chalmette, Arabi, Southport, Harahan, and Kenner on the N side, and Algiers, McDonoghville, Gretna, Harvey, Marrero, Westwego, Bridge City, and Avondale on the S side. The frontage for deep-draft vessels within the port limits includes approximately 50 miles along the river banks, about 10 miles on the Inner Harbor Navigation (Industrial) Canal, and the Mississippi River-Gulf Outlet Canal. The Intracoastal Waterway above the Inner Harbor Navigation (Industrial) Canal and below Harvey Lock offers frontage for barges and small vessels.

The city of **New Orleans** is the major commercial area within the port limits. It is one of the largest cities on the Gulf and is a natural gateway to and from the vast central and S portions of the nation, and particularly to the entire Mississippi Valley with which it is connected by numerous inland water routes. From New Orleans, main-route air and rail lines fan out to all parts of the country. Foreign and coastwise trade are extensive. The chief imports are alcoholic beverages, bananas, basic textile products, building cement, chemicals, coffee, copper alloys, crude rubber and allied gums, fertilizer, glass and glass products, gypsum, iron and steel products, limestone, lumber and wood products, machinery and foreign autos, marine shells, nonferrous ores, nonmetallic minerals, ordnance and accessories, paper and paperboard, phosphate rock, sand, sugar, gravel, and crushed rock. The chief exports are basic chemicals and chemical products, clay, coal and petroleum products, dried milk and cream, food products, grains and flour, glass and glass products, iron and steel scrap, lumber, machinery, manganese ore, marine shells, motor vehicles, nonferrous metal scrap, nonmetallic minerals, paper and paperboard, plastic, prepared animal feed, pulp, structural clay products, sulfur, synthetic rubber, and vegetable oils.

New Orleans is a popular winter resort with many fine hotels, theaters, restaurants, parks, and places of historical interest. Among the latter is the famous French Quarter (Vieux Carre) which is kept in as near its original state as possible. For the convenience of representative citizens of foreign countries who arrive or depart via New Orleans, an international world trade center known as the **International House** is in a 9-story building at the corner of Gravier and Camp Streets.

The city proper is bounded on three sides by the Mississippi River. The city limits extend N to Lake Pontchartrain, which is connected to the river by the Inner Harbor Navigation (Industrial) Canal along the E side of the city. Strong levees protect the city from flood waters of the Mississippi River, which at times rise to a level higher than that of the city streets.

Abreast of New Orleans on the opposite bank of the river are **Algiers,** which is part of the city of New Orleans, **McDonoghville, Gretna, Harvey Marrero,** and **Westwego.** Algiers is connected with New Orleans by ferry service operated by the Mississippi River Bridge Authority and the Greater New Orleans Highway Bridge.

The Port of New Orleans has over 25 miles of public and private wharves and other related facilities. The public docks can handle as many as 85

ships at a time. The port is mainly a general cargo port, and the first objective is to give shippers whatever facilities and services they need to handle any type of cargo. Modern handling devices suitable for the varied commodities entering the port are provided on the wharves and in the transit sheds. Almost all wharves have rail connections.

The port is the heart of the busiest grain export area in the world. The port's public grain elevator can store over 7 million bushels and transfer up to 1 million bushels of grain a day. A private grain elevator at Westwego, about 7.3 miles above Canal Street, has a capacity of 4 million bushels and can load vessels at a rate of 20,000 bushels per hour. A Tidewater Bulk Terminal is on the N side of the Mississippi River-Gulf Outlet Canal about 1.5 miles E of the Inner Harbor Navigation (Industrial) Canal. Its three loading towers each can discharge ore, bulk sugar, and other bulk commodities at the rate of 2,000 tons per hour. There is also a bulk meal-handling facility owned by the Illinois Central Railroad at the Stuyvesant Wharf, which is one of the few privately owned terminals in the port.

The port also has **Foreign Trade Zone No. 2,** which is located behind the Napoleon Avenue Wharf about 3.6 miles above Canal Street. The zone is one of seven neutral zones in the United States, where goods can be brought and sorted, mixed, labeled, packaged, and even manufactured without payment of customs duties unless they are then taken into the country. Foreign Trade Zone No. 2, established by Act of Congress, is owned and operated by the Board of Commissioners under rules and regulations issued by the U.S. Department of Commerce's Foreign Trade Zone Board, Washington, D.C. The port also has a banana handling wharf and has existing and developing facilities for handling containerized cargo.

Most of the wharves along the waterfront of the city of New Orleans are public facilities under the control of the Board of Commissioners (Dock Board) of the Port of New Orleans. Virtually all these wharves parallel the river bank, and for 9 miles along the bank there is an almost continuous quay. Transit sheds cover much of the wharf area. Depths at the wharves range from 6 to 42 feet, with about 35 feet alongside most wharves. It is the Dock Board's responsibility to keep sufficient depths alongside the wharves for ships to berth. The board controls the area from the faces of the wharves to 100 feet into the stream. The dock areas silt up rapidly and change from day to day. The Dock Board's dredge is working continually to keep the docks open.

The offices of the Dock Board are in the 33-story International Trade Mart building on the waterfront in Eads Plaza at the foot of Canal Street.

**Channels.**-The main deepwater channels leading to and in the Port of New Orleans are in the river, the Inner Harbor Navigation (Industrial) Canal, and the Mississippi River-Gulf Outlet Canal. (See Channels at the beginning of this chapter.) Secondary channels for shallow-draft vessels and barges are on Algiers, Harvey, and other canals and waterways that radiate from the river in all directions.

The **Inner Harbor Navigation (Industrial) Canal** offers a deep-water connection between Mississippi River and Lake Pontchartrain, a distance of about 5 miles. The lock is 0.5 mile N of the Mississippi River Levee; inside dimensions are 640 feet long, 75 feet wide, and 31½ feet over the sills at low water in the Mississippi River. Approaching craft are directed by loud speaker, lights, and radiotelephone. VHF-FM channels 12 (156.60 MHz), 14 (156.70 MHz), and 16 (156.80 MHz) are continuously monitored. N from the lock in January 1972, the controlling centerline depths were 29 feet to the junction with the Mississippi River-Gulf Outlet Canal, thence 32 feet to the Chef Menteur Highway Bridge, and thence 31 feet to the Seabrook Highway and Southern Railway bridges at the N end of the canal. A 900-foot-wide turning basin about 0.7 mile N of the lock has depths of 31 feet. A second turning basin at the junction with the Mississippi River-Gulf Outlet Canal has a 1,600-foot diameter with depths of 40 feet.

**Caution.**-A submerged drainage line is reported crossing the Inner Harbor Navigation (Industrial) Canal just S of the Florida Avenue bridge; maximum permissible draft over the line is 30 feet.

A total of eight bridges cross the canal between the Mississippi River and Lake Pontchartrain. The St. Claude Avenue highway bridge at the S end of the navigation lock has a bascule span with a clearance of zero feet. The North Claiborne Avenue (Seeber) highway bridge, about 0.2 mile N of the lock, has a vertical lift span with a clearance of 40 feet down and 156 feet up. About 0.9 mile N of the lock, the combination Florida Avenue and Southern Railroad bridge has a bascule span with a clearance of zero feet. An overhead power cable crossing close N of the bridge has a clearance of 166 feet. The combination Gentilly Road highway and Louisville and Nashville Railroad bridge, 2.4 miles N of the lock, has a bascule span with a clearance of zero feet. The U.S. Interstate Route 10 highway bridge close N of Gentilly Road bridge has a fixed span with a clearance of 120 feet for the middle 200 feet and 115 feet elsewhere. An overhead power cable crossing close N of this bridge has a clearance of 136 feet. Chef Menteur (U.S. Route 90) highway bridge, 2.6 miles N of the lock, has a bascule span with a clearance of 9 feet at the center. The combination Seabrook Highway and Southern Railroad Bridge across the N entrance of the canal, about 4.1 miles N of the lock, has a bascule span with a clearance of 1 foot. A highway bascule bridge with a clearance of 46 feet at the center crosses the canal close N of the Seabrook Highway and Southern Railroad Bridge. (See 117.535 and 117.555, chapter 2, for drawspan

regulations and opening signals for the bridges crossing the Inner Harbor Navigation Canal.)

The river entrance to the canal is marked by lights on both sides and by a 333° lighted range.

**Harvey Canal** is opposite New Orleans about 85.3 miles (AHP). The canal and locks connect the Mississippi River with an extensive network of inland waterways SW of New Orleans. The canal is the route of the Intracoastal Waterway. (See chapter 12 for description of canal and locks.)

**Anchorages.**-Within the port limits, vessels may anchor in the designated anchorages or as directed by the District Commander, U.S. Coast Guard. (See 110.195, chapter 2, for designated areas of anchorage at New Orleans.)

**Dangers.**-Submerged revetments are located on the river bottom on both sides in the port area; anchorage is prohibited in these areas. (See 207.200, chapter 2, and chart 11368 (497) for revetment areas and regulations.)

**Bridges.**-A high-level fixed highway bridge connecting Algiers and New Orleans, 0.6 mile above Canal Street, has a clearance of 150 feet over a central 750-foot width. The Huey P. Long Bridge, a combined highway and railroad bridge crossing the river 9.6 miles above Canal Street, has a clearance of 135 feet for a channel span width of 500 feet. These are the only bridges over the Mississippi in the New Orleans vicinity. The other bridges and tunnels in the port are covered in the description of the respective waterways which they cross.

**Cables.**-An overhead power cable with a clearance of 155 feet crosses the river 0.4 mile below Nine Mile Point, about 90 miles (AHP).

**Tides and Currents.**-A description of tides and currents is given under the general discussion of the Mississippi River at the beginning of this chapter.

**Weather.**-The climate at New Orleans and the surrounding suburbs is influenced, in a large degree, by the many water surfaces provided by lakes and streams, and by the proximity to the Gulf of Mexico. Throughout the year, these water areas modify the relative humidity and temperature conditions, decreasing the range between the extremes; when S winds prevail, these effects are increased, imparting the characteristics of a marine climate. Relative humidities of less than 50 percent occur in each month of the year; however, they are less frequent in the summer months than in other seasons. During mid-June to mid-September, the prevailing SE to SW winds carry inland warm, moist air favorable for sporadic, often quite localized, development of thundershowers. In the New Orleans area, these showers tend to occur most frequently around 1300-1400, and keep the temperature from rising much above 90°F. At times, a thunderstorm will develop over Lake Pontchartrain in the early evening, and move over the city. Occasionally the pressure distribution changes to bring in a flow of hotter and drier air. However, there is only an average of about 7 days per year when the temperature rises to 95°F. or higher, from about mid-November to mid-March, the area is subjected alternately to tropical air and cold continental air in periods of varying length. About 80 percent of the December-February hourly temperatures range from 41°F. to 69°F. The mean date of the first occurrence of 32°F. or lower is about December 12, while the mean date of the last occurrence is about February 13. Between those dates, there is, on the average, more than 6 days out of 7 entirely above freezing, with some afternoons having temperatures in the seventies and eighties. The mean length of the freeze-free period is about 302 days. The latest freeze date in spring was March 27, 1955, with 30°F. reported at the airport and Audubon Park. The earliest freeze date in the fall was November 11, 1894, with 32°F. observed at Audubon Park. The usual track of winterstorms is to the N of New Orleans, but occasionally one moves into the area, bringing large and rather sudden drops in temperature, but the cold spells seldom last over 3 or 4 days. In about two-thirds of the years, one can expect the annual lowest temperature to be 24°F. or warmer, with some years entirely above freezing. The lowest recorded temperature was 6°F. on February 13, 1899, at Audubon Park. From December to May, the water of the Mississippi River is usually colder than the air temperature, favoring the formation of river fogs, particularly with weak S winds. The nearby lakes also serve to modify the extremes of temperature and to increase fogginess over narrow strips along the shores. From April through October, the occurrence of fog is not frequent enough to ordinarily consider them operationally significant. In other months, particularly in winter (December through February), the occurrences increase, with the greatest frequency in February. Visibility at times is reduced by smoke from the industrial plants along the river. Smoke, particularly during the fall and winter, also occurs when marshland areas are burned.

A fairly definite rainy period is from mid-December to mid-March. Measurable precipitation occurs on about one-third of the days, periodically, to the N of a warm front or a cold front which has stalled over the N Gulf of Mexico. It is as apt to fall in one hour as another, generally slow, steady, and relatively continuous, often lasting for several days. Snowfall amounts are generally small, with the snow usually melting as it falls. The pattern of spring rains is similar to that of winter, while fall rains are distributed in much the same manner as summer rains. April, May, October, and November are generally dry, but there have been some extremely heavy showers in those months.

While thunder usually accompanies summer showers, thunderstorms with damaging winds are relatively infrequent. The most damaging thunderstorms are those which move over the city from

Lake Pontchartrain, usually in connection with cold fronts and line squalls. Hail of a damaging nature seldom occurs, and tornadoes are extremely rare. Since 1900, the centers of three hurricanes have passed over the city. The area has been affected by several other hurricanes and also by a number of tropical storms which did not attain hurricane intensity. New Orleans is in the belt where a mean recurrence interval of 50 years gives an extreme mile of wind with a speed of 95 to 100 m.p.h. or more.

The lower Mississippi River floods result from runoff upstream. Rainfall within the State of Louisiana has little influence on these stages. The levees at New Orleans have not been overtopped in more than 100 years. If the water level in the river becomes dangerously high, the Bonnet Carre Spillway, some 33 miles above the city, may be opened to divert the floodwaters.

The National Weather Service maintains an office in the Federal Building; **barometers** may be compared there or checked by telephone. (See appendix for address.) **Storm warning display** locations are listed on NOS charts and shown on the Marine Weather Services Charts published by the National Weather Service.

(See page T-4 for **New Orleans climatological table.**)

**Pilotage** is discussed under the general description of the river at the beginning of this chapter.

**Towage.**-Tugs up to 4,500 hp are available at New Orleans for towing and docking. (See detailed description at the beginning of this chapter.)

**Quarantine** procedures are discussed at the beginning of this chapter. A United States Public Health Service and numerous public and private hospitals are in New Orleans.

**Agricultural quarantine** procedures are discussed at the beginning of this chapter.

**Customs.**-New Orleans is a customs port of entry with a customhouse on Canal Street. (See appendix for address.) Vessels are generally boarded by customs officers at berth; however, arrangements can be made for the officers to board vessels at any point within the port limits. The customhouse serves the area from the Mississippi River entrance to Reserve, a small town about 120 miles (AHP).

**Immigration.**-The U.S. Immigration and Naturalization Service maintains a district office at New Orleans. (See appendix for address.) Inspectors board vessels at the quarantine anchorage or alongside the wharves. Arrangements should be made through ships' agents.

**Coast Guard.**-The **Captain of the Port** maintains an office in New Orleans. **Marine inspection** and **vessel documentation** offices are at New Orleans. (See appendix for addresses.)

**Harbor regulations.**-The navigation of vessels in the Mississippi River, the Inner Harbor Navigation (Industrial) Canal to its junction with the Mississippi River-Gulf Outlet Canal, and the Mississippi River-Gulf Outlet Canal are under the jurisdiction of the District Engineer of the U.S. Corps of Engineers. The development, operation, and control of the Port of New Orleans is regulated by The Board of Commissioners of the Port of New Orleans.

**Movement of vessels in vicinity of Algiers Point:**

Traffic control in the river in the vicinity of Algiers Point is subject to regulations stated in 207.200, chapter 2. In addition to the traffic lights at Governor Nicolls Street Wharf and at Gretna, described in that regulation, there is a traffic light at **Westwego,** 5.7 miles above Canal Street, which indicates to downbound traffic whether the Gretna traffic control light, 1.5 miles above Canal Street, is red or green.

At a conference of representatives of navigation interests in New Orleans, it was agreed that high stages on the Mississippi River require special precautionary measures in the operation of vessels in New Orleans Harbor, particularly in the vicinity of Algiers Point where high-river stages produce strong currents and powerful shifting eddies.

The following recommendations were made for the operation of vessels and other craft when the stage of the river is 10 feet or above on the Carrollton Gage. All underpowered vessels should be assisted by a tug around Algiers Point; and further, underpowered vessels should not leave the harbor unless they can clear Algiers Point during daylight. Terminal-operators and fleet-owners should observe extra precaution in the mooring of barges to prevent the possible breaking loose of such craft to the danger of all installations downstream.

The attention of all navigation interests, masters, pilots, and operators is invited to the urgent necessity for observance of these policies and meticulous adherence to good seamanship and sound operating practice in order to minimize navigational hazards during the period of high stages of the river.

**Note:** When emergency conditions exist due to the velocity of the flow of the Mississippi River in the vicinity of New Orleans, the Commander, Eighth Coast Guard District, will issue special orders and notices restricting the size and make up of tows, movement of vessels, and the use of anchorages.

**Control of the Port of New Orleans:**

The **Board of Commissioners of the Port of New Orleans,** a State agency generally known as the **Dock Board**, has full control of the port except for matters pertaining to the levees and the yacht harbor on Lake Pontchartrain, which are under control of the **Levee Board,** and the **New Orleans Public Belt Railroad,** which is a terminal railroad owned and operated by the city of New Orleans through the **Public Belt Railroad Commission.**

The Dock Board consists of members selected by the Governor of the State of Louisiana from a list of nominees compiled by seven business and civic associations. The board is charged with the

development, operation, and control of the Port of New Orleans and establishes rules and regulations for the various terminals and the part of the Inner Harbor Navigation (Industrial) Canal under its control. Foreign Trade Zone No. 2, discussed earlier under Port of New Orleans, is owned and operated by the Board of Commissioners.

The Executive Port Director and General Manager is in charge of operations and is assisted by two Associate Port Directors and three Deputy Port Directors. About two-thirds of the improved wharf frontage is owned by the State of Louisiana and operated by the board. The office of the Dock Board and Superintendent of Docks is on Canal Street near the river, in the International Trade Mart Building.

**Fire prevention.**-Smokestacks of vessels moored to the wharves and landings must be equipped with spark arrestors, and every precaution must be taken to avoid an issue of sparks. Smoking in the holds or on the decks of vessels, while loading or discharging cargo while alongside the wharves, is prohibited.

**Extracts from the rules and regulations for the Inner Harbor Navigation Canal are as follows:**

**General.**-No vessels shall berth at any wharf, landing or mooring, or move from one point to another in the canal, or load or unload cargo elsewhere than at a regularly established wharf, except by authority of the Superintendent.

**Obstructing Navigation-Anchoring and Mooring.**-No vessel shall anchor in the channel of the canal or in the approaches thereto, except in case of distress or emergency or while waiting the opening of a drawbridge, and such stoppages shall be only for such periods as may be absolutely necessary by reason of such causes. Vessels moored at wharves, landings, clusters, etc., shall be so placed and tied up as not to interfere with safe passage of other vessels navigating the canal. No warp line shall be passed across the channel, wharf, or landing, so as to obstruct passage or to cause interference with the discharging of cargoes.

Vessels shall not be berthed two abreast alongside any wharves, bulkheads, or clusters, except that small barges or other small craft may be moored two or more abreast when necessary clearances for proper operation of the canal can be maintained, and permission of the Superintendent shall have been obtained.

Vessels, lighters, barges, launches, other watercraft, timbers, rafts, or similar floating objects moored or tied to and alongside vessels, wharves, bulkheads, or clusters, shall be placed so as not to obstruct the channel, and shall be made fast securely at both ends to prevent swinging out or breaking loose, and shall display conspicuously suitable lights at night.

Under no circumstances shall vessels or other watercraft be anchored or moored within 100 feet of the centerline of the Inner Harbor Navigation Canal channel as determined by the Engineering Department of the Board.

In the event any vessel or other floating equipment, including any logs or lumber assembled in rafts or separated therefrom, or any large sinkable object on any such vessel shall sink, or in any manner obstruct navigation in the canal, the owner or agent of said vessel shall promptly remove same. In case the owner or agent fails for any cause to remove any such obstruction promptly upon demand, the Board may remove it or cause it to be removed at the cost, risk, and expense of said vessel, its owner, or agent.

**Responsibility for Vessel.**-Masters of vessels in Canal waters shall be responsible for safe handling and proper navigation of vessels under their charge. Masters of vessels shall abide by the rules and regulations of the canal, as interpreted by the Superintendent.

No vessel, even if moored and tied up, shall be left without sufficient crew to care for it properly. Lights shall be displayed at all times, both when tied up and navigating the canal, in accordance with the provisions of the Inland Rules.

The dropping of anchors, weights, or other ground tackle, within the areas occupied by submarine cables or pipe crossings, is prohibited. Such crossings will be marked ordinarily by signboards on each bank.

The master or other party in charge of the movement of an oceangoing vessel or craft of unusual height, including piledrivers, derricks, etc., shall before passing through the canal bridge openings, make certain that such craft and every part of the superstructure or any equipment or cargo beyond the gunwales will clear all parts of the bridge structure.

As it may see fit, the Board reserves the right to place its own pilot on any vessel passing through the canal. The canal pilot will serve only in an advisory capacity. . . .

Vessels shall exercise due care in navigating the canal, as to speed and otherwise, in order to avoid damage to the canal structures or equipment, or to other vessels.

The making of trial runs in the canal by speed boats and other such motorcraft is prohibited. Under no circumstances shall any watercraft navigate in the canal at a **speed exceeding 10 m.p.h.**

Vessels shall be liable for any damage to canal structures, equipment, and/or appurtenances while passing through the canal.

The Board has noted that some masters ground their vessels bow-on while waiting lockage in the forebay of the lock. As such contact endangers the levees, mariners are directed to discontinue the practice.

Steel-pile dolphins and other facilities are on the E and W banks downstream from the lock forebay to provide "ready" mooring areas for barges and tows awaiting lockage. These crafts are under the direction and control of the lockmaster.

A port-wide radiotelephone system using VHF-FM channel 13 (156.65 MHz) connects all ter-

minals, bridges, tugs, pilots, and the yacht harbor with the Dock Board offices.

**Wharves.**-The Port of New Orleans has more than 180 piers and wharves located on both sides of the Mississippi River, the Inner Harbor Navigation (Industrial) Canal, and the Mississippi River-Gulf Outlet Canal. More than 100 additional facilities for small vessels and barges are on Harvey Canal, Algiers Canal, Michoud Canal, and Bayou Barataria. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to the Port Series, a Corps of Engineers publication.) The alongside depths are reported; for information on the latest depths contact port authorities or the private operators. All the facilities described have direct highway connections, and most have plant trackage with direct railroad connections. Water is available at most of the wharves, but electrical shore power connections are available at only about 25 percent of the wharves. General cargo at the port is usually handled to and from vessels by ships' tackle. Cargo on the wharves, particularly the public facilities, is handled by a wide range of equipment furnished by various stevedoring companies. Special handling equipment, if available, is mentioned in the description of the particular facility. Shore-based hoisting equipment with capacity up to 110 tons is available to the public at New Orleans; floating cranes and derricks up to 600-ton capacity are available.

Of the facilities described, about one-half are for public use operated by the Board of Commissioners of the Port of New Orleans. They operate 29 general and containerized cargo wharves, five heavy lift and bulk material handling wharves, two grain elevators, and a wharf for handling foreign automobiles. Nearly half of the private facilities are for handling petroleum and chemical products. Most of the rest are for handling general, bulk, and liquid cargo.

**Facilities on N side of river from Meraux to Inner Harbor Navigation (Industrial) Canal:**

Murphy Oil Corp. Wharf (30°55′33″N., 89°56′45″W.): 757 feet of berthing space at the face of six offshore breasting platforms; 40 feet alongside; 205 feet of barge berthing space at the rear of the lower platforms, 35 feet alongside; deck height, 24 feet; receipt of crude oil by barge, shipment of petroleum products by tanker and barge; bunkering tankers; fueling towboats; owned and operated by Murphy Oil Corp.

Tenneco Oil Co., Crude Terminal Wharf (30°55′33″N., 89°57′54″W.): 542 feet of berthing space with dolphins; 35 feet alongside; deck height, 21 feet; receipt of crude oil by tanker; owned and operated by Tenneco Oil Co.

Humble Oil and Refining Co., Steamer Dock (30°55′38″N., 89°58′12″W.): 310 feet of berthing space with dolphins; 25 feet alongside; deck height, 20 feet; receipt and shipment of petroleum by barge; bunkering vessels; owned and operated by Humble Oil and Refining Co.

Tenneco Wharf No. 4 (30°55′45″N., 89°58′40″W.): 390 feet of berthing space with dolphins; 50 feet alongside; deck height, 27 feet; shipment of petroleum products and petrochemicals by tanker and barge; bunkering vessels; owned and operated by Tenneco Oil Co.

Chalmette Slip, Dock No. 2 (29°56′33″N., 89°59′17″W.): E side of slip; 1,600 feet of berthing space; 30 feet alongside; deck height, 20 feet; 3-ton electric crane; 288,000 square feet of covered storage; receipt and shipment of general cargo, aluminum ingots, and salt; receipt of tapioca root; owned by Southern Railway System and operated by Kaiser Aluminum and Chemical Corp., Cargill, Inc., and Geismar and Co., Inc.

Chalmette Slip, Dock No. 1: W side of slip; 1,280 feet of berthing space; 30 feet alongside; deck height, 20 feet; 192,000 square feet of covered storage; receipt of lumber; owned by Southern Railway System and operated by Lumber Importers Service Corp.

Amstar Corp. Wharf (29°56′37″N., 90°00′05″W.): 1,115 feet of berthing space; 45 feet alongside; deck height 21½ feet; two 10-ton electric gantry cranes, 36-inch electric belt-conveyor system, with bulk sugar unloading rate of 500 tons per hour; 5-ton electric grantry hoist for loading vessels; 60,000 square feet covered storage, 2¼-million-gallon molasses storage tanks; receipt of raw sugar and molasses, shipment of refined sugar and molasses; owned and operated by Amstar Corporation.

St. Maurice Avenue Wharf (29°57′02″N., 90°00′50″W.): 509-foot berth at lower end, 715-foot berth with dolphins at upper end; 35 feet alongside; deck height, 21 feet; open storage at upper berth for approximately 1,700 vehicles; mooring vessels for repairing, outfitting, and conversion at lower berth, receipt of foreign automobiles and components at upper berth; lower berth owned by Board of Commissioners and operated by Buck Kreiths Co., Inc.; upper berth owned and operated by Board of Commissioners.

Charbonnet Street Wharf (29°57′10″N., 90°01′06″W.): 1,031-foot face; 30 feet alongside; deck height, 22 feet; 97,000 square feet of covered storage at wharf, 569,000 square feet of general storage and a cotton compress at warehouse behind wharf; receipt and shipment of general cargo, shipment of cotton; owned by Board of Commissioners and operated by Warehouse Corporation of America.

**Facilities on E side of Inner Harbor Navigation (Industrial) Canal:**

Southern Scrap Material Co. Wharf (29°59′00″N., 90°01′13″W.): 451-foot face, 32 feet alongside; deck height, 7 feet; two 45-ton electric gantry cranes; receipt of scrap metal by barge, shipment of scrap metal and heavy machinery by ship and barge; owned and operated by Southern Scrap Material Co.

United States Gypsum Co. Wharf (30°01'18"N., 90°01'50"W.): 362-foot face, 25 feet alongside; 240 feet of barge berthing space at rear of face, 12 feet alongside; deck height, 7½ feet; 54-inch, electric, belt-conveyor system leads from wharf to gypsum storage bins having a capacity of 60,000 tons, 24-inch, radial, belt-conveyor system leads from barge berths to open storage area for 16,000 tons of shell; receipt of gypsum rock by vessel, receipt of shell by barge; owned and operated by United States Gypsum Co.

Morrison Yard, Ship Wharf and Turning Basin Barge Wharf (30°01'30"N., 90°01'54"W.): 975 feet of berthing space with dolphins, 30 feet alongside, 1,104 feet of barge berthing space along S and E sides of barge basin; 12 feet alongside; deck height at ship wharf, 7 feet; 7½ acres of open storage; receipt and shipment of miscellaneous bulk and heavy-lift commodities and containerized cargo, receipt of lumber and steel, shipment of scrap metal; owned and operated by Board of Commissioners.

NL Industries Ship Wharf (30°01'47"N., 90°01'58"W.): 490 feet of berthing space with dolphins; 32 feet alongside; deck height, 6 feet; 30-inch, electric, belt-conveyor system leads from wharf to open storage area for 60,000 tons of barite ore; receipt of barite; owned and operated by Baroid Division, NL Industries, Inc.

**Facilities on W side of Inner Harbor Navigation (Industrial) Canal:**

Dresser Minerals Unloading Dock (30°01'34"N., 90°01'59"W.): 500 feet of berthing space; 30 feet alongside; deck height, 6 feet; floating crane furnished by stevedoring company unloads vessels; open storage for 60,000 tons of barite ores; receipt of barite; owned by Dresser Industries, Inc., and operated by Dresser Minerals, Division of Dresser Industries.

France Road Terminal, Berth No. 1 (29°58'58"N., 90°01'19"W.): 830 feet of berthing space; 36 feet alongside; deck height, 10½ feet; electric, traveling, full-portal, gantry crane for handling containers; receipt and shipment of containerized cargo; owned and operated by Board of Commissioners.

France Road Terminal, Berth No. 5: about 600 yards N of Berth No. 1; 700 feet of berthing space; 36 feet alongside; deck height, 10½ feet; 30-ton crane, 32 acres open storage; receipt and shipment of containers; owned by Board of Commissioners, operated by J. Young and Co., Inc.

Florida Avenue Wharf (29°58'45"N., 90°01'30"W.): 482-foot face; 30 feet alongside; deck height, 9 feet; 43,000 square feet of covered storage; receipt and shipment of general cargo; owned and operated by Board of Commissioners.

Galvez Street Wharf (29°58'24"N., 90°01'29"W.): 2,380-foot face, 35 feet alongside; 265-foot N side, 30-20 feet alongside; deck height, 9 feet; 357,000 square feet of covered storage; receipt and shipment of general and containerized cargo; owned and operated by Board of Commissioners.

**Facilities on the Mississippi River-Gulf Outlet Canal:**

Public Bulk Terminal Wharf: N side of canal, 1.4 miles E of junction with Inner Harbor Navigation (Industrial) Canal; face 2,235 feet of berthing space with dolphins; 36 feet alongside; 1,808 feet of barge berthing space at rear of face, 20 feet alongside; deck height, 12½ feet; covered storage tanks for 30,000 tons of bulk materials, open storage for 159,000 square feet or 48,000 tons of bulk materials; one electric, traveling, combination vessel and barge-loading bridge tower served by electric, belt-conveyor system with 2,000 to 3,000 tons per hour loading rate; three electric, traveling, unloading towers serving one 42-inch and two 60-inch electric belt conveyors with a combined unloading rate of 3,350 tons per hour; receipt and shipment of various dry bulk commodities including: coke, alumina, manganese, sugar, barites, salt phosphate, ammonium sulphate, iron ore, zinc, petroleum pitch, gypsum, coal, fluorspar, urea, steel, ferrochrome, pig iron, bauxite, copper, and potash; owned and operated by Board of Commissioners.

**Facilities on the N side of river from Inner Harbor Navigation (Industrial) Canal W to Southport:**

Poland Street Wharf (29°57'29"N., 90°01'59"W.): 2,193-foot face; 75 to 32 feet alongside; deck height, 25½ feet; 286,000 square feet of covered storage; receipt and shipment of supplies; owned by U.S. Government and operated by Department of the Navy.

Pauline Street Wharf (29°57'34"N., 90°02'17"W.): 581-foot face; 40 to 42 feet alongside; deck height, 22 feet; 63,000 square feet of covered storage; receipt and shipment of general cargo; operated by Board of Commissioners.

Congress Street Wharf: adjacent W of Pauline Street Wharf; 968 feet of berthing space; 40 to 42 feet alongside; deck height, 22 feet; 90,000 square feet of covered storage, 50,000 square feet of paved open storage; receipt and shipment of general cargo; operated by Board of Commissioners.

Desire Street Wharf: adjacent W of Congress Street Wharf; 440-foot face; 35 feet alongside; deck height, 22 feet; 100,000 square feet of covered storage; one 50-ton diesel crawler crane with a 2-cubic yard grab bucket, 36-inch, electric, belt-conveyor system leads from wharf to storage area; receipt of bulk fertilizer by barge, shipment of bagged fertilizer by vessel; owned by Board of Commissioners and operated by Atlantic and Gulf Stevedores, Inc.

Piety Street Wharf: adjacent W of Desire Street Wharf; 523-foot face; 35 feet alongside; deck height, 21 feet; 46,000 square feet of covered storage; receipt and shipment of general cargo; operated by Board of Commissioners.

Louisa Street Wharf: adjacent W of Piety Street Wharf; 1,061 feet of berthing space; 34 feet alongside; deck height, 21 feet; 31,000 square feet of

covered storage; 58,000 square feet of paved open storage; receipt and shipment of general and containerized cargo and heavy items, receipt of molasses; mooring floating derricks; operated by Board of Commissioners.

Press Street Wharf: adjacent W of Louisa Street Wharf; 947 feet of berthing space; 40 feet alongside; deck height, 21 feet; 48,000 square feet of covered storage; receipt and shipment of general cargo; operated by Board of Commissioners.

Mandeville Street Wharf: adjacent W of Press Street Wharf; 1,121-foot face; 35 feet alongside; deck height, 22 feet; 97,000 square feet of covered storage; receipt and shipment of general cargo; operated by Board of Commissioners.

Esplande Avenue Wharf: adjacent W of Mandeville Street Wharf; 584-foot face; 35 feet alongside; deck height, 22 feet; 66,000 square feet of covered storage; receipt and shipment of general cargo; operated by Board of Commissioners.

Governor Nicholls Street Wharf: adjacent SW of Esplanade Street Wharf; 1,211-foot face; 40 feet alongside; deck height, 22 feet; 100,000 square feet of covered storage, 14,400 square feet of paved open storage; receipt and shipment of general and containerized cargo; operated by Board of Commissioners.

Bienville Street Wharf (29°57′08″N., 90°03′46″W.): 1,664 feet of berthing space; 35 feet alongside; deck height, 22 feet; 171,000 square feet of covered storage, 50,000 square feet of paved open storage; receipt and shipment of general and containerized cargo; operated by Board of Commissioners.

Poydras Street Wharf (29°56′49″N., 90°03′43″W.): 1,370-foot face; 35 feet alongside; deck height, 22 feet; 370,000 square feet of covered storage; receipt and shipment of general cargo including newsprint and coffee; operated by Board of Commissioners.

Julia Street Wharf: adjacent S of Poydras Street Wharf; 1,189-foot face; 35 feet alongside; deck height, 22 feet; 137,000 square feet of covered storage; receipt and shipment of general cargo; operated by Board of Commissioners.

Erato Street Wharf: adjacent S of Julia Street Wharf; 987-foot face; 35 feet alongside; deck height, 22 feet; 85,000 square feet of covered storage; one 9-ton gasoline and one 5-ton electric mobile crane, four electric banana unloaders serving electric banana conveyor-system leading to interior of transit shed; receipt and shipment of general cargo, receipt of bananas; owned by Board of Commissioners and operated by United Fruit Co.

Thalia Street Wharf: adjacent S of Erato Street Wharf; 860-foot face; 35 feet alongside; deck height, 22 feet; 109,000 square feet of covered storage; shell-surfaced parking area for 55 trucks, use of cargo-handling facilities described for Erato Street Wharf, except banana unloaders and conveyor; receipt and shipment of general cargo; owned by Board of Commissioners, operated by Board of Commissioners and United Fruit Co.

Robin Street Wharf: adjacent S of Thalia Street Wharf; 1,216-foot face; 35 feet alongside; deck height, 22 feet; 157,000 square feet of covered storage; receipt and shipment of general cargo; operated by Board of Commissioners.

Orange Street Wharf: adjacent S of Robin Street Wharf; 1,020 feet of berthing space; 30 feet alongside; deck height, 22 feet; 133,000 square feet of covered storage; receipt and shipment of general cargo; operated by Board of Commissioners.

Market Street Wharf (29°55′44″N., 90°03′47″W.): 1,015 feet of berthing space; 30 feet alongside; deck height, 22 feet; 119,000 square feet of covered storage; receipt and shipment of general cargo, receipt of fuel oil for powerplant consumption; operated by Board of Commissioners.

Celeste Street Wharf: adjacent SW of Market Street Wharf; 1,200 feet of berthing space; 35 feet alongside; deck height, 22 feet; 129,000 square feet of covered storage; receipt and shipment of general cargo; operated by Board of Commissioners.

St. Andrew Street Wharf: adjacent SW of Celeste Street Wharf; 1,598-foot face; 35 feet alongside; deck height, 22 feet; 146,000 square feet of covered storage; receipt and shipment of general cargo; operated by Board of Commissioners.

First Street Wharf (29°55′18″N., 90°04′21″W.): 1,037 feet of berthing space; 35 feet alongside; deck height, 22 feet; 105,000 square feet of covered storage, 6,000 square feet of paved open storage; receipt and shipment of general cargo; operated by Board of Commissioners.

Third Street Wharf: adjacent SW of First Street Wharf; 900-foot face; 35 feet alongside; deck height, 21 feet; 107,000 square feet of covered storage; receipt and shipment of general cargo; operated by Board of Commissioners.

Washington Avenue Wharf: adjacent SW of Third Street Wharf; 871-foot face; 32 feet alongside; deck height, 22 feet; 122,000 square feet of covered storage; receipt and shipment of general cargo; operated by Board of Commissioners.

Seventh Street Wharf: adjacent SW of Washington Avenue Wharf; 859-foot face; 35 feet alongside; deck height, 22 feet; 105,000 square feet of covered storage; receipt and shipment of general cargo; operated by Board of Commissioners.

Harmony Street Wharf: adjacent SW of Seventh Street Wharf; 1,437 feet of berthing space; 35 feet alongside; deck heights, 22 and 24 feet; 177,000 square feet of covered storage; receipt and shipment of general cargo; operated by Board of Commissioners.

Stuyvesant Docks, Sections 1-6 (29°54′56″N., 90°05′25″W.): 2,600 feet of berthing space; 30 feet alongside; deck height, 25 feet; 173,000 square feet of covered storage; one-story warehouse and cot-

ton compress located in rear of transit shed; receipt and shipment of general cargo; owned and operated by Illinois Central Railroad Co.

Stuyvesant Docks, Sections 7 and 8: adjacent W of Sections 1-6; 870 feet of berthing space; 30 feet alongside; deck height, 25 feet; transit shed with 125-ton capacity meal storage bin; warehouse located in rear of transit shed; one electric loading tower served by covered electric belt-conveyor system with 250 tons per hour vessel loading rate; one marine leg for unloading barges; receipt and shipment of soybeans and meals; owned by Illinois Central Railroad Co. and operated by Dockside Commodity Terminals, Inc.

Stuyvesant Docks, Sections 9 and 10: adjacent W of Sections 7 and 8; 1,060 feet of berthing space with dolphins; 30 feet alongside; deck height, 25 feet; 47,000 square feet of covered storage; 7,500 square feet of open storage; two 15-cubic yard, traveling, rail car loading hoppers mounted on rails, and one 15-cubic yard, portable, straddle loading hopper; receipt of steel, sugar, rock, and other miscellaneous dry bulk cargo; owned by Illinois Central Railroad Co. and used by various operators.

Napoleon Avenue Open Wharf (29°54′45″N., 90°06′04″W.): 375-foot face; 30 feet alongside; deck height, 24 feet; two 6-inch pipelines lead from wharf to soybean oil storage tanks with a capacity of over 1-million gallons; receipt and shipment of general and containerized cargo, heavy items, and bulk and packaged soybean oil; operated by Board of Commissioners.

Napoleon Avenue Wharf C: adjacent W of Open Wharf; 1,000-foot face; 30 feet alongside; deck height, 24 feet; 150,000 square feet of covered storage; warehouse building, vacuum fumigation plant, lumber drying kiln; open storage area and other facilities of Foreign Trade Zone No. 2 located in rear of transit shed; receipt and shipment of general cargo; operated by Board of Commissioners.

Napoleon Avenue Wharves B and A: adjacent W of Wharf C; 775 and 761 feet of berthing space; 30 feet alongside; deck height, 24 feet; 164,000 square feet of covered storage; receipt and shipment of general and containerized cargo, receipt of steel products; operated by Board of Commissioners.

Public Grain Elevator of New Orleans Terminal: adjacent W of Napoleon Avenue Wharf A; 2,200 feet of ship berthing space, 35 feet alongside; 778 feet of barge berthing space, 20 feet alongside; deck height, 24 feet; transit shed with four bagging machines and 26,000 square feet of covered storage for up to 305,000 bushels of bagged grain; grain elevator has a capacity of over 7 million bushels; thirty-four 18-inch loading spouts having a combined vessel loading rate of 140,000 bushels per hour; three marine legs serving electric belt-conveyor system having a barge unloading rate, for each marine leg, of 30,000 bushels per hour; receipt of grain, meal, and pellets by barge; shipment of bulk and sacked grain, meals, and pellets by vessel and barge; owned by Board of Commissioners and operated by Public Grain Elevator of New Orleans.

Nashville Avenue Wharf (29°54′48″N., 90°07′30″W.): 2,759 feet of berthing space; 35 feet alongside; deck height, 22 feet; 567,000 square feet of covered storage, 31,000 square feet of open storage; receipt and shipment of general and containerized cargo; operated by Board of Commissioners.

Henry Clay Avenue Wharf: adjacent W of Nashville Avenue Wharf; 842 feet of berthing space; 35 feet alongside; deck height, 22 feet; 63,000 square feet of covered storage; 105,000 square feet of paved open storage, 163,000 square feet of shell-surfaced open storage; 45,000-square-foot warehouse with 20,000 square feet of cooler space; receipt and shipment of general and containerized cargo and heavy items; operated by Board of Commissioners.

U.S. Industrial Chemicals Co. Wharf (29°55′51″N., 90°08′08″W.): 300 feet of berthing space with dolphins; 27 feet alongside; deck height, 25 feet; pipelines lead from wharf to storage tanks in rear; receipt and shipment of molasses, alcohol, and chemicals; owned and operated by U.S. Industrial Chemicals Co.

**Facilities on S side of river from Algiers Alternate Route W to Avondale:**

Perry Street Wharf (29°56′02″N., 90°03′19″W.): face, 1,300 feet of berthing space with dolphins; 50 feet alongside; deck height, 24½ feet; 120,000 square feet of covered storage; receipt and shipment of general and containerized cargo, mooring LASH and SEABEE vessels; operated by Board of Commissioners.

Southern Pacific Transportation Co. Wharf (29°55′21″N., 90°03′43″W.): 670 feet of berthing space with dolphins; 28 to 29 feet alongside; deck height, 20 feet; pipelines lead from wharf to molasses storage tanks in rear; receipt of molasses and miscellaneous bulk cargo including bauxite, lead and zinc ore, and sugar; owned and operated by Southern Pacific Transportation Co.

Publicker Chemical Corp. Wharf (29°55′15″N., 90°03′49″W.): 100-foot face; 30 feet alongside; deck height, 4 feet; pipelines lead from wharf to molasses and alcohol storage tanks in rear; receipt of molasses, shipment of alcohol; owned and operated by Publicker Chemical Corp.

Consolidated Terminals Corp. Wharf (29°54′37″N., 90°05′21″W.): 382 feet of berthing space with dolphins; 35 feet alongside; deck height, 28 feet; 18,000 square feet of covered storage located in rear; pipelines lead from wharf to storage tanks for miscellaneous liquids and phosphoric acid; receipt and shipment of petroleum products, petrochemicals, phosphoric acid, chemicals, and various other bulk liquids and solid materials; owned and operated by Consolidated Terminals Corp.

Commercial Solvents Wharf (29°54′36″N., 90°05′27″W.): 370 feet of berthing space with dolphins; 32 feet alongside; deck height, 20 feet; pipelines lead from wharf to storage tanks in rear; receipt and shipment of methanol; owned and operated by Commercial Solvents Corp.

Texaco Wharf (29°54′22″N., 90°06′08″W.): 746 feet of berthing space with dolphins; 34 feet alongside; deck height, 18 feet; receipt and shipment of petroleum products and crude oil, loading mid-stream fueling barges and barges for bunkering vessels at berth, fueling tugs; owned and operated by Texaco, Inc.

Hess Oil and Chemical Main Wharf (29°54′20″N., 90°06′18″W.): 320 feet of berthing space with dolphins; 40 feet alongside; receipt and shipment of petroleum products, chemicals, and vegetable oils by barge; bunkering vessels and loading barges for bunkering vessels at berth; owned and operated by Hess Oil and Chemical Division of Amerada Hess Corp.

National Gypsum Co. Wharf (29°55′15″N., 90°08′31″W.): 566 feet of berthing space with dolphins; 30 feet alongside; deck height, 20 feet; open storage area for 75,000 tons of gypsum rock; one electric unloading tower serving a covered 36-inch, electric, belt-conveyor system with unloading rate of 180 tons per hour; receipt of gypsum rock; owned and operated by National Gypsum Co.

Continental Grain Co. Westwego Elevator Wharf (29°56′18″N., 90°08′32″W.): 1,221-foot face; 40 feet alongside; deck height, 22 feet; grain elevator having a capacity of over 4 million bushels; five vessel loading spouts served by a 42-inch, electric, belt-conveyor system having a combined loading rate of 40,000 bushels per hour, one marine leg for unloading barges with an unloading rate of 8,300 bushels per hour; receipt and shipment of grains; owned by Board of Commissioners and operated by Continental Grain Co.

International Tank Terminals, Docks No. 2 and No. 1 (29°55.3′N., 90°12.0′W.)(chart 11370 (650-SC)): 250 feet of berthing space with dolphins at Dock No. 2; 300 feet of berthing space with dolphins at Dock No. 1; 40 feet alongside each dock; deck heights, 6 feet at Dock No. 2 and 7 feet at Dock No. 1; receipt and shipment of petroleum products, alcohol, liquid chemicals and petrochemicals, lard, and vegetable, fish, and tung oils; owned and operated by International Tank Terminals, Ltd.

Point Landing Wharf (29°55.3′N., 90°12.1′W.)(chart 11370 (650-SC)): 215 feet of berthing space with dolphins; 80 feet alongside; deck height, 8 feet; receipt and shipment of petroleum products, fueling various types of vessels; mooring mid-stream fueling barge; owned by Humble Oil and Refining Co. and operated by Point Landing, Inc.

**Supplies.**-An unlimited supply of purified river water is available at nearly all piers and wharves. This water, while excellent for drinking purposes, contains a small percentage of sulfate which causes some scale when used in stationary boilers. Several concerns furnish bunker oil from tank barges to vessels alongside the wharves. The bunkering capacity ranges from 1,000 to 3,500 barrels per hour. Bunker C and diesel oil can be obtained at a number of oil terminals on both sides of the river. Marine supplies of all kinds are obtainable, and ice and provisions are plentiful.

**Repairs.**-New Orleans has numerous commercial plants which can handle vessels for underwater repairs. Most plants have equipment at wharves for making repairs above the waterline, or portable equipment for working on vessels anywhere in the harbor. The largest floating drydock, on the S side of the river opposite the Inner Harbor Navigation Canal, has a capacity of 18,000 tons, a length of 554 feet over the keel blocks, and a maximum clear width of 90 feet. It can lift vessels up to 650 feet long. Also available are numerous other floating drydocks, small graving docks, and marine railways. The largest marine railway has a capacity of 1,000 tons and can handle vessels up to 300 feet long. Marine repair plants are operated in connection with drydocks, the larger plants having well-equipped shops and other facilities necessary for complete repairs to wooden or steel vessels. A large shipbuilding plant at Avondale builds all types of vessels up to 600 feet long.

**Salvage facilities.**-Practically any equipment necessary for heavy salvage work at sea or in port is procurable at New Orleans. This includes floating derricks, dredges, barges, pumps, deep-sea divers and diving equipment, and ground tackle.

**Communications.**-New Orleans is the terminus for eight trunk line railroads including the Gulf, Mobile, and Ohio, the Illinois Central, the Kansas City Southern, the Louisville and Nashville, the Missouri Pacific, the Texas and Pacific, the Southern Pacific, and the Southern railroads. The New Orleans Public Belt Railroad is a city-owned switching railroad that expedites the handling of rail freight in the port. About 100 steamship lines operate on regular schedules out of the port. Coastwise service and intracoastal service reaches all important Gulf, Atlantic, and Pacific coast ports, and foreign service includes all world ports, particularly West Indian, Caribbean, the Panama Canal, Central and South American, European, West, South, and East African, and Far Eastern ports.

Inland barge lines operate on the Mississippi River and its tributaries as far as Minneapolis and St. Paul on the Mississippi, and Chicago on the Illinois River, Kansas City on the Missouri River, and Pittsburgh on the Ohio River. There is also barge-line service to Mobile and to Port Birmingham, the port for Birmingham, Ala., on Black Warrior River. The barge-line terminals are on the Inner Harbor Navigation (Industrial) Canal, just above the locks and on both banks of the river

above and below the city. There are inside freight routes on the Intracoastal Waterway out of New Orleans E to Mobile, Pensacola, Panama City, and Apalachicola, and W to New Iberia, Port Arthur, Galveston, Houston, Texas City, Port Lavaca, Corpus Christi, Port Mansfield, and Brownsville.

New Orleans International Airport (Moisant Field) about 11 miles NW of the center of the city is served by several airlines, which offer scheduled service to all parts of the country and overseas destinations. New Orleans Lakefront Airport is on Lake Pontchartrain on the E side of the N end of the Inner Harbor Navigation (Industrial) Canal. Alvin Callender Field is a naval reserve training facility on the S side of the river E of Algiers.

Paved highways give access to all terminals and wharves in the port and lead in all directions along the Gulf coast and to the interior.

Radio and radiotelephone service is available through the New Orleans Marine Operator.

**Small-craft facilities.**-Most small-craft facilities are on the canals inside the locks from the river, at Chef Menteur, or at the Municipal Yacht Basin and Orleans Marina at the yacht harbor, about 4 miles W of the Inner Harbor Navigation Canal, on Lake Pontchartrain. Covered and open berths with electricity for over 800 craft up to 100 feet long are available at the yacht harbor. Two yacht clubs, several boatyards, and service wharves in the yacht harbor have gasoline, diesel fuel, water, ice, provisions, marine supplies, and ramps. Marine lifts and cranes can lift out craft up to 85 feet long for hull and engine repairs, or dry open or covered storage. Electronic repairs can be made. Fuel, water, and supplies are also available on the Industrial and Harvey Canals, and on the Algiers Alternate Route of the Intracoastal Waterway.

**Charts 11369 (1269), 11352 (1050), 11370 (650-SC), 11354 (880-SC).**-Above New Orleans, the Mississippi River is used by oceangoing vessels to Baton Rouge, 117 miles above Canal Street.

**Boundary lines of inland waters.**-Pilot rules for W rivers are used in the Mississippi River and its tributaries above the Huey P. Long Bridge. (See 82.100, chapter 2.)

**Channels.**-The river channel between New Orleans and Baton Rouge is for the most part deep and clear. However, at low river stages, there are sections of the river that have been improved by dredging to accommodate deep-draft vessels. These sections called crossings number eight in all and are at Fairview-18.2 miles, Belmont-52 miles, Philadelphia-76.4 miles, Alhambra-82.5 miles, Bayou Goula-88.6 miles, Granada-94.7 miles, Medora-101.6 miles, and Red Eye-112 miles, respectively, above Canal Street, New Orleans. Federal project depth for the crossings is 40 feet. Contact the New Orleans District Office, Corps of Engineers, for controlling depths; the office is at the foot of Prytania Street, New Orleans; telephone (504-865-1121). The centerline of the channel at the crossings are marked by lighted ranges. In some cases the channel edges are marked by lighted and unlighted buoys which are maintained only at low river stages.

Buoys are also maintained at low river stages at Bonnet Carre Point Bend, Caliborne Island Bend, Plaquemine Bend, Manhac Bend, and Missouri Bend. Both river banks are marked by lights at critical places on the river and at the bends.

**Bulletin boards** showing the river stage above normal low river are maintained at New Orleans on the Corps of Engineers Wharf-6.6 miles, at College Point-54.1 miles, and on the W bank at the entrance to Port Allen Lock-115.8 miles, respectively, above Canal Street, New Orleans.

**River gages** are maintained at Bonnet Carre-30 miles, Reserve- 37.8 miles, College Point-54.1 miles, Donaldsonville-69.8 miles, and Port Allen Lock-115.8 miles, respectively, above Canal Street, New Orleans.

**Anchorages.**-Anchorage in the river from the upper limit of the Port of New Orleans to Baton Rouge is in a manner and area as prescribed by the District Commander, U.S. Coast Guard. (See 110.195, chapter 2, for limits and regulations.) Temporary anchorages in the river between New Orleans and Baton Rouge are established from time to time by the District Commander, U.S. Coast Guard, and are published in the Local Notices to Mariners. The limits of the Baton Rouge anchorage are given in 110.195, chapter 2.

**Dangers.**-Logs and other floating debris are likely to be encountered in the river at all times. Operators of small craft are advised to maintain a sharp lookout. Night travel by small craft is not recommended because of the hazard of floating obstructions.

**Ferries** cross the river at Destrehan-22.3 miles, at Reserve- 37.5 miles, at Lutcher-45.7 miles, at Donaldsonville-69.8 miles, at White Castle-83.8 miles, and at Plaquemine-97.4 miles, respectively, above Canal Street.

**Bridges.**-High-level highway bridges with a minimum clearance of 133 feet cross the river above New Orleans at Union-63 miles, and at Baton Rouge-116.6 miles, respectively, above Canal Street.

In 1974, a fixed highway bridge with design clearances of 133 feet for the center 1,200-foot span and 117 feet for the 460-foot span was under construction across the Mississippi River between Destrehan and Luling about 23.4 miles above Canal Street.

**Cables.**-Overhead power cables with a minimum clearance of 149 feet cross the river at Ninemile Point-7.6 miles, one mile above the Huey P. Long Bridge at Bridge City-10.7 miles, at Montz- 29.3 miles, at Point Pleasant-92.3 miles, at Lukeville-112.2 miles, and at Baton Rouge-119.7 miles, respectively, above Canal Street.

**Pilotage.**-Pilots to destinations above New Orleans are obtainable at New Orleans. (See information on pilotage at the beginning of this chapter.)

**Towage.**-Tugs are available at Gramercy, Burnsides, and Baton Rouge to assist vessels in docking and undocking.

**Facilities on the Mississippi River above New Orleans to Baton Rouge.**-Private and public terminals for handling oil and other products are on both sides of the river; most places have only bankside landings. Detailed description of the facilities on this part of the river in 1973 follows. **All mileage referred to on the upper river is in nautical miles above Canal Street (ACS).**

At **Avondale** on the S side of the river 11.2 miles (ACS) are the ways and fitting out wharves of a large shipyard that is equipped to build, convert, or repair vessels up to 600 feet long. The yard has machine and fabricating shops, thermite welding facilites, and can turn out shafts and steel forgings up to 20,000 pounds. The yard has five floating drydocks. The largest can accommodate vessels up to 3,800 tons displacement, 72-foot beam, and 15-foot draft. The docks can be combined to lift larger vessels. The yard has a marine railway that can handle vessels up to 300 feet. The yard has barges and facilities for gas freeing and tank cleaning.

At **Point Landing** on the S side of the river 11.9 miles (ACS), a wharf is operated by an oil-handling facility, and 11.4 miles (ACS) two wharves and storage facilities are operated by a tank terminal company. (See Wharves under Port of New Orleans for descriptions.)

**Harahan** is on the N side of the river at 12.2 miles (ACS). Fuel and some supplies may be obtained.

At **Fortier** on the S side of the river 17.2 miles (ACS), a chemical plant and barge wharf are operated by the American Cyanamid Co.

At **Ama** on the S side of the river 19.9 miles (ACS), a grain elevator has facilities for unloading barges and loading vessels. Silos at the elevator have a storage capacity of 5 million bushels.

**St. Rose,** on the N side of the river 20.4 miles (ACS), has a large oil terminal and wharf operated by the American Liberty Tank Terminals. A vegetable oil-handling terminal just W of the oil terminal wharf has a barge wharf and ship wharf operated by International Tank Terminals, Ltd.

E of **Luling,** on the S side of the river 21.9 miles (ACS), a large chemical plant and barge wharf are operated by the Monsanto Chemical Co. A conveyor system is at the wharf for loading bulk material.

**Destrehan,** on the N side of the river opposite Luling, is the site of two large grain elevators. The Bunge Corp. grain elevator, 22.0 miles (ACS), has 680 feet of ship berthing space with 40 feet reported alongside. The facility, with a storage capacity of 8 million bushels, can load vessels at a rate of 120,000 bushels per hour. The St. Charles grain elevator, 22.4 miles (ACS), has 700 feet of ship berthing space with 45 feet reported alongside. The facility has storage for over 2 million bushels of grain and can load vessels at a rate of 1,000 tons per hour. A vehicular ferry crosses the river between Luling and Destrehan.

In 1974, a fixed highway bridge with design clearances of 133 feet for the center 1,200-foot span and 117 feet for the 460-foot span was under construction across the Mississippi River between Destrehan and Luling about 23.4 miles (ACS).

On the W side about a mile below the tank at **Hahnville,** there is a prominent brick courthouse with clock tower. A shipyard at Hahnville has marine railways that can handle barges up to 180 feet for general repairs.

**Good Hope,** on the E side of the river 26.5 miles (ACS), is the site of a large oil storage area. The General American Transportation Corp. operates a 285-foot floating wharf for loading and unloading petroleum products. In 1972, 35 feet were reported alongside.

At Norco, 27.1 miles (ACS) on the N side of the river, an oil-transfer wharf is operated by the Shell Oil Co. The wharf has 825 feet of berthing space with 40 feet reported alongside. Barges can berth at the rear of the upper face. In 1973, construction was underway for an additional 525 feet of berthing space. About a mile above the oil wharf, the large Shell Oil chemical plant has a barge wharf.

The **Bonnet Carre Floodway** is on the N side of the river 28.7 miles (ACS). When the spillway is in operation due to high stages of the river, all vessels and particularly heavily loaded tows passing the site are directed to steer a course sufficiently close to the S bank to avoid possible cross currents or draw resulting from water being diverted through the spillway and flowing toward and into Lake Pontchartrain.

A cargo transfer anchorage is on the N side of the river near the Bonnet Carre Floodway. (See 110.195, chapter 2, for limits and regulations.)

**Taft,** on the S side of the river about 28 miles (ACS), is the site of the Union Carbide Corp. petrochemical wharf. The wharf has facilities for loading and unloading liquid chemicals to and from tankers and barges. About 1 mile W of the Union Carbide wharf is the Hooker Chemical Corp. liquid and bulk handling wharf.

Two overhead power cables about 0.5 mile apart cross the river just below Montz about 29.6 miles (ACS). The minimum clearance of the cables is 160 feet.

**Laplace,** on the N side of the river 34 miles (ACS), is a truck-farming center and prosperous sugar section. About 1.3 miles above Laplace on the N side at 35.3 miles (ACS) is the large DuPont refinery and chemical plant. A 300-foot barge wharf at the plant has pipelines for handling liquid chemicals. The cracking towers and tanks at the refinery and chemical plant are prominent.

**Edgard,** on the S side of the river about 37.4 miles (ACS), has a large brick church with twin towers and a tank, and about 0.7 mile W is a large sugarmill with a tall white stack.

**Reserve,** 38 Miles (ACS), has a large sugar refinery with two tall stacks, and a grain elevator. The town is the trading center and shipping point for a very productive sugarcane region. A wharf at the sugar refinery has 767 feet of berthing space with 40 feet reported alongside. A conveyor loading system at the wharf can load sugar into vessels at a rate of 400 tons per hour. The grain elevator wharf has 800 feet of berthing space with 40 feet reported alongside. The 4-million-bushel grain elevator has a conveyor loading system at the wharf which can load vessels at a rate of 60,000 bushels per hour. A ferry crosses the river from Reserve to Edgard.

A tank is prominent in **Garyville,** 42.4 miles (ACS).

**Gramercy,** 45 miles (ACS), has a large aluminum reduction and chemical plant and a sugar refinery. An ore-handling wharf at the aluminum reduction and chemical plant has 600 feet of ship berthing space with 45 feet reported alongside. Bulk bauxite and fluorspar ore can be unloaded at a rate of 1,300 tons per hour. A wharf at the sugar refinery has 330 feet of berthing space with 40 feet reported alongside. The unloading gantries on the ore wharf, a tall stack at the mill, and two tanks are prominent.

**Lutcher,** 46 miles (ACS), has a lumber mill and a factory for processing perique tobacco. A vehicular ferry crosses the river from Lutcher to Cresent Landing.

**Vacherie,** on the S side of the river 48 miles (ACS), has a sugarmill with four stacks and a water tank. An oil-loading berth operated by the Continental Oil Co. is W of Vacherie at 48.6 miles (ACS).

**College Point,** 53.2 miles (ACS), is the site of Jefferson College. A bulletin board and a river gage are at 54.1 miles (ACS) on the E side. A large sugarmill with a tall stack is across the river.

A temporary anchorage has been designated near Reserve, La., in an area approximately 3,696 feet long, extending from mile 54.0 (ACS) to mile 54.7 (ACS), bounded by the mean low water mark on the right descending bank and a line 800 feet channelward therefrom.

At **Uncle Sam,** on the E side 57.0 miles (ACS), a wharf for handling bulk and liquid cargo is operated by the Freeport Chemical Co. The wharf has 625 feet of berthing space with 35 feet reported alongside.

At **Lauderdale,** on the W side 61.3 miles (ACS), the Shell Oil Co. has a floating wharf used for handling crude oil.

**Sunshine Bridge,** a fixed cantilever bridge with a clearance of 133 feet crosses the river just below Union about 63 miles (ACS). The lower limit of the Port of Baton Rouge is about 0.7 mile above the bridge. The Texaco Oil Co. has a refinery and a wharf on the E side of the river 63.7 miles (ACS).

**Burnside,** on the E side of the river 65 miles (ACS), has a bulk-handling terminal owned by the Greater Baton Rouge Port Commission and operated by Olin Mathieson Chemical Corp., and a liquid chemical-handling barge wharf operated by E. I. dupont de Nemours and Co. The bulk-handling terminal's main deepwater wharf has 858 feet of ship berthing space with 60 feet reported alongside. A 190-foot barge wharf, just N of the ship wharf, has 2,575 feet of berthing space with dolphins with 12 feet reported alongside. The ship wharf has two unloader gantries, each with a capacity of 1,000 tons per hour, and a vessel-barge loader with a capacity of 1,500 tons per hour. Loading spouts at the barge wharf have a capacity of 1,500 tons per hour. Bulk material handled at the terminal include bauxite, alumina, raw sugar, coal, phosphate, iron ore, manganese and chrome ores, zinc, salt, and coke. Liquid caustic soda is transferred by pipeline from barges to storage tanks at rear of ship wharf. A tug is available for docking and undocking vessels.

**Donaldsonville,** on the S side of the river 70 miles (ACS), is a town at the former junction of the river and Bayou Lafourche. A vehicular ferry crosses the river to Darrow about 69.9 miles (ACS). Just S of the ferry landing is a barge where boats may tie up to take on fuel and provisions, which are trucked in. A river gage is at Donaldsonville just above the ferry landing. A rice mill is in the town. A church with twin spires and a tank are prominent.

**Geismar,** on the N side of the river 78 miles (ACS), has several chemical plants with wharves for handling liquid chemicals, and two petroleum wharves used to receive petroleum products and ship petrochemicals. The petroleum wharf, operated by the Shell Oil Co. 76.8 miles (ACS), has 940 feet of berthing space at the face with dolphins with 38 feet reported alongside and 450 feet of berthing space at rear of face with 34 feet reported alongside. Pipelines at the wharf lead to storage tanks. The Wyandotte Chemical Corp. Wharf, 77.4 miles (ACS), has 615 feet of berthing space with dolphins with 50 feet reported alongside. The petroleum barge wharf, operated by the Mobil Oil Co. 79.2 miles (ACS), has a 225-foot face with 10 to 20 feet reported alongside. The wharf has facilities for loading barges with gasoline and liquid propane gas. The Allied Chemical Corp. Ship and Barge Wharf, 80.1 miles (ACS), has 1,175 feet of ship berthing space at the face with 50 feet reported alongside and 700 feet of barge berthing space at rear of face with 10 to 15 feet reported alongside. Pipelines and bulk material handling equipment at the wharf are used for handling receipts of phosphate, fluorspar, and dry and liquid sulfur, and for loading shipments of liquid fertilizer, ammonia, and petrochemicals. The industrial chemical handling wharf, operated by Marbon Chemical, Division of Borg-Warner Corp. 80.9 miles (ACS), has 360 feet of berthing space with dolphins with 45 feet reported alongside. Pipelines lead from the wharf to storage tanks at plant in rear.

The **White Castle** ferry crosses the river to **Carville** about 83.7 miles (ACS). The U.S. Public Health Service Leper Colony and hospital are on the N side of the river at Carville.

**St. Gabriel,** on the E side 92 miles (ACS), has a chemical plant with a large wharf used for receipt of bulk salt and shipment of chlorine and caustic soda and a small floating petroleum wharf used for receipt of crude oil by barge. The chemical wharf, operated by Stauffer Chemical Co. 91.3 miles (ACS), has 1,225 feet of berthing space with dolphins with 35 feet reported alongside.

The Willow Glen powerplant is at **Sunshine,** on the N side of the river 92.5 miles (ACS).

**Plaquemine,** on the W side of the river about 99 miles (ACS), is at the junction of the Mississippi and Bayou Plaquemine. A vehicular ferry crosses the river just below Plaquemine. The town has a foundry, and several sugarmills are in the vicinity. A petrochemical wharf is operated by Hercules, Inc., on the W side 95.6 miles (ACS). The wharf has 700 feet of berthing space with dolphins with 60 feet reported alongside. Dow Chemical Co. has a large chemical plant and wharf on the W side about 100 miles (ACS). The wharf has 730 feet of berthing space with dolphins with 35 to 40 feet reported alongside. Pipelines at the wharf lead to bulk liquid storage tanks at the plant.

An overhead power cable crossing the river at Lukeville, 112.2 miles (ACS), has a clearance of 150 feet.

**Chart 11370 (650-SC).-Baton Rouge,** the capital of Louisiana on the E side of the river 117 miles above Canal Street, New Orleans, is a river port of considerable importance. The **Port of Baton Rouge** limits extend from Union, 63.7 miles (ACS), to Point Menoir, 139.2 miles (ACS). The Greater Baton Rouge Port Commission owns and controls the public port facilities which include the Bulk Marine Terminal at Burnside, the grain elevator and general cargo terminal on the W side of the river at Port Allen, and the Port of Baton Rouge Terminal at the head of **Baton Rouge Harbor** on the E side of the river about 6.5 miles above Baton Rouge.

The principal industries in the city are petrochemical and petroleum, synthetic rubber, chemical, lumber and wood products, stone, gravel, clay, and cement, steel fabricating, aluminum, food and staples, machinery, and transportation equipment. The principal shipments from the port include wheat, corn, sorghum, soybeans, animal feeds, petroleum, products, scrap iron, aluminum, lumber, steel products, rubber, chemicals, and sulphuric acids. The principal receipts are sugar, molasses, coffee, vegetable oil, iron, manganese, chrome, and zinc ores, bauxite, phosphate rock, caustic soda, sulfur, sodium hydroxide, alcohol, sulfuric acid, and newsprint.

At **Port Allen,** the N end of the Intracoastal Waterway (Port Allen to Morgan City Alternate Route) connects with the Mississippi River at Port Allen Lock about 115.8 miles (ACS). (See chapter 12.) Baton Rouge is the site of Louisiana State University and is the cultural center of the State.

**Prominent features.**-The most conspicuous object in the city is the State Capitol Building, a 455-foot white structure that dominates the area. Several tall buildings and the State University and stadium are prominent. The Interstate Route 10 fixed highway bridge, with a clearance of 135 feet at the center and 125 feet elsewhere, crosses the river between Baton Rouge and Port Allen about 116.6 miles (ACS).

**Channels.**-Federal project depth for the river is 40 feet to 119.5 miles (ACS), about 1.3 miles below the highway-railroad bridge, thence 12 feet to Cairo, Ill., about 640 miles above Baton Rouge. In 1972, project depths were available to 196 miles (ACS), about 79 miles above Baton Rouge, thence 9 feet to Cairo. Federal project depth for the Baton Rouge Harbor is 12 feet for 2.5 miles. The channels are maintained and well marked.

**Anchorages.**-Limits and regulations for the anchorage areas at Baton Rouge are given in 110.195, chapter 2. Temporary anchorage for vessels awaiting berths are prescribed by the District Commander, U.S. Coast Guard.

**Bridges.**-Besides the Interstate Route 10 fixed highway bridge crossing the river between Baton Rouge and Port Allen, the combination Airline Highway (U.S. Route 190) and Kansas City Southern Railroad bridge crosses the river 120.7 miles (ACS), about 4 miles above Baton Rouge. The bridge, known as the Baton Rouge Railroad and Highway Bridge, has a 748-foot fixed span over the channel with a clearance of 65 feet. This bridge is the limit of deepwater navigation on the river.

**Cables.**-An overhead power cable, with a clearance of 150 feet, crosses the river about 119.7 miles (ACS).

**Tides and currents.**-The mean range of tide at Baton Rouge at low river stage is 0.2 feet. Tidal effects are felt in the river to some extent to 148 miles (ACS), about 31 miles above Baton Rouge. The highest stage of the river ever recorded was 47 feet in 1927. A bulletin board showing the river stage and a river gage are on the W side of the river at the entrance to Port Allen Lock.

**Pilotage** is compulsory on the river between Baton Rouge and the Gulf of Mexico. (See Pilotage information at the beginning of this chapter.)

**Towage.**-Tugs up to 1,800 hp are available at Baton Rouge, Gramercy, and Burnside to assist during docking.

Baton Rouge is a **customs port of entry.** Quarantine officials are stationed in New Orleans, and **immigration** and **agricultural quarantine** officials are stationed in Baton Rouge. (See appendix for addresses.) Vessels subject to such inspections generally make arrangements in advance through ships' agents.

**Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

The U.S. Public Health Service maintains a **contract physician's office** in Baton Rouge. A general hospital and several private hospitals are in the city.

The Coast Guard maintains a **vessel documentation office** in Baton Rouge. (See appendix for address.)

**Harbor regulations.**-Federal regulations for the navigation of the Mississippi River are given in 207.200, chapter 2. The Greater Baton Rouge Port Commission, consisting of members appointed by the governor of the State, establishes rules and regulations for the Port of Baton Rouge. The Executive Director of the commission is the Port Director who is in charge of the management and operation of the port facilities under control of the commission, and the Superintendent of Operations assigns berths at the various public terminals.

**Wharves.**-The Port of Baton Rouge has over 20 piers and wharves located on both sides of the Mississippi River and in Baton Rouge Harbor. More than half of these facilities are for barges with depths less than 15 feet alongside. Only the deep-draft facilities and the larger barge facilities are described. (For a complete description of the port facilities, refer to the Port Series, a Corps of Engineers publication.) The alongside depths are reported; for information of the latest depths contact port authorities or the private operators. All the facilities described have direct highway and 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. Cranes up to 150 tons, warehouses, and open storage facilities are adjacent to the waterfront.

**Facilities on the E side of the river:**

Humble Oil and Refining Co. Wharf: about 1.5 miles below Baton Rouge Railroad and State Route 190 highway bridge; 2,760-foot face, 40 feet alongside; 1,250 feet of barge berthing space at rear of face, 12 feet alongside; deck height, 50 feet; a ballast line, a steam line, compressed air lines, high-pressure river water lines, and drain lines are at the wharf; receipt and shipment of petroleum products; shipment of petrochemicals; bunkering tankers berthed at wharf; loading barges for fueling tugs in midstream; operated by Humble Oil and Refining Co.

Solvay Process Wharf: about 0.8 mile below Baton Rouge Railroad and State Route 190 highway bridge; floating offshore wharf; 315-foot face, 35 feet alongside; 155 feet of berthing space at rear of face, 10 feet alongside; deck height, 6 feet; one 36-inch, electric, belt-conveyor system extends from chemical plant to wharf; pipelines leading from wharf connect with storage tanks in rear; receipt of caustic liquids; shipment of liquid and dry chemicals; owned and operated by Allied Chemical Corp., Industrial Chemicals Division.

Kaiser Aluminum and Chemical Corp. Wharf: about 400 feet below Baton Rouge Railroad and State Route 190 highway bridge; 809 feet of berthing space with dolphins; 40 feet alongside; deck height, 47 feet; two electric, traveling unloading towers on wharf serve a 54-inch, covered, electric, belt-conveyor system having an unloading rate of 800 tons per hour; one electric, traveling loading tower on wharf served by a 42-inch, covered, electric, belt-conveyor system with a loading rate of 1,000 tons per hour; one 13-ton electric crane on unloading tower; one 6-inch, steam-traced pipeline extends from wharf to two steel storage tanks; receipt of bauxite by vessel, and shell and liquid caustic soda by barge; shipment of alumina and plant equipment by vessel and barge; owned and operated by Kaiser Aluminum and Chemical Corp.

Ideal Cement Co. Wharf: about 500 feet above Baton Rouge Railroad and State Route 190 highway bridge; 464-foot face; 10 feet alongside; deck height, 50 feet; one 10-ton, electric, fixed, hammerhead crane serves a 30-inch, electric, belt-conveyor system having an unloading rate of 200 tons per hour; one 12-inch cement loading pipeline extends from storage silos at plant; open storage area in rear for 100,000 tons of shell and 46,000 tons of other bulk materials; receipt of shell; shipment of bulk cement by barge; owned and operated by Ideal Cement Co., Division of Ideal Basic Industries, Inc.

**Facilities on Baton Rouge Harbor:**

Greater Baton Rouge Port Commission, Baton Rouge Harbor Barge Terminal Pier: head of Baton Rouge Harbor, about 2.1 miles above entrance; 90-foot face, 399-foot E side, 430-foot W side; 12 feet alongside; deck height, 47 feet at face and on E side, 50 feet on W side; mobile cranes up to 30 tons; open storage area available on pier approach and in rear; receipt and shipment of general cargo by barge; owned and operated by Greater Baton Rouge Port Commission.

**Facilities on W side of river at Port Allen:**

Greater Baton Rouge Port Commission, Dock No. 2: about 400 feet above Interstate Route 10 highway bridge; marginal wharf, 931-foot face; 50 feet alongside; deck height, 50 feet; 84,000 square feet of covered storage; receipt and shipment of general cargo; owned and operated by Greater Baton Rouge Port Commission.

Greater Baton Rouge Port Commission, Dock No. 1: adjacent to lower side of Interstate Route 10 highway bridge; marginal wharf, 1,358-foot face; 50 feet alongside; 400 feet of barge berthing space at rear of face on lower end; deck height, 50 feet; 110,000 square feet of covered storage; commodity warehouse in rear of wharf with 75,000 square feet of storage space; 30-ton portable

gantry crane; portable bagging machine in transit shed; pipelines extend from wharf to molasses storage tanks having a capacity of 11-million gallons; receipt and shipment of general cargo; shipment of scrap metal; receipt and shipment of molasses; owned and operated by Greater Baton Rouge Port Commission.

Greater Baton Rouge Port Commission, Grain Wharf: about 0.3 mile below Interstate Route 10 highway bridge; 510 feet of berthing space with dolphins at face and same at rear of face; 40 feet alongside; deck height, 115 feet; five vessel-loading spouts along face having a combined loading rate of 60,000 bushels per hour; two marine legs at rear of face having a combined unloading rate of 30,000 bushels per hour; grain elevators having a storage capacity of over 7 million bushels; receipt of grain by barge; shipment of grain by vessel; owned by Greater Baton Rouge Port Commission, and operated by Cargill, Inc.

**Supplies.**-Gasoline, diesel fuel, diesel oil, bunker fuels, provisions, and marine supplies are available. Vessels can receive bunker fuel from tank barges while alongside the wharves or at the Humble Oil and Refining Co. Wharf, about 1.5 miles below the Baton Rouge Railroad and State Route 190 highway bridge. Water is piped to the wharves.

**Repairs.**-Baton Rouge has no facilities for making major repairs or for drydocking large, deep-draft vessels; the nearest facilities are at New Orleans. Several above-the-waterline repair wharves are equipped to make repairs to tugs, fishing boats, barges, and other small vessels. Above-the-waterline hull and engine repairs can be made. Cargo hold cleaning, gas freeing, and tank cleaning facilities are available in the port.

A shipyard on the Port Allen Canal, about 8 miles above its junction with the Mississippi River, has two floating drydocks; the largest drydock can handle vessels up to 2,500 tons.

**Small-craft facilities** are limited to temporary berthage at some of the barge docks and floating docks along the river bank.

**Communications.**-The port is served by the numerous steamship lines to all domestic and overseas ports of the Caribbean, West Indies, Central and South America, Europe, Africa, and the Far East. Three main line railroads offer direct service to the port and a fourth by reciprocal switching. The Illinois Central, the Kansas City Southern, Missouri Pacific, and the Texas and Pacific Railroads serve the area. Numerous truck lines serve the port. Local and interstate bus service is available. Several airlines offer service at the Ryan Airport about 5 miles N of the city.

Above Baton Rouge, a depth of 9 feet is available in the Mississippi River and the Illinois Waterway to Chicago and Lake Michigan, 1,228 miles from Canal Street (New Orleans). Limiting clearances of the Illinois Waterway are: bridges; 75 feet wide, 17 feet high; locks; 110 feet wide, 600 feet long.

Navigation maps of the Mississippi River and its tributaries are published by the Corps of Engineers. (See appendix.)

**Chart 11354 (880-SC).-Old River,** about 64 miles above Baton Rouge and 181 miles above Canal Street, New Orleans, is a 6-mile-long stream that formerly connected the Mississippi River with the Red and Atchafalaya Rivers. In 1963, a dam was constructed about a mile from its E entrance to prevent the Mississippi from flowing uncontrolled into the Atchafalaya Basin. An outflow channel with a control structure was built on the W side of the Mississippi about 11 miles upriver to regulate and control the flow into the Red River.

**Old River Navigation Canal and Lock** was built to bypass the dam and permit navigation between the three rivers. The Federal project provides for a dredged channel 12 feet deep and about 2 miles long from the Mississippi to Old River about 1.4 miles W of the dam, thence 12 feet to the junction at Barbre Landing with the Red and Atchafalaya Rivers at A.R. Mile 0.0. The lock is 1,200 feet long (1,190 feet usable), 75 feet wide, and 11 feet over the sill. State Route 15 highway vertical lift bridge over the lock has a clearance of zero feet down and 53 feet up.

**Atchafalaya River** flows S into the Gulf of Mexico from its confluence with Red and Old Rivers. The 101.5-mile section, the confluence to Morgan City, has a Federal project depth of 12 feet. In 1972, the deepest draft carried on the river was 12 feet, and with average drafts between 5 and 6 feet. There is considerable commerce on the river in shell, logs, sand and gravel, petroleum products, liquid sulfur, alcohol, industrial chemicals, fertilizer, sugar, and molasses.

The minimum clearance of the overhead power cables and pipelines is 51 feet. The minimum clearance of the drawbridges crossing the river is 3 feet. The minimum clearance of the fixed highway bridges is 40 feet.

# 9. MISSISSIPPI RIVER TO SABINE PASS

This chapter describes the coast of Louisiana from the delta of the Mississippi River to Sabine Pass, Tex. Also discussed are Barataria, Timbalier, Terrebonne, Atchafalaya, East and West Cote Blanche, and Vermilion Bays, and the interconnecting rivers and bayous which form a network of waterways in this section of Louisiana. The deep-water port of Lake Charles as well as many smaller ports and cities are described.

**Chart 11340 (1116).**-From the delta of the Mississippi River to Sabine Pass, a distance of 250 miles, the coast has a general W trend with several deep indentations or bays somewhat separated from the Gulf by chains of long narrow islands. It is characterized by a fringe of low sandy beaches backed for many miles by vast streches of marshy ground.

The off-lying water is shoal for long distances from the beach and, except for the first 50 miles W of Southwest Pass, the 10-fathom curve is 25 to 40 miles offshore. Numerous shallow areas, irregular in outline and well out of sight of land, are serious menaces to navigation of vessels of even moderate draft.

With the exception of Barataria Pass, the numerous shallow passes E of Atchafalaya Bay are dangerous to enter except during fair weather. The channels change frequently because of storms, and local knowledge is generally necessary.

Calcasieu Pass is the first and only deep-draft channel from the Mississippi River W to Sabine Pass. An extensive network of bayous and canals with depths of 2 to 9 feet covers the country up to about 75 miles back from the coast. The waterways from Empire and Venice to the Gulf are the only canals entering the Mississippi between New Orleans and Southwest Pass.

The low swampy coastal country is but sparsely settled and is frequented principally by fishermen and muskrat trappers. Through the canals and bayous the bottom is deep mud, usually so soft that it is often possible to push through with drafts of about 1 foot in excess of the depths.

Between Atchafalaya Bay and Vermilion River are several mounds, or islands, from which commercial salt is produced.

Extensive oil exploration is going on along the coast, inland in the lakes and swamps as well as to seaward. The offshore development is expanding rapidly. The offshore derricks and structures are required to be well marked and lighted. They extend up to 125 miles offshore.

Inside the 100-fathom curve from Southwest Pass to Sabine Pass the currents sets W with an average velocity of about 0.2 knot. A clockwise eddy having a velocity of about 0.2 knot covers most of the bay formed by the curving coastline between Southwest Pass and Timbalier Bay.

**Charts 11364 (1271), 11361 (1272), 11358 (1273).**-From Southwest Pass to Barataria Pass, at the entrance of Barataria Bay, the shoreline is broken by numerous small passes and shallow bays, frequented only by small craft and shallow-draft vessels, and never approached by seagoing vessels.

**Grand Pass,** 10 miles N of Southwest Pass, permits craft drawing up to 4 feet to proceed from West Bay via The Jump (see chapter 8) and Ostrica Canal (see chapter 7) to Quarantine Bay and Breton Sound.

**Buras,** a town on the Mississippi River 21.5 miles above Head of Passes, has several stores where gasoline, diesel fuel, provisions, and some supplies are available. Numerous fishing boats operate in the waters to the W of the river. Rail, highway, and bus communications extend to New Orleans.

**Scofield Bayou,** about 23 miles N of Southwest Pass, provides an entrance from the Gulf to the lakes and bayous to the S of and through the Fasterling Canal to Buras. An entrance channel was dredged in 1957. A schooner wreck is just W of the channel. Local knowledge is required.

**Empire** is a small town on Doullut Canal and Empire Waterway, about 3.5 miles NW of Buras and 25.6 miles above Head of Passes. There are a number of bases for the offshore oil wells in the vicinity. A water tank and a church spire N of the lock and a microwave tower S of it are prominent. Empire has several marinas. Berths, gasoline, diesel fuel, marine supplies, and launching ramps are available. A State-owned 50-ton mobile hoist is available to handle vessels for hull and engine repairs.

The State-owned Empire Waterway Lock through the Mississippi River levee at Empire is 197 feet long and 40 feet wide, and has a depth of 10 feet over the sill.

The **Empire Waterway** provides for a passage from the Mississippi River at Empire to the Gulf of Mexico. The waterway leads from the W end of **Doullut Canal,** which extends W from Empire Lock to **Adams Bay,** thence through a marked dredged bypass channel in the NE part of Adams Bay, thence through **Bayou Long** and **Bayou Fontanelle,** and thence through a cut in Pelican Island to the Gulf. Formerly, passage could be made directly from Doullut Canal to Bayou Long, but because of floodgates being under construction in 1973 across Bayou Long, about 1 mile below Doul-

lut Canal, the bypass channel in Adams Bay is now used. Controlling depths in the Empire Waterway were: in January 1974, 7 feet in Doullut Canal, thence 8 feet in the bypass channel in Adams Bay, thence 9 feet through Bayou Long and Bayou Fontanelle, thence 12 feet over the bar at the Gulf entrance. Stone jetties protect the Gulf entrance. The approach to the Gulf entrance is marked by a lighted bell buoy and the entrance off the jetties by a light and buoy.

**Vessels should approach the Empire Waterway from the Gulf through the Empire Safety Fairway.** (See 209.135, chapter 2.)

Doullut Canal is crossed by a railroad swing bridge with a 41-foot span and a clearance of 1 foot about 0.1 mile W of its E entrance, and by a highway bascule bridge with a clearance of 3 feet immediately W of the railroad bridge. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) In 1972, a fixed highway bridge with a design clearance of 53 feet or 55 feet for a midwidth of 100 feet was under construction across the canal about 0.4 mile W of the highway bascule bridge.

Considerable commerce in seafood, shell, petroleum products, oil well supplies, clay, drilling mud, and industrial chemicals moves on the waterway between the Gulf and Mississippi River.

The waterway, in conjunction with the Ostrica Canal, offers a water route for craft across the Mississippi Delta between Barataria Bay and Breton Sound.

Another route to the Gulf from Doullut Canal with depths of about 3 feet is across Adams Bay, which is usually marked by stakes, thence through **Meyers Canal** and **Grand Bayou.** Somewhat less draft can be carried via Bayou Cook and Bastian Bay. Barataria Bay, W of Adams Bay, can also be reached from Doullut Canal by following Grand Bayou N to its junction with the Freeport Sulphur Company Canal, which connects with Lake Grande Ecaille, and then with Barataria Bay. Depths of about 3 feet can be carried to Barataria Bay.

**Port Sulphur** is a small town about 11 miles above Buras on the W bank of the river. **Freeport Sulphur Company Canal** extends from the river levee to **Lake Grande Ecaille,** a distance of about 8 miles. Craft drawing up to 3 feet can pass through the lake into Barataria Bay and adjacent waters, but there is no connection with the Mississippi River.

Several other canals, having depths of about 3 feet, lead from behind the levees to adjacent waters and to the canneries and the highway on each side of the river, but do not connect with the river. **Socola Canal** at **Fosters Canal (City Price)** (chart 11364 (1271)) leads to Grand Bayou, and thence either to the Gulf or to Barataria Bay. **Wilkinson Canal** at **Myrtle Grove** (chart 11364 (1271)) leads to Barataria Bay.

**Vessels should approach Bastian Bay and Grand Bayou from the Gulf through Grand Bayou Pass Safety Fairway.** (See 209.135, chapter 2.)

**Bastian Bay,** 26 miles NW of Southwest Pass, is 1 to 3 feet deep. The bay is separated from the Gulf by **Bastian Island. Bastian Pass,** E of the island, is not navigable. **Grand Bayou Pass,** W of the island, is the main entrance to Bastian Bay and also to Grand Bayou. Controlling depth in the dredged channel over the bar in the pass was 6 feet in 1961.

**Grand Bayou,** is used considerably by local fishing boats. On a favorable tide, about 3 feet can be carried through Grand Bayou and Meyers Canal and thence across Adams Bay to the Doullut Canal connecting with the Mississippi River at Empire, a distance of 9 miles. A depth of 3 feet can be carried to the canals along the E side of Adams Bay NW of Empire which lead to the river levee and the New Orleans-Buras Highway. This depth likewise can be taken to Barataria Bay via the Freeport Sulphur Company Canal and Lake Grande Ecaille.

**Bayou Cook,** emptying into the N end of Bastian Bay, leads to Adams Bay and thence through Doullut Canal, which connects with the Mississippi River. The shallow depths across the S portion of Bastian Bay limit this route to about 2 feet on a favorable tide.

**Chaland Pass** is a shallow, unfrequented pass 3 miles W of Bastian Bay.

**Quatre Bayous Pass,** 5.5 miles E of Barataria Bay Light, is the approach to **Bay Ronquille, Cat Bay,** and **Lake Grande Ecaille.** The approach is marked by a lighted buoy and the W side of the entrance to the pass by a light. This pass, Grand Bayou Pass to Grand Bayou, and the pass to the Empire Waterway are the only passes E of Barataria Bay used extensively by local fishermen. Bay Ronquille is separated from Cat Bay by a group of islands through which is a pass known as **Four Bayous Cutoff** about 1.3 miles NW of the light at the entrance. A light is on the W side at the N end of the cutoff. Bay Ronquille and Cat Bay are shallow. On a favorable tide, a depth of about 3 feet can be carried to Barataria Bay through Four Bayous Cutoff and Cat Bay. This same depth can also be taken across Bay Ronquille to Lake Grande Ecaille and thence to the Freeport Sulphur Company Canal which leads to the Mississippi River via the Doullut Canal.

To enter Quatre Bayous Pass, approach the light from SE. Barataria Bay is entered by passing close E of the light and following the SW shore of Bay Ronquille for 1.3 miles to Four Bayous Cutoff. Go through this cutoff into Cat Bay, leaving the light and some small reefs to W. The passage from Cat Bay into Barataria Bay is about 0.7 mile NW of the cutoff light. The **tidal currents** in Quatre Bayous Pass average 1.3 knots and in Pass Abel average 0.9 knot on the flood and 1.6 knots on the ebb.

**Barataria Bay,** is a large marsh-fringed, shallow lake, separated from the Gulf by two low, narrow sand islands known as **Grand Terre Islands.** The bay has general depths of 4 to 6 feet and is frequented chiefly by oilmen, fishermen, and oystermen, who use launches of 3 to 4 feet in draft. Except for fishing camps, the only settlement on the bay is Grand Isle.

**Charts 11358 (1273), 11352 (1050), 11367 (878-SC).-Barataria Waterway,** extends in a N direction from the Gulf for about 34 miles through Barataria Bay to an intersection with the Intracoastal Waterway at the towns of Barataria and Lafitte.

**Vessels should approach Barataria Waterway and Bay through Barataria Pass Safety Fairway.** (See 209.135, chapter 2.)

**Channels.**-A dredged channel leads across the bar at Barataria Pass into Barataria Bay, thence in landcuts through Beauregard, Mendicant and other islands on the W side of Barataria Bay, thence through **Mud Lake, Bayou St. Denis,** and **Bayou Cutler,** thence through a landcut known as **Dupre Cutoff,** and thence through **Bayou Dupont,** and **Bayou Barataria,** to the Intracoastal Waterway. In November 1974, 14 feet was available across the bar, thence 9 feet to the junction with the Intracoastal Waterway.

**Barataria Pass** is the main entrance to Barataria Bay. It is marked on the E side by **Barataria Bay Light** (29°16.4'N., 89°56.7'W.), 65 feet above the water, and shown from a white skeleton tower with a red triangular daymark on the parapet of Fort Livingston on the E side of the entrance.

Oil derricks are conspicuous in the general vicinity of Barataria Pass, in 5 to 10 fathoms of water. A lighted bell buoy, 3 miles SE of the light, marks the approach to the dredged channel across the bar.

In 1968, a fishing boat reported striking an unidentified submerged object SE of the sea buoy in about 29°14'N., 89°54'W. A large submerged object, covered from 4 to 5 feet, was also reported about 0.5 mile west of the sea buoy; in 1969, however, a search of the area failed to reveal its existence. Mariners are advised to exercise extreme caution in this area and the surrounding area.

A stone jetty extends 200 yards SE from the E tip of Grand Isle and is marked on the end by a light. To carry the best water into Barataria Bay, proceed through the dredged channel and follow the aids into Barataria Pass.

Hard sandbars with from 2 to 5 feet over them extend for about a mile offshore on each side of the channel. The bar off the entrance channel shows in extremely heavy winds. Inside the bar, depths up to 12 feet extend N as far as **Independence Island.** The tidal currents in Barataria Pass average about 1.4 knots.

**Bayou Rigaud,** on the N side of Grand Isle, is the approach to the town of Grand Isle, 4 miles W of Barataria Pass. A dredged channel leads SW from just inside the pass for about 3.7 miles through **Bayou Fifi** and Bayou Rigaud to a turning basin at an oil company's dock. In November 1974, the controlling depth was 10 feet for 2.7 miles, thence 5 feet to the turning basin. Lights and buoys mark the channel.

A privately marked channel leads N through Barataria Bay, between Queen Bess Island and Independence Island, and W of the light marking Shell Reef. This channel had a reported controlling depth of about 6 feet in August 1972. Another privately marked channel leads across Barataria Bay from the Freeport Sulphur Company Canal to Bayou St. Denis.

Former routes N through **Grand Bayou, Little Lake, Turtle Bay, Harvey Cutoff** and **Bayou Rigolettes** (see chart 11352 (1050)) are little used as shoaling has occurred. The S entrance to Grand Bayou is marked by a light on the E side of the entrance. Both Grand Bayou and Bayou St. Denis lead into Little Lake with depths of about 3 feet. This depth can also be carried across the lake.

Passage to the E is possible from the junction of Dupre Cutoff Canal with Bayou Cutler across **Round Lake** and **Lake Laurier** into **Lake Hermitage.** Local knowledge is advised.

**Wilkinson Canal** enters Barataria Bay about 1.5 miles E of Bayou St. Denis. The canal, 11 miles long, leads to Myrtle Grove on the Mississippi River, but does not enter the river. The canal depth is about 3 feet. Other similar canals N of Port Sulphur can be reached via Grand Bayou.

From Barataria Bay the islands separating the bays from the Gulf, as well as the entrance channels between the islands, are undergoing continual changes. There are few aids to navigation, and local knowledge is necessary.

Considerable commerce moves on Barataria Waterway in seafood, shell, lumber and piles, clays and drilling mud, liquid sulfur, oil well pipe and supplies, petroleum products, cement, sand and gravel, and machinery.

**Grand Isle,** the only town on Barataria Bay, is in the center of a long, narrow island of the same name. Its residents, most of whom speak French, either work for the oil industry or engage in fishing. A Coast Guard station is on the NE corner of the island. **Storm warning signals are displayed.** (See chart.) Several oil companies have marine repair bases at which oil well structures and barges are built or repaired, a shipyard, and several service wharves. Many shrimp, oil well supply, and crewboats operate from Grand Isle. There is a 20-ton mobile hoist at the shipyard that can handle craft up to 55 feet for hull and engine repairs. Berths, electricity, gasoline, water, ice, and marine supplies are available at a marina near the bridge. These facilities are on Bayou Rigaud.

The U.S. Public Health Service maintains a **contract physican's office** in Grand Isle. (See appendix for address.)

A paved highway connects Grand Isle with the main coastal road and New Orleans via Bayou Lafourche. The local heliport is owned by an oil company. Passengers are transported to New Orleans, the offshore oil wells, or nearby oil company bases.

**Pilots.**-There are no licensed pilots at Grand Isle, but local fishermen may be engaged as guides for fishing and hunting parties. Charter boat captains act as pilots on request.

**Note.**-In the Barataria Bay area the name Grand Bayou appears on two bodies of water. The first is to the W of Bastian Bay, and the second is off the NW side of Barataria Bay.

**Lafitte,** along the E bank of the waterway about 29 miles above the entrance at the junction of Bayous Rigolettes, Dupont, and Barataria, is a small settlement which borders the waterway for about 6 miles. Several small marinas and an oil company supply base and wharf are at Lafitte. Berths, gasoline, and diesel fuel are available. A paved highway along the E bank of the waterway connects with Lafitte, Crown Point, and New Orleans.

**Bayou des Oies,** locally known as **Goose Bayou,** enters Barataria Waterway about 3.5 miles S of Lafitte. State Route 45 highway bridge crossing the entrance to Bayou des Oies has a 45-foot fixed span with a clearance of 10 feet. A large marina at the bridge and in a slip close E of the bridge has a marine lift that can handle craft up to 35 feet for hull and engine repairs, or storage. Berths, electricity, gasoline, diesel fuel, water, and marine supplies are available at the marina.

Oil and gas terminals, shrimp docks, and service wharves are on both banks of the waterways between Lafitte Village and the head of the waterway at its junction with the Intracoastal Waterway and Bayou Villars.

There are several shipyards that build commercial vessels and repair commercial and pleasure craft along the E bank of the waterway at Lafitte. Boats up to about 80 feet are hauled out using marine railways or a marine lift for general repairs. Machine, wood and metal shops, and welding equipment are available. A boatyard at Jones Point, where the Barataria Waterway joins the Intracoastal Waterway, has a floating drydock that can lift out boats up to 100 feet long, 500-ton displacement, and 7-foot draft for general repairs.

**Barataria,** on the W bank, and **Lafitte,** on the E bank, are fishing and agricultural communities at the head of Barataria Waterway. A highway bridge crossing the waterway between Lafitte and Barataria has a swing span with a clearance of 7 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) There are shrimp and oil company docks and service wharves. Gasoline, diesel fuel, water, ice, marine supplies, and berthage are available at the shipyard and at the service wharves.

**Bay des Ilettes, Bay Joyeux, Bay Tambour,** and **Caminada Bay** are on the W side of Barataria Bay from which they are partially separated by low, marshy islands. These are shallow bodies of water 2 to 4 feet in depth and of the same characteristics as Barataria Bay. These bays provide approaches to the Southwestern Louisiana Canal, which connects Barataria Bay with Bayou Lafourche and Timbalier Bay. The channel through the bays is marked by privately maintained buoys.

**Caminada Pass,** about 7 miles SW of Barataria Bay, connects Caminada Bay with the Gulf. The pass is little used, as every storm shifts the entrance channel. Usually a depth of 4 to 5 feet can be taken into the pass, but only 2 or 3 feet into the bay. Just inside the pass, an old highway bridge with its midsection removed is used as fishing piers. A fixed highway bridge on the NE side of the fishing piers has a clearance of 14 feet for a channel width of 30 feet. An overhead power cable crossing at the bridge has a clearance of 23 feet. Another overhead power cable about 0.3 mile SW of the bridge has a clearance of 37 feet. The tidal current in Caminada Pass averages 1.5 knots with higher velocities reported. The pass is not recommended for strangers.

**Charts 11352 (1050), 11357 (1274).-Belle Pass** (29°05.1'N., 90°13.5'W.), about 12 miles SW of Caminada Pass, is the entrance from the Gulf of Mexico to Bayou Lafourche and Bayou Fourchon. The dredged channel through the pass is marked by lights and a buoy, and the approach by a lighted bell buoy. The old entrance channel between the jetties close E of the dredged channel is closed by a dam.

**Vessels should approach Bayou Lafourche and Bayou Fourchon through the Belle Pass Safety Fairway.** (See 209.135, chapter 2.)

**Bayou Fourchon** empties into the E side of Bayou Lafourche about 2 miles above the entrance to Belle Pass. There are several slips and mooring dolphins along the NE side of the bayou. These facilities, constructed by the Greater Lafourche Port Commission, are used by commercial fishing and oil well supply vessels, and have depths of about 9 feet reported alongside.

**Bayou Lafourche,** formerly an outlet of the Mississippi River at Donaldsonville, 70 miles above Canal Street, New Orleans, is blocked off from the river by a levee. The bayou extends from Donaldsonville in a SE direction for 93 miles, and empties into the Gulf at Belle Pass, 19 miles SW of Barataria Bay Light. The Intracoastal Waterway crosses the bayou at Larose.

Bayou Lafourche is navigable to Thibodaux, about 63 miles above Belle Pass entrance. The bayou above this point is closed by vegetation. In October 1974, the controlling depths were 11 feet in the channel through Belle Pass; thence 10 feet to Leeville; thence 8 feet to Golden Meadow; thence 6 feet to Larose; thence 5 feet to Lockport and Thibodaux.

Numerous shrimp boats base at Leeville, Golden Meadow, Galliano, and Larose. Crew boats based at Leeville operate out of the bayou to the offshore oil wells. There are seafood canneries and shipyards along the bayou and oil company terminals and wharves at Leeville. There is considerable commerce on the bayou in seafood products, sugar, petroleum products, cement, lumber and piles, clays and drilling mud, liquid sulfur, sand and gravel, oil well pipe, machinery and supplies, caustic soda, chemicals, and general cargo.

There are numerous private warehouses, wharves, and stiff-leg derricks for handling sugarcane along the bayou. The banks of Bayou Lafourche are thickly settled throughout the greater part of its length. Larose, Lockport, **Raceland,** and **Thibodaux** are principally agricultural towns. On the lower part of the bayou there is considerable commerce in oil barges.

Many bridges and overhead power cables cross Bayou Lafourche and are described in order of ascension. Regulations and opening signals for the drawbridges crossing the bayou are given in 117.240, and 117.245 (a) through (e), and (j)(3) and (4), chapter 2.

A slip, constructed by the Greater Lafourche Port Commission, is on the E side of Bayou Lafourche, about 2.3 miles above the entrance. This facility is used by commercial fishing and oil well supply vessels, and has depths of about 9 feet reported alongside.

A wharf of an oil company supply vessel base is on the W side of the bayou, about 2.5 miles above the entrance; depths of about 9 feet are reported alongside the wharf. Diesel fuel is available.

At **Leeville,** on the W side of the bayou about 11 miles above the entrance, a highway vertical lift bridge with a clearance of 73 feet up and 40 feet down crosses the bayou. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) There are shrimp docks, seafood packing plants, oil company terminals and bases, a small boatyard, and a marina at Leeville. The marina can handle craft up to 25 feet for hull and engine repairs. Berths, gasoline, diesel fuel, water, and limited marine supplies are available. The Southwestern Louisiana Canal crosses the bayou at Leeville.

Two overhead power cables with clearances of 151 feet cross the bayou between Leeville and Golden Meadow.

**Golden Meadow,** 20 miles above the entrance, is the principal fishing settlement on Bayou Lafourche. A highway vertical lift bridge with a clearance of 73 feet up and 2 feet down crosses the bayou at Golden Meadow. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) A boatyard, on the W side about 0.6 mile below the bridge, has marine railways that can handle craft up to 35 feet for general repairs. A shipyard, on the W side about 2 miles below the bridge, has a marine railway that can handle craft up to 95 feet for general repairs; steel vessels are built at the yard. Gasoline, diesel fuel, water, ice, and marine supplies are available at Golden Meadow.

Two overhead power cables cross the bayou between Golden Meadow and Galliano; minimum clearance is 65 feet.

At **Galliano,** about 23.5 miles above the entrance, a highway pontoon bridge crosses the bayou. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) Gasoline, diesel fuel, and supplies are available at Galliano.

A highway vertical lift bridge with a clearance of 73 feet up and 3 feet down and a pontoon bridge cross the bayou about 3 miles and 5.5 miles, respectively, above the pontoon bridge at Galliano. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

At **Cut Off,** about 30.5 miles above the entrance, a highway pontoon bridge crosses the bayou. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) On the W side of the bayou at Cut Off are several shipyards with marine railways that can handle craft up to 60 feet for repairs. An overhead power cable with a clearance of 91 feet crosses the bayou just above the pontoon bridge.

At **Larose,** about 34 miles above the entrance to Bayou Lafourche, the Intracoastal Waterway crosses the bayou. Two pontoon bridges cross the bayou at Larose; one just E and the other about 0.5 mile W of the junction with the Intracoastal Waterway. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) There are two wharves on the SW side of the intersection. Larose has several shipyards and boatyards. One shipyard with a 1,000-ton floating drydock is on the Intracoastal Waterway just SW of its junction with Bayou Lafourche; general repairs can be made. Marine railways that can handle craft up to 70 feet for general repairs are available at the boatyards. Machine shops and radio repair facilities are also available. Fuel, water, ice, and marine supplies can be obtained. A shipyard builds barges on the N side of the bayou just above the intersection.

Two overhead power cables cross the bayou between Larose and Valentine; minimum clearance is 68 feet.

At **Valentine,** about 39 miles above the entrance, a highway pontoon bridge crosses the bayou. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) Valentine has a large sugar mill and a paper mill. A shipyard that builds commercial vessels up to 120 feet is on the W side of the bayou about 2 miles above Valentine. Marine railways at the yard can handle vessels up to 110 feet for hull and engine repairs.

**Lockport,** about 44 miles above the entrance, is a town at the intersection of Company Canal with Bayou Lafourche. A highway swing bridge with a clearance of 6 feet crosses the bayou just below the intersection. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) An overhead power cable with a clearance of 90 feet

crosses the bayou just below the swing bridge. A pontoon bridge crosses Company Canal close NE of the intersection, and a highway vertical lift bridge with a clearance of 50 feet up and 5 feet down crosses the canal about 0.2 miles SW of the intersection. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

Lockport has a large shipyard and a boatyard. The shipyard builds boats, tugs, and barges up to 176 feet, and has marine railways that can handle craft up to 125 feet for general repairs. Gasoline, diesel fuel, water, ice, and marine supplies are available. The Southern Pacific Railroad connects Lockport with Valentine and New Orleans.

Several overhead power cables cross the bayou between Lockport and Mathews; minimum clearance is 60 feet.

At **Mathews,** about 47 miles above the entrance, a pontoon highway bridge crosses the bayou. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) Several overhead power cables cross Bayou Lafourche between Mathews and Raceland; minimum clearance is 60 feet.

At **Raceland,** about 51 miles above the entrance, Bayou Lafourche is crossed by two vertical lift bridges about 0.5 mile apart. The more southerly bridge has a clearance of 59 feet up and 7 feet down, and the northerly bridge has a clearance of 50 feet up and 7 feet down. (See 117.240, and 117.540, chapter 2, for drawbridge regulations and opening signals.)

Several overhead power cables cross the bayou between Raceland and Lafourche; minimum clearance is 60 feet.

At **Lafourche,** about 60 miles above the entrance, a railroad swing bridge with a clearance of 19 feet crosses the bayou. (See 117.240, and 117.245 (a) through (e) and (j)(3), chapter 2, for drawbridge regulations and opening signals.) Several overhead power cables cross the bayou between Lafourche and Thibodaux; minimum clearance is 60 feet.

At **Thibodaux,** about 63 miles above the entrance, a vertical lift bridge, kept in a closed position and with a clearance of 11 feet, crosses the bayou. (See 117.245 (a), and (j)(4), chapter 2, for drawbridge regulations.)

**Charts 11358 (1273), 11357 (1274).-Southwestern Louisiana Canal** connects Barataria Bay with Timbalier Bay and affords a protected inside passage for small boats. The canal crosses Bayou Lafourche at Leeville, about 11 miles above the bayou mouth. The canal is about 10 miles long and 4 feet deep, with shoaler depths at the W approach. The E entrance to the canal is marked by a private light.

With a favorable tide about 3½ feet can be carried through Caminada Bay, the E approach, and about 3 feet across Little Lake, the W approach. **Deep Bayou** and **Bayou Blue** connect Little Lake with **Lake Raccourci.** These approaches sometimes are staked, but generally are difficult for a stranger. The main route to the canal from Barataria Bay is through **Bayou Fifi, Bay des Ilettes, Bayou Andre,** or **Bay Joyeux,** and **Caminada Bay.** The channel is marked by privately maintained buoys which are not charted. Another route is through **East Champagne Bay,** Bay des Ilettes, and **Bay Tambour** via a cut between the last named bays. Because this channel is not marked, strangers should hire fishermen as pilots.

State Route 1 fixed highway bridge crosses the middle of the Southwest Louisiana Canal, making it necessary to enter the canal from Bayou Lafourche through a short cutoff.

**Chart 11357 (1274).-Greys Canal,** 3 miles S of Leeville, with a connecting channel through Bayou Blue, offers the deepest and most used route from Bayou Lafourche to Lake Raccourci and Timbalier Bay. On a favorable tide, about 8 feet can be taken through the channel; the best water is reportedly found in midchannel. Bayou Blue also joins Little Lake.

**Havoline Canal,** 6 miles S of Leeville, is a privately dredged canal that extends from Bayou Lafourche into Timbalier Bay. In 1972, the canal had a reported controlling depth of 7 feet. The SW approach channel leading to the canal is marked by lights and private buoys which reportedly should be followed closely. Havoline Canal is open to the public without charge.

**Timbalier Bay** and **Terrebonne Bay** are large shoal-water bays separated from the Gulf by a chain of low sand islands. These waters are accessible from the Gulf through several passes having depths of 4 to 14 feet; however, the depths in Timbalier and Terrebonne Bays range from 4 to 9 feet. There are no settlements of importance in the area, but the bays are frequented by large numbers of fishing and oystering craft which carry their catch through the inside passages to New Orleans and Houma. This area has numerous oil well structures.

**Lake Barre,** N of Terrebonne Bay, has general depths of 4 to 6 feet. **Lake Barre (Seabreeze) Pass** provides a passage marked by a light and a daybeacon into Bayou Terrebonne and to **Lake la Graisse** at the NW end of Terrebonne Bay. **Pass Barre** connects with Terrebonne Bay, and several passages at the NW corner of the bay lead to Lake Felicity.

**Old Lady Lake** is a shoal body of water between Lake Raccourci and Lake Barre and S of Lake Felicity. Numerous passages connect with these lakes and with Timbalier Bay. The lake has depths of 3 to 4 feet, but the passes are very shallow and restrict entry to boats drawing 1 or 2 feet.

**Lake Felicity,** with depths of 5 to 6 feet, is N of Old Lady Lake. Many bayous and passes connect with adjacent bays and lakes. Most of the bayous to the E and N of Lake Felicity are used as oyster bedding grounds and, accordingly, contain nu-

merous oyster reefs. The water in the bayous shoals rapidly where the bayous widen, and the channels are difficult to follow without local knowledge. An inside route between Bayou Terrebonne and Bayou Lafourche passes through Lake Felicity; thence through Bayou Jean Lacroix, Cutoff Canal, Grand Bayou Canal, and Canal Blue. The entrance to Lake Felicity is marked by a light.

**Lake Raccourci** is a shoal body of water lying N of Timbalier Bay. The general depths are 4 to 5 feet. The area around **Philo Brice Islands** and **Jacko Camp Bay** contains many oyster beds and fish traps. The oyster beds are marked by iron or brush stakes. Deep Bayou and Bayou Blue lead to Little Lake, and **Grand Pass Felicity** leads to Lake Felicity.

**Dangers.**-There are numerous oil well structures in and about Timbalier and Terrebonne Bays. Privately marked channels lead from Cat Island Pass to Bayou Terrebonne and Bayou Lafourche. Drilling operations are in progress near Caillou Island, **Brush Island,** and East Timbalier Island. Mariners should use the waters in this area only with local knowledge.

**Secondary channels in Timbalier Bay and Terrebonne Bay.**-A channel marked by privately maintained buoys leads W across Timbalier and Terrebonne Bays to Troiscent Piquets Bay and into Bayou Petit Caillou, S to Cat Island Pass, or W into Lake Pelto.

From the E and W channel crossing Terrebonne and Timbalier Bays, a channel extends NE into Lake Raccourci passing through Philo Brice Islands NW of the light and thence continuing E to the entrance to Bayou Blue leading to Bayou Lafourche. On a favorable tide a depth of about 5 feet can be carried into Lake Raccourci and about 4 feet into Bayou Blue.

From inside Cat Island Pass, a channel extends N across the central portion of Terrebonne Bay to **Pass Barre,** which connects with Lake Barre. Depths of 7 feet can be carried into Lake Barre. A group of small low islands exists about 2.5 miles S of Pass Barre with shoaling to 5 feet close W.

The route to Bayou Terrebonne is through the S entrance to Lake la Graisse. The channel through the lake is marked by lights, and a depth of about 5 feet can be carried into the bayou. A second route to Bayou Terrebonne from Lake Barre through Lake Barre Pass is good for 4½ feet.

A route leads from Lake Barre Pass across Lake Barre into Lake Felicity, thence to Grand Pass Felicity and across Lake Raccourci to Bayou Blue or Deep Bayou, and thence through either Southwestern Louisiana Canal or Greys Canal to Bayou Lafourche. An unmarked channel leads through Lake Chien, N of Lake Felicity, to Bayou Jean Lacroix. A light marks the E side of the entrance to Lake Chien.

**Timbalier Island** and **East Timbalier Island** are the two largest islands in the chain separating Timbalier and Terrebonne Bays from the Gulf. In recent times the E end of Timbalier Island has been washed away and the W end built up to the W a like amount. East Timbalier Island has built up especially to the W, all but closing Grand Pass Timbalier. Several fish camps are reported on Timbalier Island and East Timbalier Island.

**Grand Pass Timbalier,** at the W end of Timbalier Island, has been filling up and is little used. The channel is narrow, winding, and difficult to navigate; with local knowledge about 4 feet can be taken through the pass into Timbalier Bay.

**Timbalier Light** (29°02′56″N., 90°21′24″W.), shown from a building on piles, is off the SW end of East Timbalier Island. About 0.4 mile ENE of the light, part of the steel framework of a wrecked lighthouse projects about 10 feet above the water.

**Little Pass Timbalier,** 2 miles W from Grand Pass Timbalier, is a wider and straighter channel used to enter Timbalier Bay. The pass has a depth of 6 feet on the outer bar and 4 feet on the inner bar. The channel branches at the inner end, the W branch being considered the safer and more generally used. It is reported that this pass is working W.

**Caillou Pass** is a shallow passage between the N side of Timbalier Island and Caillou Island; local knowledge is advised.

**Vessels should enter Terrebonne Bay through Cat Island Pass Safety Fairway.** (See 209.135, chapter 2.)

**Cat Island Pass,** 60 miles W of Southwest Pass, connects the deepest part of Terrebonne Bay with the Gulf and is the principal entrance into Terrebonne Bay. The pass is marked by several lighted and unlighted buoys. The channel across the bar had a controlling depth of 14 feet in September 1973. Anchorage area inside the bay has depths of 12 to 16 feet. Farther inside, the depth gradually shoals to the general bay depth of 7 feet or less. The current in Cat Island Pass averages about 1.1 knots on the flood and 1.5 knots on the ebb, however, greater velocities have been reported.

**Charts 11357 (1274), 11352 (1050), 11355 (879-SC).-Houma Navigation Canal** extends in a NW direction from Cat Island Pass for about 8 miles across Terrebonne Bay, thence in a landcut in a N direction for about 23 miles to an intersection with the Intracoastal Waterway about a mile below Houma. The canal, dredged by the parish of Terrebonne to a depth of 15 feet, is now maintained by the Corps of Engineers. In September-November 1974, the controlling depths were 14 feet through Cat Island Pass, thence 13 feet to the Intracoastal Waterway. The channel is well marked with aids.

Bayou Petit Caillou crosses the canal about 9.8 miles above the entrance, and Bayou Grand Caillou crosses about 17.5 miles above the entrance. No other major waterways cross the canal. A pon-

toon bridge crosses the canal about 20 miles above the entrance. State Route 66 highway bridge crossing the canal about 0.2 mile below the Intracoastal Waterway has a swing span with a clearance of 1 foot. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

There is considerable commerce on the navigation canal in seafood products, shell, lumber and piles, oil well drilling equipment, machinery and supplies, petroleum products, cement, sand and gravel, and chemicals.

**Bayou la Carpe** extends N from a junction with Bayou Pelton about 6 miles below Houma. It crosses Houma Navigation Canal about 5.5 miles below Houma and recrosses the canal about 4 miles below Houma. It meets Ashland Canal about 2.7 miles below Houma and enters the Intracoastal Waterway opposite Bayou Black. In June 1972, the controlling depth in Bayou la Carpe was 8 feet from its junction with the Intracoastal Waterway at Houma to its junction with Bayou Pelton.

A highway bridge crossing the bayou about 0.5 mile S of the Intracoastal Waterway has a vertical lift span with clearances of 3 feet down and 73 feet up. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) An overhead power cable about 0.3 mile S of the bridge has a clearance of 60 feet. There is considerable commerce on the bayou in petroleum products, shell, clay, shellfish and seafood, oil well pipe, and building cement. The bayou has a large shipyard.

**Bayou Pelton,** in June 1972, had a controlling depth of 3 feet from Bayou la Carpe to its junction with Bayou Grand Caillou. Overhead power cables crossing Bayou Pelton have a least clearance of 62 feet.

**Houma,** the parish seat of Terrebonne Parish, is at the head of the Navigation Canal, about 32 miles above the entrance. The principal industries are seafood, petroleum, natural gas, sulphur, and sugar and molasses. The area is important in agriculture and cattle raising. The area has numerous offshore oil company supply bases and shipyards. A large shipyard on Bayou la Carpe builds steel vessels and barges up to 300 feet. There is a 1,000-ton marine lift which can lift boats up to 310 feet long and 54 feet wide. The largest of two marine railways at the yard can handle craft up to 225 feet for hull and engine repairs; a 60-ton crane is also available. The city has seafood canneries, a sugar mill, and cold storage facilities.

U.S. Route 90, the main coastal highway, passes through the town, and the Southern Pacific Lines offer railway freight service. U.S. Route 90 swing bridge over the Houma Navigation Canal at the junction with Bayou la Carpe, has a clearance of 3 feet. (See 117.240, and 117.540, chapter 2, for drawbridge regulations and opening signals.) The Houma airport and an industrial park are SE of the city. Berths, gasoline, diesel fuel, water, ice, and marine supplies of all kinds are available.

The United States Customs Service maintains a **customs station** at Houma.

**Bayou Terrebonne** is navigable to the town of Houma, 33 miles above its S mouth. For the lower 4 miles of its course, the bayou flows through a long, narrow delta separating Lake Barre and **Lake Jean Pierre** and **Lake Saint Jean Baptiste.** At its S end, Bayou Terrebonne empties into Pass Barre. From each of these are several entrances into the bayou. **Lake Barre Pass,** connecting Lake Barre and Lake la Graisse, crosses the N end of the delta and provides the main entrance into the bayou from both Lake Barre and Terrebonne Bay. A dredged channel in the bayou leads from Bush Canal to Houma. In September-October 1973, the controlling depth was 3 feet from the mouth at Pass Barre through the delta to Lake Barre Pass, thence in May 1974, 4 feet to the Intracoastal Waterway through Company Canal at Bourg, thence through the Intracoastal Waterway to the junction with Bayou Terrebonne, thence 5 feet W in the bayou to the head of navigation at the site of the twin fixed spans of a highway bridge at New Orleans Boulevard in Houma, about 0.25 mile above the Intracoastal Waterway. Only small skiffs can pass under this bridge.

In October 1973, controlling depths were 3½ feet through Lake la Graisse to Terrebonne Bay and from Lake Barre Pass through Bayou Terrebonne to Terrebonne Bay. Between Lake Barre Pass and Pass Barre, **Bayou Jose** and another opening form a connection between Lake Barre and Lake Jean Pierre which can be used by boats drawing up to 2½ feet.

Lights and a daybeacon mark the entrances to the bayou from Lake la Graisse and from Lake Barre.

Bayou Terrebonne has considerable barge traffic in shell, seafood, sugar, petroleum products, building cement, clays and drilling mud, oil well pipe, machinery and supplies, and general cargo.

**Tides.**-The diurnal range of tide is 1.3 feet at the mouth of Bayou Terrebonne and 0.5 foot at Houma. Wind will vary the tide 1 to 3 feet at the mouth, and floods may raise the water level 3 to 4 feet in the upper section.

The banks of Bayou Terrebonne are thickly settled throughout the upper half, in which section mariners may find numerous settlements selling gasoline, oil, and provisions. State highway 55 extends along the E bank of the bayou for 6 miles below Montegut to Lapeyrouse.

Bayou Terrebonne crosses the Intracoastal Waterway at Houma and is joined by Bayou Petit Caillou 3 miles below Houma. At Bourg, 7 miles below Houma, a section of the **Company Canal,** known as **Bourg Canal,** furnishes a cutoff between the bayou and the Intracoastal Waterway. In September 1973, the controlling depth was 5 feet. Several other canals enter Bayou Terrebonne and are used by small boats. **Bush Canal** connects Bayou Terrebonne with Bayou Petit Caillou about 12 miles above the entrance.

Bayou Terrebonne is crossed by several highway bridges with swing and lift spans with ample openings, and by numerous overhead cables with minimum clearance of 60 feet.

**Lapeyrouse,** about 14 miles above the entrance, has a fish wharf with a service wharf at which diesel fuel is available, and a grocery store with a service wharf at which gasoline is available.

**Point Barre,** about 16 miles above the entrance, has facilities for launching outboard motor boats and a commercial fish wharf.

**Montegut,** about 20 miles above the entrance, has boatyards with marine railways capable of handling craft up to 50 feet for general repairs; one of the yards has a machine shop. Gasoline, diesel fuel, water, and limited marine supplies are available. A large sugar mill is at Montegut. A highway bridge at Montegut has a 45-foot vertical lift span with clearances of 3 feet down and 48 feet up. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) A road connects Montegut with Bayou Petit Caillou.

A highway bridge crossing the bayou at **Klondyke,** about a mile below Bourg, has a swing span with a channel width of 47 feet and a clearance of 7 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) Gasoline in cans and some groceries can be obtained just above the bridge.

A highway bridge with a 40-foot swing span and a clearance of 5 feet crosses Bayou Terrebonne at **Bourg,** about 25 miles above the entrance and just above the Bourg (Company) Canal. Bourg Canal is crossed at Bourg by a highway vertical lift bridge with clearances of 5 feet down and 50 feet up. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) Several overhead power cables cross Bourg Canal in the vicinity of this bridge; least clearance is 80 feet.

Several overhead power cables with a least clearance of 60 feet cross Bayou Terrebonne between Bourg and Presquille.

At **Presquille,** about 27 miles above the entrance to Bayou Terrebonne, a highway bridge with a 45-foot vertical lift span and clearances of 3 feet down and 48 feet up crosses the bayou. (See 117.240, and 117.245 (a) through (e) and (j)(2), chapter 2, for drawbridge regulations and opening signals.) A least clearance of 60 feet is available for the overhead power cables crossing the bayou between Presquille and Houma.

At **Mechanicville,** about 29 miles above the entrance, a highway bridge with a 40-foot vertical lift span and clearances of 3 feet down and 47 feet up crosses Terrebonne Bayou. The highway bridge just E of Houma has a 40-foot swing span and a clearance of 3 feet. (See 117.240, and 117.540, chapter 2, for drawbridge regulations and opening signals.)

**Bayou Petit Caillou** empties into **Troiscent Piquents Bay** on the W side of Terrebonne Bay, about 5 miles N of Wine Island Pass. A private light marks the S side of the passage between Terrebonne and Troiscent Piquets Bays.

Bayou Petit Caillou is 29 miles long to its junction with Bayou Terrebonne 4 miles E of Houma. Several canals enter the bayou: Bush Canal leading to Bayou Terrebonne, and Boudreaux Canal and **Robinson Canal** connecting with Bayou Grand Caillou. Two miles above Cocodrie is a connecting route to Bayou Terrebonne through Sevin Canal, Bay Negresse, and Lake la Graisse, good for 3 feet on a favorable tide. About 5 miles above the entrance the bayou crosses the Houma Navigation Canal. In May 1974, the controlling depth was 2 feet from the mouth of the bayou to Cocodrie, thence 4½ feet to Robinson Canal, about 11 miles above the entrance, thence in March 1971, 2 feet to its junction with Bayou Terrebonne.

The lower portion of Bayou Petit Caillou is used considerably by local oystermen and fishermen. The bayou has considerable commerce in petroleum products, and oil well pipe casing, machinery, and supplies.

A highway extends S along the W shore to **Cocodrie,** 6 miles above the mouth of the bayou. There are several oil company bases and fish wharves. Gasoline, diesel fuel, and ice are available. A marina on a bayou about 0.2 mile W of Bayou Petit Caillou, at Cocodrie, has open and covered berths, gasoline, diesel fuel, a paved launching ramp, a 6½-ton fixed lift for handling boats up to 30 feet, ice, water, and groceries. The marina is accessible with Bayou Petit Caillou through a channel with a reported controlling depth of 10 feet in 1972.

**Robinson Canal** enters the bayou from W about 11 miles above the entrance. There is a shipyard on the bayou here, and an oil refinery about 0.5 mile above it. **Bush Canal** enters the bayou from E about 3 miles above Robinson Canal. At **Boudreaux Canal,** 15 miles above the mouth, is a shrimp and oyster cannery.

Several boatyards near **Chauvin** can handle craft up to 60 feet for general repairs; one has a machine shop. Gasoline, diesel fuel, lubricants, water, ice, and marine supplies can be obtained at several places along the bayou.

Six drawbridges cross the waterway between the mouth and the junction with Bayou Terrebonne. The bridges with swing spans have a minimum width of 40 feet and a minimum clearance of 3 feet, and the limiting clearances at the lift bridges are 3 feet down and 47 feet up. (See 117.240 and 117.540, chapter 2, for drawbridge regulations and opening signals.) Overhead power cables crossing the waterway have minimum clearances of 60 feet.

A channel from Bayou Petit Caillou through Boudreaux Canal, **Lake Boudreaux** and **Bayou Dulac** to Bayou Grand Caillou is marked with lights and a daybeacon. Controlling depths are about 5 feet in Boudreaux Canal, 2 feet through Lake Boudreaux, and 1 foot through Bayou Dulac.

**Wine Island Pass** is 3.5 miles W of Cat Island Pass, and forms a passage between Wine Island and Isles Dernieres from the Gulf to Lake Pelto and Terrebonne Bay. The pass has depths of 5 to 9 feet over the bar and 7 to 8 feet inside where good anchorage is available. The channel lies close to Isles Dernieres, and, when any sea is running, breakers clearly outline the edges of the channel. The pass is unmarked.

The diurnal range of **tide** at Wine Island Pass is 1.3 feet. The **tidal current** at strength averages 1.7 knots on the flood and 1.9 knots on the ebb. At **Caillou Boca** at the W end of Lake Pelto the diurnal range of tide is 1.4 feet and the tidal current strength averages 1.3 knots on the flood and 0.7 knot on the ebb. The flood flows E and the ebb W.

**Whiskey Pass** forms another passage from the Gulf to Lake Pelto through Isles Dernieres. The depths are 4 to 5 feet at the N end of the unmarked pass. In 1969, a small concrete pyramid marker was reported to mark the W side of the pass.

The main passage from Terrebonne Bay to Lake Pelto, marked by buoys, lies between **Wine Island** and **Point Mast** and has a general depth of 6 to 7 feet. Another passage through Pass la Poule, which is good for a draft of 3 to 4 feet, is marked by private buoys.

**Lake Pelto,** W of Terrebonne Bay and N of **Isles Dernieres,** has general depths of 5 to 7 feet. A protected inside route is afforded small craft drawing 4 to 5 feet from Timbalier and Terrebonne Bays W through Lake Pelto and **Caillou Boca** to Caillou Bay. The channel is marked by lights and buoys.

**Charts 11352 (1050), 11357 (1274), 11356 (1275).**-An extensive network of lakes, bayous, and canals extends inland between Terrebonne Bay and Atchafalaya Bay. Though sparsely populated, this area is frequented by local fishermen, trappers, and oil development personnel. The principal entrances from the Gulf are described as follows:

**Caillou Bay,** a large bight with general depths of 5 feet, is N and E of **Raccoon Point** at the W end of Isles Dernieres. An anchorage site with a depth of 7 to 8 feet is close inside Raccoon Point.

**Coupe Colin,** 3 miles E of Raccoon Point, is shallow, changeable, difficult to follow, and is not used even by local fishermen.

**Vessels should approach Bayou Grand Caillou through the Bayou Grand Caillou Safety Fairway.** (See 209.135, chapter 2.)

**Bayou Grand Caillou** empties into Caillou Bay 6.5 miles N of Raccoon Point. **Bayou Grand Caillou Entrance Light 2** (29°09.5'N., 90°57.8'W.), 17 feet above the water and shown from a red triangular daymark on a dolphin, about 1.3 miles SW of the entrance, marks the entrance to the bayou. Another channel, marked by unlighted buoys, extends 7.6 miles WSW of the light. In March 1965, the controlling depth in the bayou was 6 feet from the entrance to **Dulac,** about 20 miles above the mouth. The bayou channels are marked by daybeacons and buoys for about 15 miles above the mouth.

Bayou Grand Caillou crosses Houma Navigation Canal about 2.3 miles below Dulac and is joined by Bayou Dulac at Dulac.

A dredged channel in Bayou Grand Caillou leads from Dulac through Bayou Pelton and Bayou la Carpe to the Intracoastal Waterway at Houma. In September 1973, the controlling depths were 2 feet from the bridge at Dulac through Bayou Grand Caillou and Bayou Pelton to the the intersection of Bayou la Carpe, thence in December 1973, 7 feet to the Intracoastal Waterway at Houma.

State Route 57 extends S along the E bank of Bayou Grand Caillou to below Dulac and connects with State Route 56 along Bayou Petit Caillou about 1.7 miles below Robinson Canal. A highway bridge over the bayou at Dulac has a swing span with a clearance of 5 feet. A highway bridge at Boudreaux has a swing span with a channel width of 46 feet and a clearance of 2 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

The highway bridge over Bayou Dulac, at Dulac, has a swing span with a clearance of 7 feet. Fixed bridges crossing Bayou Grand Caillou above the highway bridge have a minimum horizontal clearance of 15 feet and a vertical clearance of 1 foot.

Bayou Grand Caillou has considerable commerce in seafood products, shell, petroleum products, clays and drilling mud, oil well pipe casing, machinery, and industrial chemicals.

Dulac has several oil company bases and wharves. A boatyard has marine railways, one of which is capable of handling craft up to 70 feet for hull and engine repairs. On the bayou between Dulac and Boudreaux are numerous shrimp docks, seafood packing plants, and ice plants. Gasoline, diesel fuel, water, ice, and some marine supplies are available at the docks. A boatyard at **Boudreaux,** about 23 miles above the mouth, has four marine railways that can handle craft up to 50 feet for hull and engine repairs. A machine shop is close by.

**Ashland Canal** which connects Bayou Grand Caillou with Bayou la Carpe had a controlling depth of about 6 feet in 1958.

**Grand Bayou du Large** extends between **Caillou Lake** and Caillou Bay. Depths of 5 to 6 feet are off the S entrance, and 3 to 4 feet through a buoyed channel across Caillou Lake to **Grand Pass** connecting with **Bayou du Large** and with **Lake Mechant.** A draft of 3 to 4 feet can be carried up Bayou du Large to **Falgout Canal** and thence into **Lake de Cade.** Lesser drafts can go to **Theriot** and thence to**Lake Theriot** through**Marmande Canal** or to Bayou Grand Caillou via **Bayou Provost.** The swing highway bridge across Bayou Provost at Theriot can be opened by prior arrangement with the State Road Department.

Bayou du Large is often dry in several spots above Theriot during the winter. Several overhead power cables cross the bayou S of Theriot; the clearance is 35 feet. Any of the cables can be removed, upon advance notice of 24 hours, for vessels requiring greater clearance. State Route 315 extends S along the E side of the bayou for several miles below Falgout Canal. This section of the bayou is heavily populated, and at several places gasoline and provisions are available. Bayou du Large has a boatyard about 5 miles below Falgout Canal, which can handle boats up to 50 feet for hull and engine repairs. A marina on the N side of Falgout Canal just W of its junction with Bayou du Large has gasoline, diesel fuel, open and covered berths, ice, a paved launching ramp, and marine supplies.

The highway drawbridges in the Theriot area have a minimum channel width of 20 feet and a minimum clearance of 3 feet. Above Theriot, the bayou narrows and is crossed by fixed bridges with little or no clearance, and navigation is restricted to small craft. (See 117.240 and 117.540, chapter 2, for drawbridge regulations and opening signals.)

Bayou du Large empties into **Taylors Bayou** which flows into the Gulf 4 miles W of Bayou Grand Caillou entrance. A privately maintained light marks the mouth of Taylors Bayou.

**Oyster Bayou,** 13 miles NW of Raccoon Point, connects the Gulf with Fourleague Bay, an arm of Atchafalaya Bay. This bayou affords a protected route for craft 3 to 3½ feet in draft going to Atchafalaya Bay from Caillou Bay or waters to the E. The bayou has several oyster reefs, which are usually marked by poles.

**Oyster Bayou Light** (29°12.7'N., 91°07.8'W.), 47 feet above the water, is shown from a white house on pile foundation at the E side of the entrance.

The route across the S end of Fourleague Bay is marked by lights and by a line of closely spaced daybeacons. Boats follow close along the E side of the daybeacons in a channel slightly deeper than the general bay depths. A light off Halters Island Point marks the entrance to Fourleague Bay from Atchafalaya Bay. **Blue Hammock Bayou** on the E side of Fourleague Bay is another entrance to the network of shallow inside waters in this vicinity. Boats drawing 2 to 3 feet can reach the Intracoastal Waterway on a favorable tide by way of **Lost Lake, Bayou de Cade,** Lake de Cade, and **Minors Canal.** Blue Hammock Bayou also connects with Lake Mechant.

**Charts 11357 (1274), 11356 (1275).-Ship Shoal,** lying about 9 miles S of Raccoon Point, is about 7 miles long in a general E-W direction, about 1.5 miles wide at the W end, and has depths ranging from 9 to 12 feet. Depths of 13 to 30 feet and wrecks with a least depth of 5 feet over them extend about 23.5 miles E of the E end of Ship Shoal. In stormy weather the shoal may be distinguished at some distance off by a choppy or breaking sea. In calm weather its position is not indicated by natural phenomena and can best be avoided by using the lead or fathometer. Heavy rips have been reported about 15 miles SW of Ship Shoal.

Oil drilling structures, marked by lights, are located on all sides of Ship Shoal and up to 60 miles offshore as well as throughout the delta section. Wrecks and other obstructions, covered and unmarked, may exist on the shoal and in the surrounding areas; mariners are advised to exercise extreme caution.

**Ship Shoal Daybeacon** (28°54.8'N., 91°04.3'W.), a brown skeleton structure on piles, formerly the structure of discontinued Ship Shoal Light, is in 14 feet of water on the NW part of Ship Shoal and about 86 miles W of Southwest Pass. The structure is marked by four quick flashing white obstruction lights, displayed at a height of 17 feet above water from the perimeter of the lower platform.

**Currents.**-Current predictions for four passes into Barataria Bay, two passes into Terrebonne Bay and several inside stations may be obtained from the Tidal Current Tables. Weather conditions often modify considerably the tidal currents in these passes.

**Charts 11351 (1276), 11354 (880-SC).-Atchafalaya Bay** is a large indentation in the coast of Louisiana 112 miles W of Southwest Pass, Mississippi River. The bay is about 28 miles long in nearly an E-W direction, averages 7 miles in width, is full of shoals and oyster reefs, and has general depths ranging from 3 to 9 feet. A fringe of reefs partially separates the bay from the Gulf, the E end being known as Point au Fer Shell Reef. The bay is the approach to Lower Atchafalaya River and the Port of Morgan City, with depths of 25 feet or less extending 25 miles off the channel entrance. Vessels navigating the bay usually draw 3 to 10 feet.

**Prominent features.**-The lighthouse on Eugene Island and the abandoned lighthouse on Southwest Reef are the only conspicuous objects in the Point au Fer Shell Reef area. **Belle Isle,** on the N shore of the bay N of the light, is 75 feet high and conspicuous from some distance offshore. Oil well structures and obstructions are throughout the area.

**Point au Fer Reef Light** (29°22.3'N., 91°23.1'W.), 54 feet above water, is shown from a white wooden house on pile foundation on Eugene Island on the W side of the dredged channel. A radiobeacon and fog signal are at the light.

A black, square, pyramidal tower, 6.5 miles W of Point au Fer Reef Light, is connected to a square house on piles with a pyramidal tower on the roof. The structure is an abandoned lighthouse and makes a prominent landmark for vessels approaching close inshore from the W.

**Boundary lines of inland waters.**-The lines established for this section of the coast are given in 82.103, chapter 2.

**Vessels should enter Atchafalaya Bay through the Atchafalaya Pass Safety Fairway.** (See 209.135, chapter 2.)

**Channels.**-Atchafalaya Bay Ship Channel extends in a NE direction from the Gulf to near the mouth of the Lower Atchafalaya River. A Federal project provides for a 20-foot dredged channel from the 20-foot contour in the Gulf to the 20-foot contour in Atchafalaya Bay. (See Local Notice to Mariners and latest editions of the charts for controlling depths.) Depths in the river are about 21 feet or more to Morgan City.

Lights and buoys mark Atchafalaya Bay ship channel. Point au Fer Reef Light marks the cut through Point au Fer Shell Reef. Strong currents will be encountered in the channel through Point au Fer Shell Reef, especially during N winds and extreme low tides.

A cutoff channel from the mouth of Lower Atchafalaya River W through the bay, to the entrance to East Cote Blanche Bay, has been abandoned. Some of the pile daybeacons marking it have been broken off, are covered at high water, and accordingly constitute a danger to navigation.

**Deer Island,** on the E side of the Lower Atchafalaya River entrance, can be approached through a short dredged channel just SW of the island. The channel has a depth of 7 feet.

Fog is most frequent during January, February, and March. S winds bring it in, and N winds clear it away.

**Tides, currents, and freshets.**-The level of the water surface and the velocity of the current depend to a considerable extent upon the force and direction of the wind. At Eugene Island the diurnal range of tide is 1.9 feet. Normal tide action is not perceptible at Morgan City. N winds lower the water surface at Morgan City as much as 1 foot, and SE winds raise it 1.5 to 2 feet.

Freshets occur frequently during May and June, at which times the river overflows its banks and the current has considerable velocity, making it difficult to keep in the channel. During ordinary stages of the river, the current has a velocity of about 0.5 knot. When there are freshets in the rivers, the water in Atchafalaya Bay is quite fresh and that in the Cote Blanche Bays is nearly so. The discolored water coming out of the mouth of the river will be encountered well offshore, the distance depending much upon the direction of the wind.

**Lower Atchafalaya River** flows S into the NE corner of Atchafalaya Bay; it is the outlet for an extensive system of S Louisiana lakes and bayous known as the Atchafalaya navigation system, an inside passage to the Mississippi River about 180 miles above New Orleans.

The **Lower Atchafalaya River** leads N from Atchafalaya Bay through Berwick Bay, thence W through Berwick Lock, and joins Bayou Teche 8 miles above the Berwick Lock near Patterson. The section of the river from Atchafalaya Bay to Berwick Lock has a crooked channel with depths from 21 to 113 feet over widths from 300 to 600 yards; the deepest water is generally in midstream. In June 1972, the controlling depth in the river from Berwick to its junction with Bayou Teche was 4 feet.

**Bayou Shaffer** is a deepwater passage branching NE to Bayou Boeuf from Sweetbay Lake in the Lower Atchafalaya. An overhead power cable with a clearance of 130 feet crosses Bayou Shaffer near the junction with Bayou Boeuf. The bayou serves as a cutoff for vessels bound E from Atchafalaya Bay to the Intracoastal Waterway.

**Avoca Island Cutoff** is a narrow channel joining Lower Atchafalaya River with Bayou Chene. The cutoff enters the E side of the river about 4 miles above the mouth. The controlling depth was 12 feet in October 1974.

**Little Wax Bayou,** which branches W from the Lower Atchafalaya about 13.5 miles above the mouth, is part of the Intracoastal Waterway, and is described later in this chapter.

**Bayou Boeuf,** also part of the Intracoastal Waterway and described in chapter 12, joins the Lower Atchafalaya from E at Morgan City. The Intracoastal Waterway follows Lower Atchafalaya S for 2.5 miles to Little Wax Bayou.

An alternate route of the Intracoastal Waterway, from Morgan City N to Port Allen on the Mississippi River and Bayou Grosse Tete, is described in chapter 12.

**Charts 11355 (879-SC), 11354 (880-SC).-Berwick Bay** is the section of the Lower Atchafalaya from Bayou Boeuf N to Sixmile Lake. Morgan City is on the E side of the bay and Berwick on the W side.

Two bridges across Berwick Bay link Morgan City and Berwick. The Southern Pacific railroad vertical lift bridge has a clearance of 4 feet down and 73 feet up, and U.S. Route 90 fixed highway bridge has a clearance of 50 feet. In 1973, a fixed highway bridge with a design clearance of 73 feet was under construction about 0.2 mile above the railroad bridge. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

The **Berwick Bay Vessel Traffic System (VTS),** operated by the U.S. Coast Guard to enhance the safety of navigation in the Berwick Bay area, consists of a communications network, vessel reporting points, and a Vessel Traffic Center (VTC). The system was established by the Commander, Eighth Coast Guard District by a special order published in Special Local Notice to Mariners No. 1, January 6, 1975, and in the Federal Register, January 15, 1975.

The Vessel Traffic System area encompasses segments of the following waterways:

(1) The Intracoastal Waterway Morgan City to Port Allen Alternate Route from Mile 0 to Mile 7.

(2) The Intracoastal Waterway from Mile 93W (Harvey Lock) to Mile 100W (Harvey Lock).

(3) The Atchafalaya River Route from Mile 113 to Mile 122.

The system is **mandatory** for the following vessels:

(1) Vessels equipped to communicate on VHF-FM channels 13 (156.65 MHz) and 16 (156.80 MHz), and on 2182 kHz and 2738 kHz; and

(2) Any other vessel that intends to transit under the lift span of the Southern Pacific Railroad Bridge over Berwick Bay. For these vessels communication procedures can be satisfied by communicating with the VTC prior to transiting by telephone (504-385-2462) or other means.

The VTC (call sign, Berwick Bay Vessel Traffic Center), manned by the Coast Guard and located in the Southern Pacific Railroad Bridge bridgetender building, maintains telephone communications and a listening watch on the following frequencies:

(1) VHF-FM channel 13 (156.65 MHz).

(2) VHF-FM channel 16 (156.80 MHz).

(3) 2182 kHz and 2738 kHz.

Nothing in these procedures should be construed as contravening or modifying the Vessel Bridge-to-Bridge Radiotelephone Act. The communications required between vessels by the Act shall be transmitted on channel 13.

When high-water conditions exist in this area, limitations as to the size and makeup of tows, and of certain types of cargo carried are put into effect.

Based upon information provided by masters of vessels and the bridgetender of the Southern Pacific Railroad Bridge over Berwick Bay, the VTC may make recommendations to coordinate the flow of traffic in the vicinity of and through the bridges across Berwick Bay. While the recommendations of the VTC to coordinate the traffic flow are advisory in nature, compliance with reporting requirements, operating procedures, and high-water vessel and traffic limitations is mandatory for those vessels which must participate in the VTS.

Navigation safety information will be relayed by the VTC. Mutual planning by vessels using the bridge-to-bridge radiotelephone is encouraged. The purpose of the Berwick Bay Vessel Traffic System is not to attempt to maneuver or navigate from shore, but to coordinate the flow of traffic through the Vessel Traffic System area.

Complete information on the Berwick Bay Vessel Traffic System is contained in Special Local Notice to Mariners No. 1 dated January 6, 1975. Mariners transiting the area are advised to obtain a copy of the Special Notice from Commander, Eighth Coast Guard District, Customhouse, New Orleans, La. 70130.

**Port of Morgan City** is at the confluence of Atchafalaya River and the Intracoastal Waterway about 35 miles from deep water in the Gulf of Mexico. The port limits include the E quarter of the Parish of St. Marys from 91°17.4'W. to Bayous Boeuf and Chene, and from Sixmile Lake to the mouth of Atchafalaya River. Numerous inland waterways that radiate from the port make it a center for offshore oil exploration and development. There is considerable commerce in seafood, shell, petroleum products, building cement, sand and gravel, oilwell pipe casing, machinery, and supplies, and chemicals. The Port of Morgan City Harbor and Terminal District has jurisdiction over the port under a Board of Commissioners appointed by the governor of the State. The board establishes rules and regulations for the port.

**Morgan City,** on the E side of Berwick Bay, has several landings with ample depths for river boats; vessels generally go alongside, because of the depths and currents in the river. The principal industries are fishing, ship building, cement, petroleum, carbon black, chemicals, sulfur, salt, menhaden, and some agriculture in the raising of rice and sugar. The city has ice and cold storage plants. Tugs up to 4,500 hp operate from Morgan City.

The Young Memorial Vocational Training Center, a school for navigation, seamanship, and marine and electrical engineering, is located in Morgan City.

The U.S. Public Health Service maintains a **contract physician's office** in Morgan City. (See appendix for address.) The nearest U.S. Public Health Service hospital is at New Orleans, but there is a hospital at Morgan City.

Morgan City is a **customs port of entry.**

**Quarantine, customs, agricultural quarantine,** and **immigration** officials board vessels at their berths. Vessels subject to such inspections generally make arrangements in advance through the ships' agents.

The U.S. Coast Guard maintains a **vessel documentation office** in Morgan City. (See appendix for address.)

**Repairs.**-Several shipbuilding and repair yards are at Morgan City and on Bayou Boeuf, one on Bayou Black at Avondale, and one at Patterson. These yards have floating drydocks, marine railways, and machine and other repair shops, and build barges, tugs, crew boats, oil well structures, and shrimp boats. The largest floating drydock, at one of the yards on Bayou Boeuf, has a 3,000-ton lifting capacity and can handle vessels up to 12½-foot draft and 72-foot beam for complete repairs; a 750-ton gantry crane is also available at this yard. The smaller yards build and repair tugs, shrimp boats, and other fishing craft. A 500-ton floating crane and many smaller cranes are available at these yards. Gasoline, diesel fuel, water, ice, and marine supplies are available.

There are no marinas at Morgan City, and dockage is limited to the fueling piers, and fishing company and oil company piers.

**Berwick,** opposite Morgan City on the W side of Berwick Bay, has several seafood, fertilizer, and chemical plants, a shipyard, and several oil company bases. The shipyard has several floating

drydocks, the largest of which can handle vessels up to 900 tons displacement, 47-foot beam, 7-foot draft, and 250 feet long for general repairs. Gasoline diesel fuel, water, ice, and marine supplies are available.

**Communications.**-The port is served by the Southern Pacific Railroad which has connections with other trunk railroads. U.S. Route 90 passes through the city. A State-owned airport is 14 miles W of the city at Patterson. Numerous truck lines operate out of the port.

**Charts 11355 (879-SC), 11354 (880-SC), 11350 (881-SC), 11352 (1050), 11345 (1051).-Bayou Teche** is a navigable waterway in S Louisiana parallel to and 35 miles W of the Mississippi River, meandering NW for about 93 miles from its junction with Lower Atchafalaya River, about 8 miles W of Berwick Lock, to its sources in St. Landrys Parish. The lock has a length of 300 feet, width of 45 feet, and depth over the sill of 9 feet at mean low water.

There is considerable commerce on Bayou Teche and that part of Lower Atchafalaya River W of Berwick Lock, in seafood, shell, sugar, molasses, petroleum products, building cement, sand and gravel, oil-well pipe casing, machinery and supplies, fertilizer, and chemicals. There are shipyards and sugar mills along the bayou. Shell barges are the principal users; shrimp boats operate to Patterson.

The main State highway between New Orleans and Lake Charles follows the bayou through the principal towns.

A dredged channel leads from Berwick Lock W through the Lower Atchafalaya River and Bayou Teche to Arnaudville, a distance of about 92 miles. In August 1974, the controlling depths, except for shoaling to 2 feet through Calumet control structures, were 3 feet from Berwick Lock to Keystone Dam, about 62 miles above Berwick Lock, thence 7 feet to Arnaudville.

**Patterson,** 6 miles above Berwick Lock, has a shipyard which builds crewboats and other commercial and military vessels up to 120 feet long.

A highway bridge about 7 miles above Berwick Lock has a swing span with a clearance of 6 feet. (See 117.240 and 117.540, chapter 2, for drawbridge regulations and opening signals.) An overhead power cable at the bridge has a clearance of 68 feet. An overhead power cable crossing the bayou about 8.5 miles above Berwick Lock has a clearance of 66 feet.

A highway swing bridge with a clearance of 5 feet is at **Avalon** about 10.6 miles above the lock. (See 117.240 and 117.540, chapter 2, for drawbridge regulations and opening signals.)

Bayou Teche crosses the Wax Lake Outlet channel at **Calumet,** about 12 miles above Berwick Lock. There are floodgates, which are usually open, across both sides of Bayou Teche at its junction with Wax Lake Outlet. During high-water stages, the E gate remains closed. The W gate is manned 16 hours a day and is opened upon request. The opened widths through the floodgates are 45 feet. The overhead power cable just E of the E floodgate has a clearance of 60 feet. Local information should be obtained before attempting the alternate route through Sixmile Lake.

About 14 miles above Berwick Lock a highway swing bridge with a clearance of 4 feet crosses Bayou Teche. At **Centerville,** about 17 miles above the lock, an overhead power cable with a clearance of 60 feet crosses the bayou. A highway swing bridge with a clearance of 5 feet crosses the bayou about 0.5 mile W of Centerville. (See 117.240 and 117.540, chapter 2, for drawbridge regulations and opening signals.)

**Garden City,** 18.5 miles above Berwick Lock, is the site of a large lumber mill. A highway bridge about 20 miles above the lock has a swing span with a clearance of 7 feet. (See 117.240 and 117.540, chapter 2, for drawbridge regulations and opening signals.) An overhead power cable just E of the bridge has a clearance of 66 feet.

**Hanson Canal** is 20.2 miles above Berwick Lock; little used for navigation, it leads S from Bayou Teche at Garden City, turns W, and enters and follows Bayou Portage to the Intracoastal Waterway in Bayou Bartholomew. In 1972, it was reported that the canal was used only by small outboard boats and local knowledge was recommended. Near the junction of Hanson Canal and Bayou Teche are the remains of an abandoned lock; three fixed bridges with minimum widths of 29 feet and clearances of 6 feet; overhead pipelines with clearances of 7 feet, and overhead power cables with clearances of 35 feet. Traffic between the Intracoastal Waterway and Bayou Teche is via the Charenton Canal discussed later in this chapter and in chapter 12.

**Franklin,** about 22 miles above Berwick Lock, is an agricultural center that has several industries, and is the seat of St. Mary Parish. **Franklin Canal,** SW of Franklin, leads into Bayou Portage and connects with the Intracoastal Waterway at Bayou Bartholomew. In June 1974, the controlling depth in Franklin Canal was 6 feet. A highway swing bridge with a clearance of 7 feet crosses the canal near its N end. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) Overhead power cables with clearances of 60 feet cross the canal about 0.3 mile above and below the highway bridge.

An overhead power cable with a clearance of 60 feet crosses Bayou Teche just below Franklin.

At the town of Franklin a highway bridge with a swing span has a clearance of 2 feet. An overhead power cable just N of the bridge has a clearance of 60 feet. Another highway bridge with a swing span with a clearance of 4 feet is about 23 miles above Berwick Lock. The railroad bridge that crosses the bayou 26.5 miles above the lock, with a width of 49 feet, was not being used in 1972, and its span was left in an open position. A highway bridge with a

swing span having a clearance of 6 feet crosses the bayou 27 miles above the lock. Several more bridges with swing spans cross the bayou between 31.1 and 48.1 miles above the lock; minimum clearance is 4 feet. (See 117.240 and 117.540, chapter 2, for drawbridge regulations and opening signals.) Between Franklin and Jeanerette several overhead power cables cross the bayou; least clearance is 60 feet.

**Jeanerette** is 44 miles above Berwick Lock and is chiefly a market town; its principal products are sugar, oil, pecans, and peppers. There is a large foundry in the town.

About 1 mile NW of **Hope,** 46.5 miles above Berwick Lock, a highway swing bridge with a clearance of 5 feet crosses Bayou Teche. (See 117.240 and 117.540, chapter 2, for drawbridge regulations and opening signals.)

The highway bridge which crosses the bayou at **Olivier,** about 50 miles above Berwick Lock, has a swing span with a clearance of 4 feet. (See 117.240 and 117.540, chapter 2, for drawbridge regulations and opening signals.)

Between Jeanerette and New Iberia are several overhead power cables that cross the bayou; least clearance is 60 feet.

**New Iberia,** the seat of Iberia Parish, lies on the banks of Bayou Teche, 54 miles above Berwick Lock. The town is the center of an extensive agricultural area and has food processing plants, dairies, condiment factories, and several small manufacturing industries, and is a supply center for the oil development of the surrounding area. New Iberia has two hospitals.

Several highway bridges with swing spans and one with a bascule span cross the bayou at New Iberia; least clearance is 4 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

The **Port of New Iberia** is located 5 miles S of New Iberia, on the Commercial Canal which connects with the Intracoastal Waterway through **Rodere Canal, the New Iberia Southern Drainage Canal, Bayou Jack Canal,** and Bayou Carlin. The canal is 125 feet wide and in April 1974, had a controlling depth of 7½ feet to the Intracoastal Waterway. From the Intracoastal Waterway at the junction of Bayou Carlin and Weeks Bayou, a channel, reported dredged to 12 feet in 1965, and marked and maintained by the Port of New Iberia, leads for 15 miles across Vermilion Bay to Southwest Pass, and thence into the Gulf.

The port is 7 miles N of the Intracoastal Waterway, about 8.5 miles from Weeks Bay, and about 35 miles from deep water in the Gulf. The port has several slips and a small turning basin, all of which are reported to have a controlling depth of 14 feet in August 1972. The principal industries located in the port area are sugar, chemicals, fertilizer, shell, grain, oil-well rig and machinery construction and repair, pipe coating, and shipbuilding. Loading and docking facilities are available at the public dock and at the public boat slip about 0.5 mile S of the public dock. Open and covered berths, gasoline, diesel fuel, water, and ice are available. A shipyard in the port builds and repairs company-owned vessels.

The canal and port are governed by the Board of Directors of the Port Commission, New Iberia Port District.

There are highway and railroad connections to the port area.

Several highway bridges with swing spans cross Bayou Teche between New Iberia and Loreauville; minimum channel width 50 feet and minimum clearance 4 feet. The highway bridge at Loreauville 61.9 miles above Berwick Lock has a vertical-lift span with a clearance of 3 feet down and 50 feet up. (See 117.240 and 117.540, chapter 2, for drawbridge regulations and opening signals.) Overhead power cables crossing the bayou between New Iberia and Loreauville have a least clearance of 60 feet.

A shipbuilding plant on the W bank above **Loreauville,** about 8 miles above New Iberia, constructs steel and aluminum hull tugs, crew boats, and barges up to 135 feet long. In an emergency they can handle boats up to 80 feet long and with 7-foot draft for complete repairs. Gasoline, diesel fuel, lubricants, water, ice, and provisions are available. Marine supplies can be obtained at the yard.

A highway bridge about 4.5 miles above Loreauville has a swing span with a clearance of 8 feet. (See 117.240 and 117.540, chapter 2, for drawbridge regulations and opening signals.) An overhead power cable crosses the bayou between Loreauville and Keystone Lock; clearance is 60 feet.

**Keystone Lock,** 160 feet long and 36 feet wide with a depth of 9½ feet over the sill, is 16 miles above New Iberia and 70.6 miles above Berwick Lock, and halfway, by highway, between New Iberia and St. Martinville.

The least clearance of overhead power cables between Keystone Lock and Ruth is 50 feet.

**St. Martinville** is a town on Bayou Teche about 20 miles above New Iberia, of interest because of the early French settlers and Evangeline, the heroine of the Longfellow's famous poem. An overhead power cable crossing the bayou at St. Martinville has a clearance of 67 feet. A highway bridge over the bayou 73.1 miles above Berwick Lock has a swing span with a width of 40 feet and a clearance of 4 feet. A combination railroad-and-highway bridge at **Levert,** 75.2 miles above the lock, has a swing span with a clearance of 8 feet. (See 117.240, and 117.540, chapter 2, for drawbridge regulations and opening signals.)

A highway bridge at **Parks,** 78.8 miles above Berwick Lock, has a vertical lift span with a width of 41 feet and a clearance of 5 feet down and 50 feet up. (See 117.240 and 117.540, chapter 2, for drawbridge regulations and opening signals.)

A highway bridge, crossing the bayou at **Ruth,** 83.6 miles above Berwick Lock, has a swing span with a width of 42 feet and a clearance of 8 feet. (See 117.240 and 117.245 (a) through (e) and (j)(10), chapter 2, for drawbridge regulations and opening signals.)

Several bridges and overhead power cables cross the bayou between Ruth and Arnaudville. Least clearances are: swing spans, 15 feet; vertical-lift spans, 1 foot down, 51 feet up; removable spans, 5 feet; fixed spans, 7 feet. (See 117.240 and 117.245 (a) through (e) and (j)(11), chapter 2, for drawbridge regulations and opening signals.) Overhead power cables between Ruth and Arnaudville have clearances of about 50 feet.

The Lower Atchafalaya River leads N from Berwick Bay through Stouts Pass to Sixmile Lake. The marked channel N through **Sixmile Lake** and **Grand Lake** is part of the Atchafalaya River navigation system discussed in chapter 12.

**Wax Lake Outlet,** the deep drainage canal SSW from Sixmile Lake to Atchafalaya Bay, crosses Bayou Teche near Calumet, the Intracoastal Waterway in the vicinity of Possum Point Bayou, thence through Wax Lake into the bay. Two bridges with fixed channel spans and a minimum clearance of 2 feet control navigation in the canal S of Bayou Teche. An overhead power cable about 150 yards S of these bridges has a clearance of 60 feet. In 1969, the entrance to Wax Lake Outlet from Sixmile Lake was reported to be marked by private buoys; also reported was an old sugarmill and stack on the E side of the entrance.

**Chart 11351 (1276).-Little Wax Bayou,** branching W from Lower Atchafalaya River 2.5 miles below Morgan City, empties into **Wax Lake** and through **Wax Lake Pass** and **New Pass** into Atchafalaya Bay. The N end of the bayou has been straightened by dredged cuts to form the route of the Intracoastal Waterway W from Lower Atchafalaya River. **Big Wax Bayou** flows into Wax Lake Pass and through New Pass into Atchafalaya Bay. These bayous form an inside route from Morgan City to the W part of the bay. In 1969, shoaling to 2 feet, and numerous uncharted stumps, snags, and logs were reported in the approach to New Pass from Atchafalaya Bay extending about 4 miles S from a point in about 29°31.5'N., 91°26.5'W.

**Charts 11350 (881-SC), 11345 (1051), 11351 (1276), 11349 (1277).-Marsh Island,** on the S side of Vermilion Bay and W of Atchafalaya Bay, is low and marshy. The entire Gulf shore of the island is foul; numerous oyster reefs, some of which uncover at low water, extend for about 4.5 miles off the S point of the island. The foul area should not be entered without local knowledge. **Shell Keys,** a low group of small islands 3 miles SSW of **Mound Point,** the southernmost point of Marsh Island, are only about 2 feet high.

**Trinity Shoal** lies about 25 miles S of Southwest Pass, Vermilion Bay, and 60 miles 285° from Ship Shoal Abandoned Lighthouse. The shoal is about 20 miles long in a WSW and ENE direction, and has depths of 11 to 18 feet. It is fairly steep-to on its S side, the 5- and 10-fathom curves being distant only about 1 and 5 miles, respectively. In calm weather Trinity Shoal is discernible by a difference in the color of the water, and in stormy weather by a choppy sea. Because of its greater depth, the sea does not break as heavily on Trinity Shoal as it does on Ship Shoal.

**Vessels should approach Southwest Pass through the prescribed Safety Fairway.** (See 209.135, chapter 2.)

**Southwest Pass** extends between the W end of Marsh Island and the mainland and is the entrance to Vermilion Bay from the Gulf. The pass is marked by lights and daybeacons. An approach channel, reported dredged to 12 feet in 1965, leads across the bar just E of the Safety Fairway. Although not difficult to enter, the pass may be difficult to recognize and local assistance is advised.

**East Cote Blanche Bay, West Cote Blanche Bay,** and **Vermilion Bay** together make up a large body of water extending WNW from the NW side of Atchafalaya Bay, and are separated from the Gulf by Marsh Island. This water area is about 32 miles long and 5 to 15 miles wide, and depths averaging of 5 to 9 feet. With the exception of Cote Blanche Island, Week's Island, and Avery Island, the shores of these bays and Marsh Island are low and marshy. In recent years there has been extensive oil exploration in the bays offshore from **Burns** off **South Bend** in East Cote Blanche Bay, along the NW shore in West Cote Blanche Bay, and on Dry Reef.

Boats bound from Atchafalaya Bay to East Cote Blanche Bay generally use **Morrison Cutoff,** which is between **Point Chevreuil** on the E and **Rabbit Island** on the W. Under favorable conditions a draft of 4 to 5 feet can be carried through the cutoff into East Cote Blanche Bay and thence through West Cote Blanche Bay to Vermilion Bay. Local knowledge is needed to carry the best water.

**The Jaws,** at the NE corner of West Cote Blanche Bay is a passage connecting the bay with the Intracoastal Waterway and with **Charenton Canal.** A depth of about 4 feet can be carried through the passage; knowledge of local existing conditions is advised. The entrance from the bay is marked by a light. In 1969, it was reported that a line of private buoys marked a passage from the bay into The Jaws.

**Cote Blanche Island,** 97 feet high, is on the N side of West Cote Blanche Bay. From the bay side, the island appears as a reddish-yellow steep bluff. **Ivanhoe Canal,** W of the island, connects West Cote Blanche Bay with the Intracoastal Waterway. The canal is marked by private aids.

**Cypremort Point,** on the E side of Vermilion Bay and NW side of West Cote Blanche Bay, is the site of a summer resort. A private light marks the W extremity of the point. Several private canals, on which are homes and private docks, have been dredged into the banks on the N side of the point. Gasoline, diesel fuel, ice, and a launching ramp are available at a fuel facility on the point. The canals and the channel leading to the fuel facility had reported controlling depths of about 4 feet in August 1972. Private mooring slips are available. State Route 319 connects the point with the town of **Cypremort.**

**Weeks Island,** 171 feet high, is E of **Weeks Bay,** the NE extension of Vermilion Bay. The Intracoastal Waterway passes close along the W side of the island. Several storage tanks and the mine buildings make prominent landmarks from the bays; salt is mined on the island. There are rail and highway connections to **Balwin** on Bayou Teche. A large oil field is on the N side of Weeks Island.

**Avery Canal** leads NW from Vermilion Bay to a junction with Bayou Petite Anse at the Intracoastal Waterway. A dredged approach channel leads from Vermilion Bay to the canal. In December 1974, the controlling depths were 6 feet in the entrance channel and 7 feet in Avery Canal. Lights and a daybeacon mark the entrance.

A dredged channel in **Bayou Petite Anse** leads from the Intracoastal Waterway N for about 5.3 miles to a fixed highway bridge at the N end of Avery Island. In August 1973, the controlling depth was 6 feet. Buoys and daybeacons mark the channel.

**Avery Island,** E of Bayou Petite Anse, has several mine buildings that show prominently from Vermilion Bay. A canal 9 feet deep leads from Bayou Petite Anse to a salt mine on the island. A railroad and a highway from New Iberia extend as far S as Avery Island.

About 2.8 miles above the Intracoastal Waterway, a dredged channel in **Bayou Carlin** branches NW from Bayou Petite Anse for about 2.5 miles to a junction with Bayou Tigre and Delcambre Canal. The dredged channel in **Delcambre Canal** continues N to **Lake Peigneur.** In December 1974, the controlling depth was 8 feet in Bayou Carlin and Delcambre Canal.

**Delcambre** is on Delcambre Canal, 2 miles S of Lake Peigneur, and is the fishing center for Iberia Parish. The town has several seafood processing plants, public wharves, and two shipyards with marine ways capable of handling vessels up to 65 feet. General hull, engine, and electronic repairs can be made. There is a marina where covered berthage can be obtained. Numerous shrimp boats base at the port. Gasoline, diesel fuel, water, ice, and marine supplies are available. Highway and railroad bridges with vertical lift spans cross the canal at Delcambre. Each bridge has a channel width of 40 feet; the Southern Pacific railroad bridge has a clearance of zero feet down and 46 feet up, and State Route 14 highway bridge has a clearance of 2 feet down and 44 feet up. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) An overhead power cable at the highway bridge has a clearance of 51 feet.

**Jefferson Island,** on Lake Peigneur, is the site of a large salt mine. It is the head of navigation on the canal. The lake is cluttered with old piling and other obstructions.

**Bayou Tigre,** navigated only by small craft at high tide, is a tortuous waterway extending from Bayou Carlin to **Erath.** Seven bridges cross the bayou; minimum width is 9 feet, and minimum clearance of fixed spans is 1 foot. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

Private lights and daybeacons in Vermilion Bay mark the entrance channel into **Boston Bayou** about 7.3 miles SW of Avery Canal. A cattle drawbridge with a channel width of 16 feet and a clearance of 2 feet crosses Boston Bayou 0.2 mile above the mouth.

**Vermilion River,** also known as **Bayou Vermilion** and so marked at the bridge crossings, flows from the N and crosses the Intracoastal Waterway and enters Vermilion Bay through the **Vermilion River Cutoff.**

A dredged channel leads from Vermilion Bay through Vermilion River Cutoff, across the Intracoastal Waterway, and N in the Vermilion River to Lafayette. In September 1974, the controlling depths were 8 feet across the bar in Vermilion Bay, thence 9 feet to the Intracoastal Waterway, thence 10 feet to Abbeville, thence 5 feet to Lafayette. Private lights and buoys mark the entrance channel. A channel, marked by private aids, leads across Vermilion Bay from Southwest Pass to the entrance channel to Vermilion River Cutoff. The entrance shoals rapidly after dredging and may be difficult to enter during the winter when strong winds from the N lower the water in the bay. Mariners are advised that strong currents may be encountered in the river.

The limiting clearances of the numerous overhead power cables crossing the river are as follows: Intracoastal Waterway to Perry, 65 feet (at Rose Hill); Perry to Abbeville, 60 feet (just SW of Abbeville); and Abbeville to Lafayette, 54 feet (at Milton). The least clearance of the four swing bridges across the river is 8 feet; of the five vertical lift bridges, 4 feet down and 50 feet up; and of the two fixed bridges (both at Lafayette), 13 feet.

Waterborne commerce on the Vermilion River is in petroleum products, shell, oil-well pipe casing, machinery, cement, sand and gravel, and crushed rock.

**Intracoastal City,** on the Vermilion River just N of the Intracoastal Waterway, has several offshore oil-well terminals and bases, a fish packing plant and wharf, boat club, and several marinas and boatyards. The largest marine railway in the area can handle craft up to 50 feet for hull and engine

repairs; lifts are also available. Floating cranes up to 250 tons, lifts, and marine railways are available for hauling out barges for repairs at the oil company bases. Gasoline, diesel fuel, water, ice, marine supplies, and open and covered berthage are available. Depths of 5 to 14 feet were reported alongside the berths in August 1972.

A shipyard that builds and repairs tugs, party boats, and barges is on the W side of Vermilion River about 3.2 miles above the Intracoastal Waterway. The yard has several floating drydocks, a 25-ton mobile crane, and machine, joiner, and welding shops. The largest floating drydock is 220 feet long and can handle vessels up to 1,250 tons and 8½ feet in draft. Fuel can be trucked in, and marine supplies are available.

A cable ferry crosses the river at **Bancker,** a small village about halfway between the Intracoastal Waterway and Abbeville.

**Perry** is a small village about 16 miles above the Intracoastal Waterway. State Route 82 highway verticle lift bridge at Perry has a clearance of 10 feet down and 55 feet up. (See 117.240 and 117.540, chapter 2, for drawbridge regulations and opening signals.) A shipyard on the W side just below the bridge has marine ways capable of handling crew boats up to 65 feet long and 7 feet in draft for general repairs. Gasoline and diesel fuel can be trucked in. There are metal, joiner, and welding shops at the yard and hull and engine repairs can be made.

A service wharf for tugs and crew boats is on the W side of the Vermilion River about 18 miles above the Intracoastal Waterway. Gasoline, diesel fuel, water, and some marine supplies are available. A shipyard, on the W side of the river about 18.5 miles above the Intracoastal Waterway, builds and hauls out for repairs wooden and steel crew boats up to 75 feet, and steel barges up to 200 feet and 5 feet in draft. Just above the yard, the Southern Pacific Railroad swing bridge with a clearance of 8 feet crosses the river. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

**Abbeville,** about 19 miles above the Intracoastal Waterway, is the seat of Vermilion Parish. There are grain elevators, grain driers, warehouses, and a rice mill. The principal industries are oil and natural gas production, shell and cement, rice, cotton, wool, sugar, molasses, and syrup, dairy products, poultry, and cattle raising, and light industry in manufacture of consumer goods. The city has a hospital and a municipal airport, and is served by freight service of the Southern Pacific Railroad and bus lines. Two highway bridges crossing the river at Abbeville have lift spans with minimum clearances of 6 feet down and 55 feet up. (See 117.240 and 117.540, chapter 2, for drawbridge regulations and opening signals.) U.S. Route 167 and State Routes 14 and 82 pass through the city. The U.S. Public Health Service maintains a **contract physician's office** in Abbeville. (See appendix for address.)

Woodlawn Highway Bridge crossing the river about 27 miles above the Intracoastal Waterway has a swing span with a clearance of 13 feet. (See 117.240 and 117.540, chapter 2, for drawbridge regulations and opening signals.) An overhead power cable with a clearance of 77 feet crosses the river about 0.3 mile below the bridge. Gasoline is available at a dock near the bridge. State Route 92 highway bridge at **Milton** about 29.7 miles above the waterway has a vertical lift span with clearances of 4 feet down and 50 feet up. (See 117.240 and 117.540, chapter 2, for drawbridge regulations and opening signals.)

State Route 733 highway bridge at **Broussard Store** about 32.2 miles above the waterway has a vertical lift span with clearances of 6 feet down and 52 feet up. **Flanders** Highway Bridge about 36 miles above the waterway has a swing span with a clearance of 16 feet. (See 117.240 and 117.540, chapter 2, for drawbridge regulations and opening signals.)

Pinhook Highway Bridge about 2 miles below Lafayette and about 39.5 miles above the Intracoastal Waterway has a swing span with a clearance of 12 feet. (See 117.240 and 117.245 (a) through (e) and (j)(14), chapter 2, for drawbridge regulations and opening signals.)

**Lafayette,** about 42 miles above the Intracoastal Waterway, is the seat of Lafayette Parish. Lafayette is referred to as the administrative oil capital of the world and is the headquarters of over 600 major and associated oil companies. It is the historical and cultural center of the Acadian country and Cajun people. The University of Southwestern Louisiana is in the city. The principal industries are oil, natural gas, and salt production, but is primarily agricultural with production of rice, cotton, sugar, molasses, dairy products, livestock, wool, and poultry. Shell is manufactured into cement, and sand, gravel, and timber are important products. There are four large hospitals, a medical center, and a municipal auditorium in the city. The city is served by passenger and freight service of the Southern Pacific Railroad, bus lines, and airlines. The Lafayette Municipal Airport is on the E side of the city. Two bridges cross the river at Lafayette; U.S. Route 90 fixed highway bridge with a clearance of 13 feet and the Southern Pacific fixed railroad bridge, about 200 yards above the highway bridge, with a clearance of 21 feet. A small marina on the E side of the river below the highway bridge has a launching ramp and limited berthage. Gasoline and diesel fuel can be trucked in. Water is available, and minor repairs can be made. The head of navigation on the river is at the railroad bridge.

**Charts 11345 (1051), 11349 (1277), 11350 (881-SC), 11348 (883-SC).**-A dredged channel leads from the Gulf through **Freshwater Bayou Canal** and Schooner Bayou Cutoff to the Intracoastal Waterway about 1 mile W of In-

tracoastal City. In December 1974, the controlling depth was 12 feet. A lighted bell buoy marks the approach; lighted and unlighted buoys mark the entrance channel; and lights mark the channel to the Intracoastal Waterway. A saltwater barrier lock is about 1.3 miles above the entrance. The lock is 600 feet long and 84 feet wide, and has depths of 16 feet over the sills. Each end of the lock on the W side of the channel has 300-foot-long timber guidewall approaches. The lock is in operation continuously.

**Vessels should approach Freshwater Bayou from the Gulf through Freshwater Bayou Safety Fairway.** (See 209.135, chapter 2.)

**Schooner Bayou** empties into the extreme W extension of Vermilion Bay and forms a part of the former inside route of Mermentau River through White and Grand Lakes and connecting passages. The best approach to Schooner Bayou is through Schooner Bayou Cutoff, the dredged canal which takes off from the Intracoastal Waterway near Intracoastal City. In 1973, the controlling depth from the Intracoastal Waterway through Schooner Bayou Cutoff was 12 feet, thence 8½ feet through Schooner Bayou to the Schooner Bayou Control Structure. **Warren Canal,** Isle Marrone Canal, and **North Prong-Schooner Bayou** connect Schooner Bayou with the Intracoastal Waterway to the W of Vermilion Lock. In January 1974, the controlling depth was 7 feet in North Prong. **Schooner Bayou Canal** is crossed by a highway bridge 3.3 miles E of White Lake. The bridge has a swing span with a clearance of 6 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) An overhead power cable E of the bridge has a clearance of 95 feet.

The entrance channel to the bayou from Vermilion Bay via Mud Point is no longer maintained and has a depth of about 2 feet. To enter by this route, follow the privately marked channel in the old Vermilion River entrance to the mouth of the bayou which is marked by a light.

**Schooner Bayou Control Structure,** 4 miles inside the bayou, prevents saltwater from flowing through Schooner Bayou Canal into White Lake; the floodgates are 75 feet wide and 12 feet deep over the sill at mean low water. During high water the gates will be opened to permit passage of any vessel that can navigate against the current that attains velocities up to 5 knots. Vessels coming from E or W can bypass the floodgates by going through North Prong-Schooner Bayou into the Intracoastal Waterway SE of Forked Island.

From Schooner Bayou Canal, the route crosses White, Turtle, Collicon, and Grand Lakes. Several lights and daybeacons mark this route. During the dry summer months, when farmers pump water to irrigate their rice fields, water in the lakes lowers enough to hamper navigation. In January 1974, the controlling depth from Schooner Bayou Control Structure through Schooner Bayou Canal to White Lake was 8 feet, thence 3 feet through White Lake, Grand Lake, and connecting canals to Mermentau River.

**White Lake** is 12 miles long and 6 miles wide, and has depths of 4 feet or more over a mud bottom. The E entrance from the lake is marked by a light and the W entrance by a daybeacon, both aids being on the N side of the channel. The course across the lake passes about 0.5 mile off the point in the middle of the N shore of the lake. The channel is not marked.

Approach the E entrance with the line of the Schooner Bayou Canal in range ahead. The channel is narrow, and the spoil bank on the S side is marked by stakes. At the W end of the lake, pass about 10 to 15 yards S of the daybeacon just off the canal entrance.

**Turtle Lake** is nearly round, with a diameter of about 0.75 mile, and is shallow. **Alligator Lake** is about the same size and depth. **Collicon Lake** is 3 miles long, 1 mile wide, and from 2 to 3 feet deep. On the W side of this lake an earth dike extends along the N side of the channel. Keep close to this dike, within 5 to 10 yards of it.

**Grand Lake** is from 5 to 7 feet deep, but the entrances are subject to shoaling. At the SE end of the lake, the entrance from Collicon Lake leads within 5 to 10 yards along the S side of an earthen dike. A light marks the outer end of the dike. There are lights on Umbrella Point and **Grassy Point** and on the E point at the entrance to the Mermentau River. From the Collicon Lake canal entrance, steer to pass about 0.5 mile off Short Point, the first point to the N, and about the same distance off **Umbrella Point,** the second point to N. From Umbrella Point, pass about 0.25 mile E of Grassy Point, and when beyond this point haul to W and pass well off the E point at the entrance to the Mermentau River, which is marked by a light. About 0.5 mile up the Mermentau River, the Intracoastal Waterway enters from E, follows the river for about a mile, and exits to W. The river channel is deep.

A network of canals S from Schooner Bayou to Cheniere au Tigre and W to Pecan Island has been dredged through the marsh. **Sixmile Canal,** a 1.5-mile passage, leaves Schooner Bayou about 1.5 miles E of Schooner Bayou Control Structure and extends S to Freshwater Bayou Canal. **Belle Isle Bayou** enters Freshwater Bayou Canal about 5.3 miles S of Schooner Bayou.

**Freshwater Bayou** and **Louisiana Fur Company Canal** enter Freshwater Bayou Canal from the W about 10 miles S of Schooner Bayou. Louisiana Fur Company Canal leads NW for about 1.7 miles thence W and N for about 5 miles to the private facilities at a large oil field S of Pecan Island. There is a fish camp near the oil company base at which gasoline, diesel fuel, ice, groceries, and a launching ramp are available.

Other accesses to this network of canals is through **Deepwater Bayou** which enters Vermilion Bay about 1.5 miles S of Schooner Bayou, or

through **Fearman Lake** with outlets to Vermilion Bay on either side of **Redfish Point.** Fearman Lake is shallow, and local knowledge is necessary to carry the best water.

**Belle Isle,** W of Vermilion Bay, is a low ridge with most of the area under cultivation. The elevation is only slightly above that of the marsh. The headquarters of the Audubon Society Game Preserve is at **Audubon** on **McIlhenny Canal** at its junction with Belle Isle Bayou at the W end of Belle Isle Lake.

**Cheniere au Tigre,** 4 miles S of Belle Isle, is a wooded ridge about 3 miles long with its E end on the Gulf Coast. The 12-foot elevation on the ridge is the highest natural elevation in the locality.

**Pecan Island,** S of White Lake, is a long, wooded ridge about 10 feet high. **Pecan Island,** a village on the S end of **Pecan Island Canal,** has a few stores with limited supplies. Gasoline may be obtained by portage.

**Pecan Island Canal,** a dredged channel, leads S from White Lake to Pecan Island. In 1956, the controlling depth across the bar was 1 foot. A light shown from a square black daymark on piles marks the N entrance of the canal.

**Charts 11348 (883-SC), 11345 (1051), 11344 (1278).-Mermentau River** empties into the Gulf of Mexico 86 miles W of Atchafalaya Bay Entrance E of Calcasieu Pass. The entrance channel shifts frequently and should be approached with caution. From the Gulf, the Mermentau leads E through Lower Mud Lake and Upper Mud Lake, thence N into the SW side of Grand Lake, out of the N end of Grand Lake to the Intracoastal Waterway and continuing on 32 miles through **Lake Arthur** to the head of navigation at the junction of Bayous Nezpique and des Cannes, where the river is formed.

**Vessels should approach Mermentau River from the Gulf through Mermentau Pass Safety Fairway.** (See 209.135, chapter 2.)

In 1968-February 1974, the controlling depths were 4 feet over the bar at the mouth, thence 3 feet to the highway swing bridge about 6 miles above the mouth, thence in September 1974, 3 feet to the Intracoastal Waterway, thence in December 1974, 10 feet through Lake Arthur to the junction of Bayous Nezpique and des Cannes.

An alternate jettied entrance to Mermentau River is through a landcut about 6 miles SSE of the natural entrance. This entrance is favored. The dredged channel had a controlling depth of 10 feet in February-September 1974 to the highway swing bridge about 6 miles above the mouth of the river.

Numerous aids mark the channel in the Mermentau River N of the Intracoastal Waterway. Near the center of Lake Arthur the channel passes through a constriction known as **The Narrows.**

The control structure across Mermentau River at Catfish Point, just below Grand Lake, has dikes and three gates to prevent the inflow of saltwater. The gates are opened for passing boats. Each gate opening is 56 feet wide; the depths over the sills are 15 feet for the two SE gates and 10 feet for the NW gate.

The principal commodities carried by barge on the river are petroleum products, oil-well pipe casing, machinery, clays and drilling mud, sand, gravel, and crushed rock.

Mermentau River is crossed by the following bridges and cables: 2.3 miles W of Grand Chenier, overhead power cables with a least clearance of 46 feet, are on the S side of State Route 82 highway bridge, which has a swing span having a clearance of 13 feet; about 1 mile W of Grand Chenier, an overhead power cable with a clearance of 68 feet; at Lake Arthur, State Route 14 highway bridge with a fixed span having a clearance of 28 feet. In 1972, a fixed highway bridge with a design clearance of 50 feet was under construction near State Route 14 highway bridge which it will replace. Overhead power cables crossing the river above Lake Arthur have a least clearance of 50 feet.

At Mermentau, the Southern Pacific railroad bridge with a swing span has a clearance of 10 feet and U.S. Route 90 highway bridge with a fixed channel span has a clearance of 29 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) Mariners should exercise extreme caution to prevent collision when approaching and navigating through the drawspan. Tows navigating through the drawspan shall not exceed one barge, and the towing vessels shall be made rigid abreast or astern of the barge.

**Creole Canal** leads NW from the Mermentau River, about 1.3 miles above its entrance. A launching ramp, ice, and gasoline are available at a grocery store at the head of the canal. A reported depth of 3 feet could be carried to the facility in September 1972. Several oil company supply bases are near the State Route 82 highway bridge. Diesel fuel is available at a fuel dock on the E side of the canal about 0.3 mile below the bridge.

**Grand Chenier,** a small settlement on the E side of the river between Lower and Upper Mud Lakes, has a highway connection to Lake Charles. Gasoline, water, and limited quantities of provisions are available in the village.

**Lake Arthur,** a town on the NW side of Lake Arthur 13 miles above the Intracoastal Waterway, has highway and rail connections to Lake Charles. A depth of about 6 feet can be taken to the city pier at Lake Arthur. Gasoline, diesel fuel, lubricants, water, ice, and supplies are available in the town.

**Mermentau,** 16 miles above Lake Arthur, is a rice milling center that has railroad and highway connections with New Orleans and Lake Charles.

**Port of Jennings,** on the W side of Mermentau River just below the railroad bridge, has slips with barge loading facilities, open storage areas for oil-well pipe casings and supplies, and rail facilities. Two shipyards in the port build tugs, crew boats,

and barges. A marine railway at one of the yards can handle craft up to 250 feet for general repairs. Mobile cranes up to 60 tons, machine, metal, welding, and joiner shops are available.

The town of **Jennings,** about 4 miles W of the port, is the center of natural gas production in SW Louisiana. It is also an important agriculture center in raising of rice and livestock, and in the production of fertilizer and cement from sea shells. Jennings has a hospital and is served by the Southern Pacific Railroad and several bus lines.

From the head of Mermentau River, Bayous Nezpique and des Cannes were navigable for depths and distances as follows: Bayou Nezpique, 12 feet for about 6.1 miles to Interstate Route 10 highway bridge in January-February 1973, thence in 1963, 14 feet for 5.2 miles, thence 4 feet for about 11 miles; Bayou des Cannes, 12 feet for about 4 miles in December 1974, thence in 1963, 4½ feet for about 2.6 miles.

Crossing Bayou Nezpique NE of Jennings are Interstate Route 10 twin fixed highway bridges with channel widths of 40 feet and clearances of 28 feet and State Route 97 highway bridge, which has a swing span with a channel width of 40 feet and a clearance of 8 feet. (See 117.240 and 117.245 (a) through (e) and (j)(17), chapter 2, for drawbridge regulations and opening signals.) Overhead cables at the swing bridge have a clearance of 39 feet, and an overhead power cable S of the twin bridges has a clearance of 61 feet.

**Bayou des Cannes** is crossed at **Evangeline** by the twin fixed spans of Interstate Route 10, about 4 miles above the mouth with a 35-foot span and a clearance of 14 feet, and about 7.4 miles above the mouth by State Route 97 highway bridge with a 45-foot span with a clearance of 1 foot.

**Bayou Plaquemine Brule** empties into Bayou des Cannes about 1 mile above Mermentau River. A dredged channel leads from the mouth of the bayou E for about 16 miles to near the town of **Crowley.** In 1972-1974, the controlling depth was 8 feet. The principal commodities carried on the bayou are shell and rice. Crowley has a large rice mill and elevator.

A ferry crosses the bayou SW of **Egan.** The Southern Pacific railroad bridge crossing the bayou N of **Midland** has a swing span with a clearance of 5 feet. (See 117.240 and 117.245 (a) through (e) and (j)(16), chapter 2, for drawbridge regulations and opening signals.) A cable ferry crosses the bayou N of **Estherwood.** Overhead cables crossing the bayou have a least clearance of 50 feet.

**Charts 11347 (651-SC), 11345 (1051).-Calcasieu Pass,** the outlet of Calcasieu Lake, is about 98 miles W of Atchafalaya Bay entrance and 78 miles E of Galveston entrance. It is the first and only deep-draft channel W of the Mississippi River and E of Sabine Pass.

**Prominent features.**-In the vicinity of Calcasieu Pass are the range and jetties and, at night, the occulting red obstruction lights on the many radio towers in the area. A silver elevated water tank in Cameron and three tall microwave towers 1.5 miles E of Cameron are very conspicuous from seaward.

**Vessels should approach Calcasieu Pass through the prescribed Safety Fairways.** (See 209.135, chapter 2.)

**Channels.**-The Calcasieu entrance has been improved by jetties and a deepwater channel. The jetties extend seaward from the shoreline for about 1.1 miles and are mostly above normal high tide. A Federal project provides for a channel 42 feet deep across the outer bar from that depth in the Gulf to the entrance jetties, thence 40-42 feet through the jetties, thence 40 feet to the Port of Lake Charles wharves, and thence 35 feet to the U.S. Interstate 10/Route 90 highway bridge. (See Notice to Mariners and latest editions of charts for controlling depths.)

The channel is marked by lighted buoys and by a lighted midchannel whistle buoy at the entrance. A lighted **351°49.5'** range leads across the bar between the jetties and into the pass.

**Caution.**-The **Sea Buoy (Calcasieu Pass Midchannel Lighted Whistle Buoy CC)** is in 29°27'19"N., 93°13'25"W. Shipmasters are cautioned against mistaking the Sea Buoy for Sabine Bank East End Lighted Whistle Buoy 1, which is 4.3 miles to the W.

**Anchorages.-Large vessels should anchor in Calcasieu Pass Fairway Anchorage, E of the safety fairway.** (See 209.135, chapter 2.) Vessels up to 12 feet in draft can obtain excellent anchorage in the bend in the river at Cameron. While waiting for daylight or fog to lift, ships can anchor out of the fairway anywhere in Calcasieu River. No anchorages exist in the landcuts, and ships entering cuts are expected to complete passage. In fog, deep-draft vessels should anchor 2 to 3 miles E of the pilot boarding station.

**Dangers.**-Seaward of the jetties, a moderate to strong current sweeps across the channel, normally setting in a W direction; however, strong W winds will cause a current reversal; mariners should exercise caution and be on the alert. A mud slush lying on the bottom, approximately 6 feet above the hard surface, frequently will be found in the channel seaward of the jetties and at various places above the pass. This material can hardly be detected by the leadline. A 1- to 4-foot layer of soupy material, some 8 to 10 feet above the hard bottom and 20 to 23 feet below the surface, occasionally is encountered in the same localities.

**Spoil banks** of undetermined depth exist on the W side of the entrance channel and outer channel except within a mile N and S of Calcasieu Channel Lighted Buoy 26, which area, the Lake Charles Pilots report, has been left clear for Pilot Station No. 1.

**Dumping grounds and prohibited dumping grounds** are located in the Gulf of Mexico off Calcasieu Pass. (See 205.80 (a), (b)(9), and (c)(5), chapter 2, for limits and regulations.)

**Tides and currents.**-Diurnal range of tide in Calcasieu Pass is 2.0 feet; in Calcasieu Lake and River it is less than 0.5 foot. Flood waters may increase the normal river level at Lake Charles 1.5 feet. There is little current in the river except during freshets.

**Weather.**-The temperature averages from the low 50's in January to the low 80's in July. Frosts are experienced from late November to late February. Northers are prevalent from November through January. Rainfall averages 60 inches annually with about 10 inches in December. Fogs are most frequent in December, but may be experienced from October through March. They usually set in during a warm spell following a period of cold weather and come in with E and SE winds and clear with N or W winds.

**Pilotage** is compulsory for all foreign vessels and U.S. vessels under register in foreign trade. Pilotage is optional for U.S. vessels of over 100 tons in coastwise trade that have on board a pilot licensed by the Federal Government. Arrangements for pilot service are usually handled through the ships' agents. The pilot station on Monkey Island monitors VHF-FM channels 12 (156.60 MHz) and 16 (156.80 MHz) when vessels are expected. The pilots carry portable radiotelephones using channel 13 (156.65 MHz) as the working frequency. A 24-hour notice of time of arrival at one of the following designated pilot stations, where pilots will board, is requested.

**Station No. 1, for vessels drawing 35 feet or less.**-In the entrance channel within 2 miles of 29°38.8'N., 93°19.5'W.

**Station No. 2, for vessels drawing between 35 and 38 feet.**-In the outer approach channel within 2 miles of 29°34'N., 93°16'W.

**Station No. 3, for vessels drawing over 38 feet.**-In the outer approach channel within 2 miles of 29°29'N., 93°13.4'W.

**Note.-Vessels requesting a pilot to board at Stations 2 or 3 will be charged an additional pilotage fee.**

Vessels are taken to and from Lake Charles day or night. The 55-foot pilot boat has a white hull and superstructure with green trim with the name CALCASIEU PILOT in black on the bow and stern, and flies the International Code flag "P" by day and shows the standard pilot lights at night.

The pilots maintain a 24-hour lookout from the pilot station on the S end of Monkey Island. Pilots can be contacted by radiotelephone or through the Port Arthur marine operator; telephone (318-436-0372).

**Cameron,** the seat of Cameron Parish, is a fishing village on the E shore of Calcasieu Pass 2.5 miles above its entrance. The village has numerous oil-well supply bases, shrimp-packing houses, and a menhaden processing plant. Gasoline, diesel fuel, water, ice, and marine supplies are available. A boatyard on Monkey Island has a 53-ton floating drydock which has a 30-foot beam and a 10-foot sill depth. Hull repairs are made at this yard while engine repairs can be made at Cameron.

Small craft may find berthing space or can anchor in the bend of the river near Cameron in depths of 12 to 30 feet. An auto ferry crosses the ship channel NW of Cameron. Another smaller auto ferry crosses the river at Cameron and connects Cameron with Monkey Island, which was formed by the river and ship channel. Overhead power cables with a least clearance of 54 feet cross the river at Cameron. The U.S. Public Health Service maintains a **contract physician's office** in Cameron. (See appendix for address.)

**Storm warning signals are displayed.** (See chart.)

**Calcasieu Lake,** at the head of Calcasieu Pass, 6 miles from the Gulf, is 15 miles long, 3 to 5 miles wide, and 5 to 7 feet deep. The controlling depth off the entrance at the S end was reported to be 6 feet in 1971. The controlling depth at West Pass, at the N end, was about 3 feet, but the lake bottom is so soft that slightly greater drafts can drag through. A row of piles marks the W side of the channel across the lake. Along the S end of the lake is an old revetment, partly submerged, extending about 1.5 miles E.

**Grand Lake,** a summer resort on the NE side of Calcasieu Lake, has numerous private piers.

**Hackberry,** on the NW side of the lake, is an oil drilling center. Both towns have highway connections to Lake Charles.

**Chart 11347 (651-SC).-Calcasieu River and Ship Channel.** N of Calcasieu Pass, the ship channel cuts across points of land along the W side of Calcasieu Lake to a junction with the Calcasieu River at **Choupique Island.** The channel is straight and well marked by lights and lighted ranges.

The Intracoastal Waterway crosses the ship channel at the N end of Choupique Island, at the mouth of the **Calcasieu River,** and continues W through **Choupique Cutoff.** N of the intersection with the Intracoastal Waterway, the ship channel follows the natural channel of Calcasieu River to the N side of **Moss Lake,** thence bypassing the river through a landcut about 1 mile long to the W bend of the river just above Haymark Terminal, thence in the natural channel to Rose Bluff, thence through **Rose Bluff Cutoff** and continuing on the same course through a cut across the S end of **Coon Island;** thence, the E or right fork for about 1.5 miles to the port wharves at Port of Lake Charles. Deep water is along midchannel but, unlike most rivers, the deeper water often favors the points rather than the bends.

**Calcasieu Landing,** on the W bank of the Calcasieu River just N of its junction with Choupique Cutoff. A shipyard here has a 2,000-ton floating drydock which can handle ships up to 200 feet and barges up to 300 feet long and 55 feet wide with drafts of 14 feet for general repairs. A marine railway at the shipyard can handle vessels up to 200 feet. The yard builds tugs, crew boats, and barges

up to 200 feet. There are metal, joiner, machine, and welding shops, a mobile crane, and tank cleaning facilities. A fuel dock adjoins the shipyard. Diesel fuel is available on a 24-hour basis at the dock or in midstream by barge. The fuel facility monitors VHF-FM channel 16 (156.80 MHz) continuously.

**Haymark Terminal, Vincent Landing,** and **Rose Bluff** are sites of extensive oil refining, storage, and shipping facilities on the Calcasieu River below Port of Lake Charles. They are discussed later in this chapter under wharves at Port Charles. An overhead power cable with a clearance of 170 feet crosses the river 0.7 mile above Vincent Landing.

A highway bridge at the N end of Rose Bluff Cutoff, about 1.5 miles below Port of Lake Charles, has a fixed channel span with a clearance of 135 feet.

**Note.**-Considerable damage, including bank erosion, is being suffered by properties along the river, particularly in the vicinity of Vincent Landing and the S or lower portion of Moss Lake. The damage results principally from wave action of light tugs and light or partially loaded ships. (See 207.180, chapter 2, for navigation regulations.) Mariners are directed to exercise every caution and to proceed at slow speed.

**Bayou d'Inde,** branching W from Rose Bluff Cutoff, is crossed by State Route 108 highway bridge 3.7 miles above the cutoff. The bridge has a 38-foot removable span with a clearance of 8 feet. Just above it the Kansas City Southern railroad bridge has a 33-foot removable span with a clearance of 6 feet. (See 117.240 and 117.245 (a) through (e) and (j)(22), chapter 2, for drawbridge regulations and opening signals.) Overhead power cables cross the bayou at all three bridges. The head of navigation on the bayou is 6.3 miles above the cutoff, which is 0.3 mile below Sulphur.

**Contraband Bayou** branches E from Calcasieu River just S of Port of Lake Charles deepwater terminals. A highway bridge crossing the bayou about 1.6 miles above the mouth has a fixed span with a clearance of 15 feet. The twin fixed spans of another highway bridge with a clearance of 15 feet are 0.1 mile above the first bridge.

A boatyard on the E side of the bayou just NW of the first highway bridge has a marine railway that can handle vessels up to 60 feet for hull and engine repairs. A basin at the yard has gasoline and covered berthing with electricity available. A marina on the E side of the bayou about 0.3 mile N of the boatyard has a mobile hoist that can handle vessels up to 30 tons for hull and minor engine repairs. Berths with electricity, gasoline, and water are available. In September 1974, the controlling depth from the cargo wharves was 6 feet to the first bridge.

A cut made across a narrow neck of land left a channel that forms a complete loop around **Clooney Island,** enabling vessels to turn around and head downstream. A dredged channel leads W off the NW side of the loop to a large alkali plant. A depth of about 18 feet can be carried to the first wharf in the channel, thence about 7 feet beyond the wharf.

The **Port of Lake Charles,** about 32 miles from the Gulf, is opposite Clooney Island on the E bank of Calcasieu River and the N bank of Contraband Bayou. It is the only major port in W Louisiana. The principal imports are vegetable oils, petroleum, steel products, barite and other ores, automobiles, fertilizer, and paint pigments. The major exports are dried milk, rice, flour, linerboard, synthetic rubber, naval stores, lumber, petroleum coke, petroleum products, chemicals, and alcohol. Other commodities handled at the port include caustic soda ash, paper products, grains and brans, creosote, frozen and canned meats, dried milk, phosphate rock, machinery, and general cargo.

**Lake Charles,** the seat of Calcasieu Parish, is located around the E side of the lake about 34 miles from the Gulf. It is the center of large chemical, petroleum, natural gas, fish oil, synthetic rubber, salt, seafood, and rice industries. There is a large municipal airport S of the city and two private airports. McNeese State University is here. Interstate Route 10 and U.S. Route 90, the main E-W highways, pass through the city, and U.S. Routes 165 and 171 lead N out of the city.

**Towage.**-Several towing companies maintain offices at the Port of Lake Charles. Tugs up to 1,600 hp are available. Divers can be obtained.

**Customs** and **immigration** officials are stationed in Lake Charles, and **agricultural quarantine** officials are stationed in Port Arthur. (See appendix for addresses.) Vessels subject to such inspections generally make arrangements in advance through ships' agents; officials usually board vessels at their berths.

**Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See U.S. Public Health Service, chapter 1.)

The nearest Public Health Service **contract physician's office** is in Cameron. There are several hospitals in Lake Charles.

Lake Charles is a **customs port of entry.**

The Coast Guard maintains a **vessel documentation office** in Lake Charles. (See appendix for address.)

**Harbor regulations.**-Federal regulations applicable to Lake Charles are those usually in force at most seaports of the United States. Local rules and regulations are enforced by a Port Director acting for the Board of Harbor Commissioners for the Port of Lake Charles, an agency of the State of Louisiana. The authority of the Commission extends from the N end of Calcasieu Lake N to Westlake.

**Wharves.**-Lake Charles has more than 60 piers and wharves. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to the Port Series, a Corps of En-

gineers publication.) The alongside depths for the facilities described are reported; for information on the latest depths contact the operator. Most of the facilities have highway and railroad connections, water, and electrical shore power.

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.

More than 400,000 square feet of covered storage and 115,000 square feet of open storage are available in the port. Mobile cranes up to 50 tons are available at the port.

**N side of Industrial Canal:**

Gulf Coast Aluminum Corp. Wharf (30°06.6'N., 93°17.8'W.): 540-foot face, 1,260 feet with dolphins; 35 feet alongside; deck height, 15 feet; loading tower and conveyor, loading rate 800 tons per hour, 100-ton crawler crane with clamshell bucket, unloading rate 125 tons per hour; receipt of alumina, shipment of calcined petroleum coke and molded carbon anode blocks; owned and operated by Gulf Coast Aluminum Corp.

**Haymark Terminal:**

Shell Oil Co. Wharf (30°08.1'N., 93°19.1'W.): 600-foot face; 25 feet alongside; deck height, 6 feet; shipment of crude oil; owned and operated by Shell Oil Co.

**W side of Calcasieu River:**

Mobil Oil Corp., Tanker Wharf (30°09.4'N., 93°19.8'W.): 570-foot face, 700 feet with dolphins; 40 feet alongside; deck height, 12 feet; receipt and shipment of crude oil; owned and operated by Mobil Oil Corp.

Clifton Ridge Terminal, Tanker Wharf (30°09.5'N., 93°19.5'W.): 660-foot face; 40 feet alongside; deck height, 11 feet; receipt and shipment of crude oil; owned and operated by Cities Service Oil Co.

Dock B (30°10.5'N., 93°19.1'W.): 700-foot face, 900 feet with dolphins; 40 feet alongside; deck height, 12 feet; receipt of crude oil, shipment of petroleum products, bunkering vessels; owned and operated by Cities Service Oil Co.

Dock C: 300 yards N of Dock B; 600-foot face; 40 feet alongside; deck height, 12 feet; receipt of crude oil, shipment of petroleum products, bunkering vessels; owned and operated by Cities Service Oil Co.

Dock D (30°11.0'N., 93°18.7'W.): 835-foot face; 40 feet alongside; deck height, 11 feet; shipment of petroleum products, liquid wax, lubricating oils, and ethylene glycol; owned by Cities Service Oil Co., operated by Cities Service Oil Co., Cit-Con Oil Corp., and Columbian Carbon Corp.

Lake Charles Harbor and Terminal District, Bulk Handling Terminal Wharf (30°11.5'N., 93°17.9'W.): 600-foot face, 960 feet with dolphins; 40 feet alongside; deck height, 14 feet; electric loading tower with chute and conveyor system, loading rate 1,000 tons per hour; shipment of raw and calcined petroleum coke; owned and operated by Lake Charles Harbor and Terminal District.

**Old River:**

PPG Caustic Soda Dock (30°13.4'N., 93°16.7'W.): 140-foot face, 535-feet with dolphins; 32 feet alongside; deck height, 7½ feet; receipt and shipment of liquid caustic soda, shipment of ethylene dichloride and chlorinated solvents; owned and operated by PPG Industries, Inc.

**N side of Contraband Bayou,** all facilities owned and operated by Lake Charles Harbor and Terminal District.

Berth 10: 0.4 mile from Calcasieu River; 200-foot face, 900 feet with dolphins; 35 feet alongside; deck height, 14 feet; loading tower and conveyor system, loading rate 400 tons per hour from storage, 200 tons per hour from rail cars; shipment of raw and calcined petroleum coke.

Bulk Rice Loading Dock: 0.25 mile from Calcasieu River; 350 feet with dolphins; 35 feet alongside; deck height, 7½ feet; loading tower and conveyor system; shipment of bulk rice.

Berths 8 and 9: junction of Calcasieu River and Contraband Bayou; 1,011-foot face; 35 feet alongside; deck height, 14 feet; 89,000 square feet covered storage; receipt and shipment of general cargo, receipt of fertilizer materials.

**Port of Lake Charles,** all facilities owned and operated by Lake Charles Harbor and Terminal District.

Berth 7: on Calcasieu River at junction of Contraband Bayou; 577-foot face; 35 feet alongside; deck height, 14 feet; 14,000 square feet covered storage; receipt and shipment of general cargo; receipt of fertilizer materials.

Berths 4, 5, and 6: 100 yards N of Berth 7; 1,600-foot face; 35 feet alongside; deck height, 14 feet; 170,000 square feet covered storage; receipt and shipment of general cargo, receipt of creosote.

Berths 1, 2, and 3: 100 yards NE of Berth 4; 1,578-foot face; 35 feet alongside; deck height, 14 feet; 141,000 square feet covered storage; receipt and shipment of general cargo; receipt of coconut oil.

Linerboard Wharf: 0.1 mile SE of Berth 1; 625-foot face; 40 feet alongside; deck height, 14 feet; 75,000 square feet covered storage; shipment of linerboard rolls.

**W side of Lake Charles:**

West Lake Terminal, Grinding Plant Wharf: 0.3 mile below Interstate Route 10 highway bridge; 250-foot face, 355 feet with dolphins; 35 feet alongside; deck height, 12 feet; two 60-ton cranes; receipt of phosphate rock and barite ore, shipment of bulk and bagged ground barite by barge; owned by Lake Charles Harbor and Terminal District, operated by Lake Charles Harbor and Terminal District and Dresser Industries, Inc.

**Cooney Island Loop:**

Continental Oil Co. Wharf No. 3 (30°13.8'N., 93°15.2'W.): 535-foot face, 640 feet with dolphins; 40 feet alongside; deck height, 14 feet; receipt of crude oil, shipment of petroleum products, bunkering vessels; owned and operated by Continental Oil Co.

Continental Oil Co. Wharf No. 1: 0.2 mile NW of Wharf No. 3; 570-foot face; 40 feet alongside; deck height, 15 feet; receipt of crude oil, shipment of petroleum products, bunkering vessels; owned and operated by Continental Oil Co.

ABC Wharf: 0.25 mile W of Wharf No. 1; 32-foot face, 253 feet with dolphins; 30 feet alongside; deck height, 7½ feet; receipt and shipment of liquid caustic soda, shipment of ammonia; owned and operated by Olin Corp.

**Supplies.**-Marine supplies are available. Freshwater is available at most deep-draft wharves. Bunker fuels are available at several of the oil terminals and by barge from Port Arthur by prior arrangements.

**Repairs.**-Lake Charles has no facilities for making major repairs or drydocking deep-draft vessels, the nearest such facilities are at Beaumont, Tex. Shipyards at Calcasieu Landing and on Contraband Bayou are available for making minor above-the-waterline repairs to vessels and hull and engine repairs to smaller vessels.

**Communications.**-The Southern Pacific, Missouri Pacific, and Kansas City Southern Railroads serve the city. Texas International Airline has scheduled service from the Municipal Airport. Several buslines and motor freight lines serve the city. Numerous steamship lines have scheduled service to all ports of the world. Several barge lines operate from the port.

About a mile above the port docks, the river widens into **Lake Charles.** The lake is fairly circular and more than a mile in diameter. The city of Lake Charles fronts on the E shore. The river channel extends along the W side of the lake.

Facilities are limited for small boats. Limited berthage is available at facilities on Contraband Bayou, and gasoline and diesel fuel are available at a small pier on the N side of the lake. Good anchorage is available in the lake in depths of 8 to 10 feet.

**Westlake,** is an industrial suburb of the city of Lake Charles on the W side of the Calcasieu River about 2 miles above the Port of Lake Charles wharves. U.S. Route 90 highway bridge that crosses the river and the N part of Lake Charles near Westlake has a fixed cantilever center span with clearance of 95 feet for a width of 380 feet and a clearance of 135 feet for the middle 200 feet of span. Just N of the highway bridge are the Southern Pacific and the Kansas City Southern railroad bridges with swing spans having a minimum clearance of 1 foot. The prescribed navigable W draw openings are protected with fender systems; any craft navigating the E draw opening does so at its own risk. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) About 0.2 mile above these bridges there is an overhead power cable with clearance of 110 feet.

**Calcasieu River Salt Water Barrier,** about 2.1 miles above the Kansas City Southern railroad bridge at Westlake, prevents salt water from flowing upriver and interfering with irrigation of the rice lands during the growing season.

The barrier consists of a 56-foot wide navigation structure with a depth of 13 feet over the sill; a floodway control structure parallel to and immediately S of the navigation structure; and a dam on a loop of the river at Two O'Clock Point, about 3.9 miles above the floodway control structure.

The dam prevents navigation upriver via the old river route. All traffic upriver is via the navigation structure. Mariners are cautioned not to pass through the floodway control structure under any conditions.

The entrance channels to the navigation and floodway control structures are marked with large signs for the aid of navigation. Yellow rope barriers hang from the center of each flood control structure gate to the water surface.

Generally, the navigation and flood control structures will be operated from 0600 to 2200 hours, 7 days a week, March through September during the rice growing season. The structures will be left open during the rest of the year.

An overhead power cable with a clearance of 136 feet, and the Southern Pacific Railroad bridge with a swing span and clearance of 7 feet, cross the river about 0.8 mile and 1.7 miles, respectively, above the navigation structure. (See 117.240, chapter 2, for drawbridge regulations and opening signals.)

**West Fork** of Calcasieu River branches W about 0.9 mile above the navigation structure. Overhead power cables cross the fork about 3 miles above Calcasieu River, and a vertical lift bridge with a clearance of 14 feet down and 50 feet up crosses the fork about 4 miles above the river. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) An overhead power cable is at the bridge.

**Houston River,** branches W from the West Fork of Calcasieu River. About a mile above the mouth, overhead power cables with a least clearance of 61 feet cross the Houston River. A highway bridge about 4.7 miles above the mouth has a 17-foot fixed span with a clearance of 10 feet. The Kansas City Southern railroad bridge about 5 miles above the mouth has a swing span with a channel width of 27 feet and clearance of 6 feet. (See 117.240 and 117.245 (a) through (e) and (j)(24), chapter 2, for drawbridge regulations and opening signals.)

**English Bayou,** branches E from Calcasieu River about 1.9 miles above the navigation structure. U.S. Route 171 fixed highway bridge with a clearance of 14 feet crosses the bayou about 0.7 mile above its mouth. An overhead power cable with a clearance of 45 feet crosses the bayou just above the bridge.

U.S. Route 171 fixed highway bridge with a clearance of 35 feet crosses Calcasieu River about 4.6 miles above the navigation structure.

In February 1974, the controlling depths in the Calcasieu River were 11 feet from U.S. Route 90-Interstate 10 fixed highway bridge to the intersection of West Fork of Calcasieu River, thence 8 feet to Hecker; above this point, the river is not navigable because of snags and trees.

**Chart 11341 (1279).-Sabine Bank,** is a succession of detached shoal spots parallel with and distant about 17 miles from the mainland. From the vicinity of Calcasieu Pass, the bank extends about 38 miles W to the vicinity of Sabine Pass and has several passages between the detached shoals. Depths on the shoals range from 16 to 30 feet and are subject to change.

**Sabine Bank Light**(29°28.3'N., 93°43.4'W.), 72 feet above the water, is shown from a red conical tower on a cylindrical pier about midway of the bank. A lighted whistle buoy, about 19 miles S of Calcasieu Pass, marks the E end of Sabine Bank.

**Sabine Bank Channel,** leads through Sabine Bank through a passage locally known as **Hole in the Wall.** This is the most used passage and is marked by lighted and unlighted buoys; its depth may be reduced as much as 3 feet during northers. The E part of the bank has a number of oil well platforms. They are lighted.

To the S of Sabine Bank and about 6 miles inside the 10-fathom curve, the bottom is somewhat irregular and broken, and several spots with depths of 35 feet or less are surrounded by depths 10 to 20 feet greater. There is an unmarked 28-foot shoal about 12 miles SE of Sabine Bank Light. These shoals lie near the track line of vessels making the passage through Hole in the Wall from the SE.

N of Sabine Bank, general depths are 33 to 40 feet. In 1965, shoaling from 3 to 6 feet less than charted depths was reported within 6 miles of the beach between Calcasieu Pass and Sabine Pass.

**Vessels approaching the passes and entrances to the ports, or bound along the Gulf Coast between Calcasieu Pass and Brazos Santiago, should proceed in the charted shipping Safety Fairways.** (See 209.135, chapter 2, for limits of fairways.)

# 10. SABINE PASS TO SAN LUIS PASS

This chapter describes the 77-mile-long Texas Gulf Coast from Sabine Pass to San Luis Pass, and Port Arthur Canal, Sabine-Neches Canal, Neches River, Galveston Bay, East and West Bays, Houston Ship Channel and their tributary waterways. Also discussed are the deepwater ports of Port Arthur, Beaumont, Orange, Galveston, Texas City, and Houston.

**Chart 11340 (1116).**-Sabine Pass and its connecting channels form an extensive system of deepwater routes leading inland as far as Beaumont and Orange, Texas. From Sabine Pass the coast follows a general WSW direction for 50 miles to Galveston Entrance. Except in the E part, deep water extends fairly close inshore. The coast is low and devoid of prominent features, with the exception of High Island. Heald Bank, off the coast, has depths of 25 to 35 feet and is a danger to deepdraft vessels.

Galveston Entrance is the approach to the cities of Galveston, Texas City, and Houston. Galveston Bay and tributaries form one of the larger commercial ports in the United States, and have extensive foreign and coastwise trade.

**Shipping Safety Fairways and Fairway Anchorages.**- A system of shipping safety fairways has been established along the Gulf Coast to provide safe lanes for shipping that are free of oil well structures. Vessels approaching the passes and entrances to ports, or bound along the Gulf Coast between Sabine Pass and San Luis Pass should proceed in the charted shipping safety fairways. Caution should be exercised when approaching or navigating in these fairways as they are unmarked.

**Fairway anchorages** have been established off the entrances to the ports, which will be generally free of oil well structures. (See 209.135, chapter 2, for limits of the **fairways** and **anchorages**, and the regulations governing them.)

**Charts 11342 (517), 11341 (1279).-Sabine Pass,** 244 miles W of Southwest Pass, Mississippi River, and 50 miles ENE of Galveston Entrance, is the approach from the Gulf to Sabine Lake, Sabine and Neches Rivers, and the cities of Port Arthur, Beaumont, and Orange.

Sabine Pass, Lake, and River together form the boundary between the States of Louisiana and Texas for a distance of 275 miles N from the Gulf.

**Dumping grounds** are located off Sabine Pass entrance channel. (See 205.80 (a) and (b) (10) (11), chapter 2, for limits and regulations.)

**Prohibited dumping grounds** are located in the area off Sabine Pass. (See 205.80 (a) and (c) (5), chapter 2, for limits and regulations.)

**Prominent features.**-The most prominent objects seen when approaching Sabine Pass are the E jetty light, an abandoned lighthouse, a white 81-foot tower, on the E side of the pass, and the dredging range towers. Also prominent are the entrance range lights, the oil and water tanks W of Sabine Pass, and the tall hotel buildings and a stack at Port Arthur.

**Sabine Pass East Jetty Light** (29°38.7'N., 93°49.4'W.), 67 feet above the water, is shown from a skeleton structure on piles on a concrete block at the S end of the jetty. A seasonal fog signal is at the light.

**Sabine Pass Radiobeacon** is on the W side of the pass at the site of the former Coast Guard station, about 1.5 miles from the shore end of the jetty. Sabine Pass Coast Guard Station and the Captain of the Port are at the site of the old quarantine station on the W side of the pass about 3.5 miles above the jetty.

**Boundary lines of inland waters.**-The lines established for Sabine Pass are described in **82.103** and **82.106**, chapter 2.

**Vessels should approach Sabine Pass through the prescribed Safety Fairway.**(See 209.135, chapter 2.)

**Channels.**-The entrance, obstructed by a bar, has been improved by the construction of two nearly parallel jetties about 550 yards apart extending about 3.5 miles in a S direction from shore. The general depths between jetties, outside the channel, are 8 to 16 feet. Federal project depths are 42 feet in the outer bar channel, thence 40 feet through the jetty channel to and through Port Arthur Canal, with 40 feet in the E and W turning basins and Taylor Bayou turning basin at Port Arthur. (See Notice to Mariners and latest editions of charts for controlling depths.)

The bar channel is marked by lighted and unlighted buoys, and the channel through the jetties by a **347°** lighted range and lighted and unlighted buoys. Unlighted dredging ranges, maintained by the Corps of Engineers, mark the sides of the outer bar and jetty channels.

Inside the jetties, the pass extends NW about 6 miles to Sabine Lake. The bottom outside the channel for the most part is soft, and vessels can touch without damage. Lighted ranges and other lighted aids mark the channel through Sabine Pass and Port Arthur Canal to Port Arthur.

**Anchorages.**-Deepdraft vessels usually anchor in the Sabine Fairway Anchorages outside of the pass entrance. (See 209.135, chapter 2.) Vessels of light draft can find good holding ground 7 to 8 miles W of the jetties as close inshore as drafts will permit. The pass affords excellent anchorage for small craft, and is used by coasting vessels as a wintertime harbor of refuge.

An anchorage basin, Federal project depth 40 feet, is on the E side of Sabine Pass Channel opposite the town of Sabine Pass. (See 110.196, chapter 2, for limits and regulations, and Notice to Mariners and latest editions of charts for controlling depths.) That portion of the old ship channel off the town of Sabine Pass, formerly used as an anchorage, was reported in 1965 to have shoaled to 12 feet and is no longer used except occasionally by small light-draft vessels.

**Dangers.**-The offshore oil well structures, Sabine Bank, and the spoil and dumping grounds on either side of the entrance channel are the principal dangers encountered when approaching Sabine Pass. Vessels should not approach the entrance too closely before the pilot boards.

**Tides and currents.**-The diurnal range of tide at the jettied entrance to Sabine Pass is 1.9 feet and about 1.5 feet at Port Arthur. The currents off the entrance of Sabine Pass are dependent upon the direction and velocity of the wind. Following continued N to E winds, a SW to W current will be found off the entrance, frequently with a velocity of 1 knot and sometimes as much as 2 knots. Following S and SW winds, the currents will be in the opposite direction, but with less velocity. The tidal current between the jetties at strength averages 1.1 knots on the flood and 1.6 knots on the ebb, but velocities up to 2.5 knots have been observed in Sabine Pass. Tidal current predictions for Sabine Pass may be found in the Tidal Current Tables, Atlantic Coast.

**Weather.**-Port Arthur's climate is a mixture of tropical and temperate zone conditions. Sea breezes prevent extremely high temperatures in the summer, except on rare occasions, and the area lies far enough S so that cold airmasses of winter have moderated in severity, but still provide the stimulating effects of seasonal change.

Average maximum temperatures range from the low sixties in January to the low nineties in July and August. Average minimum temperatures range from the middle forties in January to the lower seventies in the warmer months. A few miles inland, away from the marked influence of the Gulf of Mexico, summer maximums are higher and winter minimums are lower than on the coast. Extreme departures from normal temperatures seldom occur on more than four successive days.

High normal rainfall, distributed quite evenly throughout the year, and prevailing S winds from off the Gulf of Mexico, explain the high humidity of the climate. Lightest precipitation usually occurs in March and October. Cloudy, rainy weather is most common in the winter. Heavy rainfall in summer occurs in thunderstorms of short duration and as a result of infrequent tropical storms.

Snow or sleet seldom occur, and no hail of importance has ever been recorded. The greatest snowfall in any one storm was only 4.4 inches.

Fog, most frequent in midwinter and rare in summer, usually dissipates before noon, but occasionally under stagnant conditions lasts into the afternoon. Along the immediate coast fog usually does not form until daybreak, but inland where radiation is more effective it may form before midnight.

The average wind movement is near 11 m.p.h. Except in infrequent tropical disturbances and severe thunderstorms the wind seldom exceeds 45 m.p.h., and it exceeds 30 m.p.h. on only about 40 days in any 1 year. (See page T-4 for **Port Arthur climatological table.**)

The National Weather Service maintains an office in Port Arthur; barometers may be compared there or by telephone. (See appendix for address.)

**Storm warning display** locations are listed on the NOS charts and shown on the Marine Weather Services Charts published by the National Weather Service.

**Pilotage** is compulsory for all foreign vessels and U.S. vessels under register in foreign trade. Pilotage is optional for coastwise vessels that have on board a pilot licensed by the Federal Government. The Sabine Pilots Association has offices at Port Arthur and Beaumont, and a lookout and depot on the W side at the inner end of the W jetty. The Sabine Pilots take vessels to and from Port Arthur, Beaumont, and Orange. The black-hulled 65-foot pilot boats have white superstructures with green trim. The pilot boats fly the International Code flag "P" in daytime and show the standard pilot lights at night. The pilot boat, depot, and the Port Arthur office are equipped with radiotelephones, and guard 2738 kHz and VHF-FM Channel 12 (156.60 MHz). All the pilots carry portable radiotelephones. Vessels are taken in day or night. Pilots can be obtained on advance notice by telegraph, radio, or by radiotelephone through the Port Arthur Marine operator; telephone, Beaumont (713-722-1141), or Port Arthur (713-985-8847), or through the ships' agents.

**Towage.**-Vessels usually proceed without assistance through the pass to Port Arthur. Radiotelephone equipped tugs up to 1,600 hp are available at Port Arthur. The tug companies are equipped to perform wrecking and salvage operations.

Quarantine, customs, **immigration,** and **agricultural quarantine** officials are stationed in Port Arthur. (See appendix for addresses.) Vessels subject to such inspections generally make arrangements in advance through ships' agents; officials usually board vessels at their berths.

**Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

The U.S. Public Health Service maintains an **outpatient clinic** in Port Arthur. (See appendix for address.) The city has three hospitals.

Port Arthur is a **customs port of entry.**

**Coast Guard.**-The **Captain of the Port** office and a **vessel documentation** office are in Port Arthur. (See appendix for addresses.)

**Texas Bayou,** on the W side opposite the abandoned Sabine Pass lighthouse, has facilities for small craft to dock and a launching ramp. Water, ice, and some provisions are available from a nearby store. Gasoline is available at a dock about 0.5 mile SSE of the bayou's entrance on Sabine Pass.

**Sabine** is a village on the W side of the pass, about 5 miles above the outer end of the jetties. The S of the two old slips is used as a small-boat harbor where gasoline, diesel fuel, water, and ice are available. There is a menhaden plant and wharf, and many shrimp boats base here. Several oil companies have bases for supplying offshore oil wells.

**Sabine Pass** is a village on the W side of the pass about 1.5 miles N of Sabine. Shrimp boats base here.

**Sabine Lake** has an average depth of about 6 feet in its 15-mile length. At the S end, where it empties into Sabine Pass, the depth is 1 to 4 feet. A highway bridge over the S end has a swing span with a clearance of 9 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) An overhead power cable close NW of the bridge has a clearance of 75 feet. Numerous gas and oil well structures, pipes, piles, and stakes, some submerged, exist within Sabine Lake. In addition to the S entrance from Sabine Pass, the lake can be entered also from the Sabine-Neches Canal or through Sabine River. The depth through **East Pass** is about 3 feet.

Off Sabine Lake waterfront at Port Arthur is a bulkhead 1.5 miles long through which a narrow opening leads to a yacht basin for small boats of 2 to 3 feet in draft.

**Johnson Bayou,** in the extreme SW part of Louisiana, empties into the SE part of Sabine Lake, directly E of Port Arthur. The dredged channel leading to the entrance has filled to the lake bottom level. The reported depth is about 2½ feet into the mouth of the bayou. Inside the entrance, the bayou is deeper and is navigable for about 4.5 miles to the settlement of **Johnson Bayou;** a highway connects the settlement with **Sulphur.**

**Port Arthur Canal** extends for about 6 miles from Sabine Pass to the entrance to Taylor Bayou. A narrow strip of land separates the canal from the W shore of Sabine Lake. Lights and lighted ranges mark the channel to Taylor Bayou.

**Port Arthur** an important shipping center, is on the W shore of the Sabine Lake, 17 miles above the Sabine Pass entrance. There are several large oil refineries and chemical plants, two shipyards, a grain elevator, and numerous small industrial firms at Port Arthur.

The principal industrial development is on Taylor Bayou, at the SW outskirts of the city, sometimes known as **West Port Arthur.** The port has extensive domestic and foreign trade in coke and crude petroleum and its refined products. There is some commerce in wheat, chemicals, lumber, iron and steel products, cotton, scrap iron, glass and clay products, shell, paper products, alcohol, caustic soda, menhaden, vegetable and fish oils, lead, and general merchandise.

**Harbor regulations.**-The port is under the control of the Port of Port Arthur Navigation District. A Port Commission, under a Port Director, is responsible for the development and operation of the port and establishes regulations.

**Wharves.**-Port Arthur has more than 50 wharves and piers. Only the deep-draft facilities are described. (For a complete description of the port facilities refer to the Port Series, a Corps of Engineers publication.) The alongside depths are reported; for information on the latest depths contact the private operator. All of the facilities have direct highway and 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. Cranes up to 75 tons are available at Port Arthur. A floating derrick barge with a capacity of 250 tons is also available.

Scurlock Oil Co. Wharf (29°44.4'N., 93°53.2'W.): 30-foot face, 300 feet with dolphins; 27 feet alongside; deck height, 6 feet; receipt and shipment of crude oil and petroleum products; owned and operated by Scurlock Oil Co.

Gulf Oil Co. U.S. Wharf, berths 1-6: E side of Taylor Bayou Turning Basin; 3,000-foot face; 38 feet alongside; deck height, 7 feet; receipt and shipment of petroleum products; bunkering vessels and loading barges for bunkering at other piers; owned and operated by Gulf Oil Corp.

Great Lakes Carbon Corp. Wharf (29°50.1'N., 93°58.0'W.): 680-foot face, 980 feet with dolphins; 38 feet alongside; deck height, 8 feet; two fixed electric coke-loading towers with conveyors, gravity spout, and mechanical trimmers, loading rate 360 tons per hour each; shipment of raw and calcinated petroleum coke; owned by Port Arthur Canal and Dock Co.; operated by Great Lakes Carbon Corp., and Kansas City Southern Railway Co.

Hydrocarbon Products Co. Wharf: adjacent S of Great Lakes Carbon Corp. Wharf; 730-foot face; 38 feet alongside; deck height, 8 feet; vessels unloaded by mobile crane with 6-ton bucket to hopper served by a conveyor, unloading rate 250 tons per hour; receipt and shipment of fertilizer and feed supplements; owned by Port Arthur Canal and Dock Co.; operated by Hydrocarbon Products Co., Inc.

Kansas City Southern Railway Co., South Grain Wharf (29°50.2'N., 93°57.4'W.): 525-foot face, 1,025 feet with dolphins; 34 feet alongside; deck height, 6 feet; conveyor systems and loading spouts; shipment of grain and soybean meal; owned by Port Arthur Canal and Dock Co.; operated by Cargill, Inc., and Kansas City Southern Railway Co.

Kansas City Southern Railway Co., Grain Shipping Wharf: N of South Grain Wharf; 553-foot face, 600 feet with dolphins; 34 feet alongside; deck height, 6 feet; grain galleries with loading spouts, conveyors, loading rate 20,000 bushels per hour; owned by Port Arthur Canal and Dock Co.; operated by Cargill, Inc.

Texaco Wharf No. 3, berths 8, 9, 10, and 11: across slip from South Grain Wharf; 2,288-foot face; 34-35 feet alongside; deck height, 12 feet; 120,000 square feet covered storage; shipment of bulk and packaged petroleum products; bunkering vessels and loading barges for bunkering vessels; owned and operated by Texaco, Inc.

Texaco Wharf No. 1, berths 5, 6, and 7 (29°50.0'N., 93°57.4'W.): 1,072-foot face; 39 feet alongside; deck height, 10 feet; 31,000 square feet covered storage; shipment of bulk and packaged petroleum products; bunkering vessels and loading barges for bunkering vessels; owned and operated by Texaco, Inc.

Texaco Wharf No. 4, berths 3 and 4: SW of Texaco Wharf No. 1; 653-foot face; 39 feet alongside; deck height, 12 feet; 27,000 square feet covered storage; shipment of bulk and packaged petroleum products, receipt of tinplate; bunkering vessels and loading barges for bunkering vessels; owned and operated by Texaco, Inc.

Texaco Wharf No. 2, berths 1 and 2: S of Texaco Wharf No. 4; 1,289-foot face; 39 feet alongside; deck height, 9 feet; shipment of bulk petroleum products; bunkering vessels and loading barges for bunkering vessels; owned and operated by Texaco, Inc.

Port of Greater Port Arthur, Public Ocean Terminal Wharf (29°51.7'N., 93°56.2'W.): on W side of Sabine-Neches Canal; 1,200-foot face; 36 feet alongside; deck height, 15 feet; 81,000 square feet covered storage, 75-ton traveling crane, 40-ton container forklift; receipt and shipment of general and container cargo; owned and operated by Port of Port Arthur Navigation District of Jefferson County.

Pabtex Corp. Wharf (29°55.8'N., 93°52.6'W.): on W side of Sabine-Neches Canal; 760-foot face; 39 feet alongside; deck height, 15 feet; traveling coal loading tower with conveyor and telescoping loading chute, loading rate 3,000 tons per hour; owned by Port Arthur Terminal Co., Inc., and Rice-Carden Corp., operated by Pabtex Corp.

**Supplies.**-Provisions and marine supplies can be obtained in Port Arthur. Water of good quality is available alongside the wharves or can be delivered in barges. Oil bunkering facilities with a loading rate of 4,000 to 5,000 barrels per hour are available. Bunker C and diesel oil can also be supplied at the wharves. Small boats can secure gasoline, oil, water, and supplies along the city waterfront of the Sabine-Neches Canal.

**Repairs.**-Port Arthur has two shipyards on the W side of the Sabine-Neches Canal. The yard, about 2.5 miles above the mouth of Taylor Bayou, builds drilling rigs, has four floating drydocks with a maximum capacity of 17,500 tons, and can handle vessels up to 650 feet. The second yard, about 7 miles above Taylor Bayou, has a 3,000-ton floating drydock and two marine railways; vessels up to 260 feet and barges up to 300 feet can be handled. Both yards have machine, electrical welding, and carpenter shops, and make general repairs. Floating cranes up to 250 tons are available in the port, and a 100-ton floating drydock is on the W side of Neches River at the mouth.

**Communications.**-Radio station WPA provides ship-to-shore radiotelephone service. The port is served by the Kansas City Southern and Southern Pacific Railroads, buslines, and the Delta and Texas International Airlines. The Jefferson County Airport is NW of the city.

**Taylor Bayou** has a navigable depth of about 4 feet for about 30 miles above the upper turning basin at West Port Arthur. Two adjacent swing bridges with a minimum width of 38 feet and a clearance of 5 feet cross Taylor Bayou above the turning basin. The bridges are maintained in a closed position. (See 117.245 (j) (29), chapter 2, for drawbridge regulations.) In addition, the bayou is crossed by timber trestles carrying overhead pipelines having a least width of 14 feet and a least clearance of 1 foot; fixed bridges with a least width of 13 feet and a least clearance of 3 feet; and several overhead power cables with a minimum clearance of 30 feet. In 1973, a pontoon bridge was under construction across the bayou, about 4.6 miles above the turning basin.

A lock, 200 feet long, 30 feet wide, and with a depth of 10 feet over the sills is about 1.7 miles above the swing bridges. (See 207.185, chapter 2, for use, administration and navigation of the lock.)

The **Sabine-Neches Canal** is a continuation of the Port Arthur Canal above the mouth of Taylor Bayou. It extends parallel with the shores of Sabine Lake, from which it is separated by a narrow strip of land, NE to the mouth of Neches River, thence E through the open water of the N part of Sabine Lake to the mouth of Sabine River. The Federal project depths are 40 feet to the mouth of Neches River, thence 30 feet to the mouth of Sabine River. (See Notice to Mariners and latest editions of charts for controlling depths.) Lights, lighted ranges, and buoys mark the channel.

A fixed highway bridge with a clearance of 136 feet crosses the Sabine-Neches Canal at Port Arthur 1.8 miles above the entrance to Taylor Bayou.

During high-river stages on Neches River, usually from January to the last of April, a vessel may encounter an athwartship current crossing Neches River along the canal route, which may prove dangerous if not guarded against.

**Chart 11343 (533).-Neches River** empties into Sabine Lake from the NW and extends in a ship

canal 18.5 miles to Beaumont. A Federal project provides for a 40-foot channel to a 34-foot turning basin at Beaumont, thence 30 feet to the Bethlehem Shipyards. (See Notice to Mariners and latest editions of charts for controlling depths.) Lights, ranges, and buoys mark the river.

State Route 87 highway bridge (Rainbow Bridge) over the river, about 1.5 miles above its mouth, has a fixed channel span with a clearance of 172 feet. This bridge and the one at Port Arthur are the only bridges crossing the channel between the Gulf and the turning basin at Beaumont. Overhead power cables with clearances of 164 feet cross the river 50 yards E of State Route 87 highway bridge and just E of McFadden Bend Cutoff. These are the least overhead clearances between Port Arthur and the turning basin at Beaumont.

On the W side, at the turn from the Sabine-Neches Canal into the Neches River, there are several basins in which are a marine service wharf, a shipyard, and a boat club. The yard builds and repairs barges and operates a tank cleaning service. The yard has a 1,220-ton floating drydock that can handle small vessels and barges up to 220 feet long and 50 feet wide. The sill depth at the drydock is 12 feet. Diesel fuel and lubricating oils are available by barge in midstream on a 24-hour basis from a fuel facility that adjoins the shipyard. The fuel facility monitors VHF-FM channel 16 (156.80 MHz) continuously.

A marina and a boatyard are on the long canal just W of the S end of State Route 87 highway bridge. Gasoline and berths are available at the marina, and a marine elevator at the boatyard can handle craft up to 30 feet for hull and engine repairs. In September 1972, reported depths of about 5 feet could be carried to the marina and boatyard. An oil transfer wharf is on the S side of Neches River about 0.5 mile W of the bridge; depths of 30 feet are reported alongside the wharf.

**Port Neches,** on the Neches River 5 miles above the mouth, is an important oil refining and chemical center. Petroleum products, asphalt, and roofing material are exported. Port Neches has several private oil handling terminals, a layup berth maintained by a ship repair firm that does above-the-waterline hull and engine repairs, and a wharf and ramp at which gasoline and water are available. The private oil handling terminals are discussed later in this chapter under Wharves, Beaumont.

The marsh island N of McFadden Bend Cutoff has been dredged away except for a strip 300 feet wide. The dredged area forms an anchorage for decommissioned ships under jurisdiction of the U.S. Maritime Administration and has a controlling depth of 18 feet. (See 207.900, chapter 2, for **regulations restricting navigation** in the vicinity.)

Above Beaumont, a depth of about 10 feet can be carried for about 12 miles upriver, but there is no commerce in this section and probably many snags obstruct the channel.

**Beaumont,** on Neches River 18.5 miles above Sabine Lake and 43 miles from the Gulf, is the largest city in E Texas, and the home of Lamar University. Petroleum, petrochemical, and shipbuilding and repair are the principal industries. Commerce is principally in petroleum products, chemicals, molasses, wheat, flour, rice, synthetic rubber, shell, newsprint, paper pulp, cement, dry and liquid sulfur, iron and steel products, scrap iron, and lumber and wood products.

**Anchorages.**-There are no anchorages at Beaumont and only emergency anchorage is permitted in Neches River. Vessels may tie up to the banks of the river for a limited period provided permission is obtained from the Corps of Engineers. There is temporary anchorage in 29 feet in the bends of the old river below Port Neches and W of the cutoff about a mile above McFadden Bend Cutoff. There is little swinging room.

A barge assembly basin, 2,200 feet long and 350 feet wide for the temporary mooring of barges of tows, is in the bend of the former channel close N of Deer Bayou. Moorings spaced about 175 feet apart on concrete deadmen are on the NE side of the basin.

The channel is clear, and all bends of less than 5,000-foot radius have been eliminated by cutoffs between the mouth of Neches River and Beaumont; there are a few places where a vessel may turn around.

Two bridges cross the improved channel above the turning basin at Beaumont. The first, the Kansas City Southern vertical lift railroad bridge, about 0.4 mile above the turning basin, has a clearance of 13 feet down and 147 feet up. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) The second, U.S. 90 highway bridge, about 1 mile above the railroad bridge, has a fixed span with a clearance of 44 feet.

**Tides and currents.**-Periodic tides are practically negligible in Neches River. The rise and fall of the water depends upon meteorological conditions.

**Pilotage** is covered at the beginning of the chapter.

**Towage.**-Tugs up to 1,600 hp are available at Beaumont.

Quarantine, **immigration,** and **agricultural quarantine** officials are stationed in Port Arthur. Customs officials are stationed in Beaumont. (See appendix for addresses.) Vessels subject to such inspections generally make arrangements in advance through ships' agents; officials usually board vessels at their berths.

**Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) The nearest U.S. Public Health Service **outpatient clinic** is at Port Arthur. (See appendix for address.) Beaumont has several public and private hospitals, and several clinics and infirmaries.

Beaumont is a **customs port of entry.**

**Harbor regulations.**-The Port Commission of the Port of Beaumont Navigation District, known as the Port Authority, has jurisdiction over and controls all terminals, wharves, sheds, warehouses, and equipment owned and operated by it. The Port Authority establishes rules, regulations, and tariffs governing the port. The Port Director is in charge of operations; the Superintendent of Docks assigns berths.

**Wharves.**-Beaumont has more than 60 wharves and piers. Only the deep-draft facilities are described. (For a complete description of the port facilities refer to the Port Series, a Corps of Engineers publication.) The alongside depths are reported; for information on the latest depths contact the private operator. The port's waterfront facilities extend along the S bank of the Neches River for about 19 miles. Most of the facilities have direct highway and railroad connections, and most of the piers and wharves have water and electrical shore power connections. General cargo at the port is usually handled by ship's tackle; special handling equipment, if any, is mentioned in the description of the particular facility. Cranes up to 75 tons are available at Beaumont.

**S side Neches River**:

Sohio Pipe Line Co., No. 1 Dock: 0.2 mile W of bridge; 512-foot face, 550 feet with dolphins; 39 feet alongside; deck height, 14 feet; receipt and shipment of crude oil, petroleum products, and petrochemicals; bunkering vessels; owned and operated by Sohio Pipe Line Co.

Sohio Pipe Line Co., Dock A: 0.3 mile W of bridge; 223-foot face, 550 feet with dolphins; 39 feet alongside; deck height, 12 feet; receipt and shipment of crude oil, petroleum products and petrochemicals; bunkering vessels; owned and operated by Sohio Pipe Line Co.

Sohio Pipe Line Co., Dock B: 0.5 mile W of bridge; 237-foot face, 430 feet with dolphins; 36 feet alongside; deck height, 12 feet; receipt of crude oil, receipt and shipment of petroleum products and petrochemicals by barge; owned and operated by Sohio Pipe Line Co.

**Port Neches:**

Jefferson Chemical Co. Wharf: 3.1 miles W of bridge; 160-foot face, 330 feet with dolphins; 40 feet alongside; deck height, 10 feet; shipment of petrochemicals and liquid caustic soda; owned and operated by Jefferson Chemical Co., Inc.

Texaco Port Neches No. 2 Dock: 3.4 miles W of bridge; 650-foot face, 1,460 feet with dolphins; 38 feet alongside; deck height, 8 feet; receipt of crude oil, petroleum products, and bulk asphalt; owned and operated by Texaco, Inc.

Texaco Port Neches No. 1 Dock: 3.6 miles W of bridge; 518-foot face, 1,000 feet with dolphins; 32 feet alongside; deck height, 8 feet; 33,000 square feet covered storage; receipt of crude oil and petroleum products; shipment of bulk and packaged asphalt and petroleum products; owned and operated by Texaco, Inc.

Union Texas Petroleum Wharf: 4.5 miles W of bridge; 60-foot face, 280 feet with dolphins; 29 feet alongside; receipt and shipment of petroleum products; owned and operated by Union Texas Petroleum, Division of Allied Chemical Corporation.

Union Oil Co., Main Wharf: 6.2 miles W of bridge; 1,170-foot face; 35 feet alongside; deck heights, 14 feet upper deck, 4 feet lower deck; 16,500 square feet covered storage; portable conveyor system; receipt of crude oil, shipment of bulk and packaged petroleum products and petrochemicals; bunkering vessels; owned and operated by Union Oil Co. of California.

Sunoco Ship Loading Wharf: 6.5 miles W of bridge; 144-foot face, 320 feet with dolphins; 40 feet alongside; deck height, 12 feet; receipt and shipment of bulk lubricating oil, shipment of crude oil and benzene; bunkering vessels; owned by Sun Oil Co., operated by Sun Pipe Line Co.

**Beaumont:**

Du Pont Wharf: 9 miles W of bridge; 785 feet of berthing space with dolphins; 35 feet alongside; deck height, 12 feet; receipt of tetraethyl lead, methanol, and sulfuric acid, shipment of anhydrous ammonia and methanol; owned and operated by E. I. du Pont de Nemours and Co., Inc.

Pan American Petroleum Corp. Wharf: 9.7 miles W of bridge; 1,066-foot face, 1,212 feet with dolphins; 36 feet alongside; deck heights, 16 and 12 feet; receipt and shipment of petroleum products, shipment of crude oil; owned and operated by Pan American Petroleum Corp.

Texas Gulf Sulphur Co., Dry Bulk Sulphur Dock (30°02.2′N., 94°02.6′W.): 10.1 miles W of bridge; 565-foot face; 35-37 feet alongside; deck height, 15 feet; electric loading tower with conveyor and loading spout with trimmer, loading rate 1,000 tons per hour; shipment of dry bulk sulfur; owned and operated by Texas Gulf Sulphur Co.

Texas Gulf Sulphur Co., Liquid Sulphur Dock: W of Dry Sulphur Dock; 31-foot face, 500 feet with dolphins; 35-37 feet alongside; deck height, 10 feet; shipment of liquid sulfur; owned and operated by Texas Gulf Sulphur Co.

Mobile Chemical Co., Nitrogen Plant Loading Wharf (30°03′44″N., 94°02′30″W.): 11.9 miles W of bridge; 49-foot face, 500 feet with dolphins; 30 feet alongside; deck height, 10 feet; shipment of liquid fertilizer; owned and operated by Mobil Chemical Co., a division of Mobil Oil Corp.

Mobil Chemical Co., Base Plant Wharf: 0.7 mile above Old River, 13.1 miles W of bridge; 150-foot face, 215 feet with dolphins; 40 feet alongside; deck height, 13 feet; shipment and receipt of petrochemicals; owned and operated by Mobil Chemical Co., a division of Mobil Oil Corp.

Mobil Oil Corp., Wharf No. 4: 0.1 mile above Base Plant Wharf: 250-foot face, 410 feet with dolphins; 38 feet alongside; deck height, 13 feet; receipt of crude and lubricating oils, shipment of

petroleum products and chemicals; bunkering vessels and loading barges for bunkering vessels; owned and operated by Mobil Oil Corp.

Mobil Oil Corp., Wharf No. 3: 0.1 mile above Wharf No. 4; 303-foot face, 323 feet with dolphins; 38 feet alongside; deck height, 13 feet; receipt of crude and lubricating oils, shipment of petroleum products and chemicals; bunkering vessels and loading barges for bunkering vessels; owned and operated by Mobil Oil Corp.

Mobil Oil Corp., Wharf No. 2; 0.1 mile above Wharf No. 3; 157-foot face, 270 feet with dolphins; 38 feet alongside; deck height, 13 feet; receipt of crude and lubricating oils, shipment of petroleum products and chemicals; owned and operated by Mobil Oil Corp.

Mobil Oil Corp., Wharf No. 1: 0.1 mile above Wharf No. 2; 313-foot face, 475 feet with dolphins; 32 feet alongside; deck height, 11 feet; receipt of crude oil, shipment of petroleum products; owned and operated by Mobil Oil Corp.

Port of Beaumont Navigation District, Berth No. 10, Grain Wharf: 0.7 mile E of Harbor Island; 597-foot face, 700 feet with dolphins; 40 feet alongside; deck height, 16 feet; grain spout and conveyors, loading rate 50,000 bushels per hour; shipment of grain; owned by Port of Beaumont Navigation District of Jefferson County; operated by Continental Grain Co., Southwest Division.

Port of Beaumont Navigation District, Berths Nos. 8 and 9: 0.6 mile E of Harbor Island; 764-foot face, 800 feet with dolphins; 40 feet alongside; deck height, 16 feet; 58,000 square feet of covered storage; receipt and shipment of general and containerized cargoes, lumber and steel products; owned and operated by Port of Beaumont Navigation District of Jefferson County.

Port of Beaumont Navigation District, Berth No. 1: NW of Harbor Island, 580-foot face; 30 feet alongside; deck height, 16 feet; receipt and shipment of general and containerized cargoes and dry bulk commodities; owned and operated by Port of Beaumont Navigation District of Jefferson County.

Port of Beaumont Navigation District, Berths Nos. 2 and 3: N of Harbor Island; 825-foot face; 34 feet alongside; deck height, 16 feet; cranes to 60 tons; receipt and shipment of general and containerized cargoes and dry bulk commodities; owned and operated by Port of Beaumont Navigation District of Jefferson County.

Port of Beaumont Navigation District, Berth No. 4: NE of Harbor Island; 560-foot face; 34 feet alongside; deck height, 16 feet; 41,000 square feet of covered storage; receipt and shipment of general cargo; owned and operated by Port of Beaumont Navigation District of Jefferson County.

Port of Beaumont Navigation District, Berths Nos. 5 and 6: 0.25 mile below railroad lift bridge; 880-foot face; 34 feet alongside; deck height, 16 feet; 65,000 square feet covered storage; receipt and shipment of general cargo; owned and operated by Port of Beaumont Navigation District of Jefferson County.

Port of Beaumont Navigation District, Berth No. 7: 0.15 mile below railroad lift bridge; 570-foot face; 34 feet alongside; deck height, 16 feet; 55,000 square feet covered storage; receipt and shipment of general cargo, receipt of molasses; owned and operated by Port of Beaumont Navigation District of Jefferson County.

**Supplies.**-Water is available at most of the wharves and piers, and Bunker C and diesel oil can be obtained by barge or at the several oil terminals. General and marine supplies are available at Beaumont.

**Repairs.**-A shipyard that builds offshore oil well drilling towers and barges up to 500 feet is on the W side of the river about 0.5 mile above the railroad bridge. The shipyard has a 17,500-ton floating drydock that can handle vessels up to 650 feet, cranes up to 110 tons, a 500-ton floating crane, and complete machine, welding, pipe, joiner, and metal shops. In addition, the yard can make most any type of repairs to wooden and steel vessels, and engines. Iron works in the port can handle any kind of foundry or machine work.

**Small-craft facilities.**-A boatyard is on Old River, S of **Smith Island,** in the bend below the turning basin. A marine railway at the yard can handle craft up to 55 feet. Another boatyard with a marine railway that can handle craft up to 50 feet for hull and engine repairs is at the mouth of **Brakes Bayou.** Gasoline, diesel fuel, water, and ice are available at a boat club just above the Interstate 10/U.S. Route 90 highway bridge. A privately marked channel with a reported controlling depth of 8 feet leads to the private boat club's berthing facilities.

**Communications.**-The Port Authority controls the terminals rail trackage at the Port of Beaumont. It connects with the four trunkline railroads serving the city. They are the Southern Pacific, Kansas City Southern, Santa Fe, and the Missouri Pacific Railroads. Over 80 steamship lines offer service to all ports of the world and barge lines operate in coastwise service from the port. Several motor freight lines and interstate buslines serve the city. Radio Station WPA at Port Arthur provides ship-to-shore radio and radiotelephone service.

**Pine Island Bayou** empties into Neches River 9 miles above Beaumont and has a navigable depth of about 8 feet for about 10 miles to the pumping plant of the Neches Water Company. The only commerce on the bayou is the transportation of fuel oil to this plant.

The Santa Fe railroad bridge, 6.5 miles above the mouth, has a 37-foot fixed span with a clearance of 20 feet. An overhead power cable on the E side of the bridge has a clearance of 47 feet. Highway and railroad bridges 6.8 miles above the mouth at Voth, Tex., have a minimum channel width of 48 feet and clearance of 21 feet.

**Sabine River** empties into Sabine Lake from the N. **Orange** is a city of some commercial importance on the river about 8 miles above Sabine Lake, and 36 miles from the Gulf. The city is on the main coastal highway between Lake Charles and Beaumont. The principal commodities handled at the Port of Orange include rice, flour, cornmeal, treated timbers and lumber, naval stores, carbon black, steel products, chemicals, petroleum products, alcohol, container board, shell, rubber, powdered milk, and general cargo. Shipbuilding and petrochemical production are the most important industries at Orange.

**Channels.**-The section of the Sabine River from the mouth to Orange, which is part of the Sabine-Neches Waterway, has been improved by dredging a deep-draft channel, which with land cuts, has eased or bypassed the sharp bends in the river. The Federal project depths are 30 feet from the end of the Sabine-Neches Canal, at the mouth of the river, to the site of the old highway bridge (30°05.6'N., 93°43.4'W.) at Orange, thence 25 feet in the channel around Orange Harbor Island to Orange. (See Notice to Mariners and latest editions of charts for controlling depths.) Lights, lighted ranges, and buoys mark the channel to Orange. In 1967, a reported depth of 12 feet, except on the sharp bends, could be carried to Echo, about 6 miles above Orange. An overhead power cable with a clearance of 172 feet crosses the river about 3 miles below Orange. Between Orange and Echo, an overhead power cable, a fixed highway bridge (U.S. 90), and a swing bridge cross the river; clearances are 146 feet, 47 feet, and 6 feet, respectively. (See 117.240 and 117.245 (a) through (e) and (j)(26), chapter 2, for drawbridge regulations and opening signals.)

The channel around Orange Harbor Island is crossed by a swing-type pontoon bridge that connects the N end of the island with the mainland. (See 117.240, and 117.245 (a) through (e) and (j)(26a), chapter 2, for drawbridge regulations and opening signals.)

**Anchorages.**-There are no anchorage areas for commercial vessels in the port. Vessels may tie up along the bank of the river for limited periods if permission is obtained from the Corps of Engineers.

**Tides and currents.**-Practically no periodic tides occur. The rise and fall of the water depends upon the meteorological conditions. Currents in the Sabine River are about 2.5 knots during high stages.

**Pilotage** is covered at the beginning of this chapter.

**Towage.**-Tugs of up to 1,200 hp are available at Orange.

Quarantine, customs, **immigration**, and **agricultural quarantine** officials are stationed in Port Arthur. (See appendix for addresses.) Vessels subject to such inspections generally make arrangements in advance through ships' agents; officials usually board vessels at their berths.

**Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

The nearest Public Health Service **outpatient clinic** is at Port Arthur. (See appendix for address.) Orange has two hospitals.

Orange is a **customs port of entry.**

**Harbor regulations.**-The local regulations are established by the Orange County Navigation and Port District of the Port of Orange. A Port Director is in charge of operations. Regulations are enforced by a harbormaster, whose office is at the Municipal Terminal.

A **restricted area** for vessels of a Navy reserve fleet has been established at Orange. (See 207.184, chapter 2, for limits and regulations.)

**Wharves.**-Deep-draft vessels at the Port of Orange berth alongside the long wharf on the W side of the Orange Municipal Slip (30°03.9'N., 93°43.2'W.), about 2 miles below the city. The wharf has five ship berths for a total length of 2,133 feet. In 1972, depths of 30 feet were reported alongside the wharf. Three acres of open storage and transit sheds with a total capacity of 237,000 square feet of covered storage are available on the wharf. Depressed railroad tracks are in the rear of the transit sheds, and a paved highway leads to the wharf. A layup berth is adjacent to the NW of the wharf. An oil-handling barge berth is on the W side of the channel opposite the S end of Orange Harbor Island.

**Supplies.**-Provisions and some marine supplies are available in Orange. Water can be obtained at either the Municipal Slip or along the riverfront in town. Bunker C and diesel oil are available by barge or truck from Port Arthur.

**Small-craft facilities.**-A marina is on the W side of the channel opposite the N end of Orange Harbor Island. Berths with electricity, gasoline, water, ice, some marine supplies, and hotel accommodations are available. In 1972, a depth of 12 feet was reported available alongside the fuel pier at the marina.

**Repairs.**-Orange has two shipyards that build vessels, offshore oil rigs, and barges up to 600 feet. The largest yard is at the N end of Orange Harbor Island. It has four floating drydocks, a pontoon pier, and a marine railway. The largest drydock at this yard has an 11,000-ton capacity, is 388 feet long and 126 feet wide, and can handle vessels up to 330 feet. The second yard is on the W side of the channel 0.6 mile SSE of the S end of Orange Harbor Island. This yard has a 1,100-ton floating drydock and two marine railways that can handle vessels and barges up to 200 feet. Both yards have machine, metal, welding, paint, and joiner shops, and can make above-the-waterline hull repairs and engine repairs. Floating cranes up to 150 tons are available in the port, and a 250-ton floating crane can be obtained from Port Arthur.

**Communications.**-The Missouri Pacific and Southern Pacific Railroads serve the port. Several

motor freight lines offer service, and buslines pass through the city. The main coastal highway (U.S. Route 90) and Interstate 10 pass N of the city, and State Route 87 connects with Port Arthur over the Rainbow Bridge.

**Cow Bayou** flows into Sabine River about 4 miles above Sabine Lake. A dredged channel leads from the Sabine River to a turning basin at the highway bridge at **Orangefield.** In 1973, the controlling depths were 10 feet in the channel and basin. A draft of 4½ feet can be carried for about 15 miles above the turning basin. Below the basin, one fixed highway bridge and two swing highway bridges cross the bayou; clearances are 8 feet for the swing bridges and 55 feet for the fixed bridge. (See 117.240, and 117.245 (a) through (e) and (j)(27), chapter 2, for drawbridge regulations and opening signals.) The fixed highway bridge at the upper end of the turning basin at Orangefield has a clearance of 18 feet. The minimum clearances of the overhead power and telephone cables below the Orangefield turning basin are 63 feet; overhead power cables at the turning basin and 0.5 mile above have clearances of 41 and 37 feet, respectively.

**Adams Bayou** empties into Sabine River 2 miles above Cow Bayou. A dredged channel leads from the Sabine River to the first fixed highway bridge. The controlling depth in the channel was 7 feet in 1973. The highway bridge has a fixed span with a clearance of 11 feet. Just below the bridge is a shipyard with a marine railway that can handle vessels up to 100 feet for general repairs. Below the bridge is a yacht basin with covered and open berths for yachts up to 45 feet. Gasoline, a 2-ton hoist, and water are available. Minor engine and hull repairs are made. The channel leading to the basin had a reported controlling depth of 6 feet in September 1972. There is a fuel facility adjoining the shipyard at which diesel fuel is available by barge in midstream or alongside. The facility monitors VHF-FM channel 16 (156.80 MHz) continuously, and fuel is available anytime. A large plant of the Dupont Chemical Company is halfway between the Sabine River and the fixed bridge; its piers are not available to the public.

**Charts 11331 (885-SC), 11348 (883-SC).-Lake Charles Deepwater Channel,** a part of the Intracoastal Waterway, enters Sabine River 0.7 mile above Adams Bayou and extends E for 22 miles to the Calcasieu River at a point 13 miles below Lake Charles. Lake Charles is described in chapter 9.

The Intracoastal Waterway route continues along Sabine River and the Sabine-Neches Canal. (See chapter 12.)

**Chart 11332 (1280).- High Island,** a small settlement on the mainland about 30 miles W of Sabine Pass, is a mound about 1 mile in diameter and 40 feet high, the highest land on the coast between Sabine Pass and Galveston. It is a conspicuous landmark for vessels making, or standing along the coast. Numerous oil derricks are on the mound and, about 1.5 miles N, are two 132-foot towers for a transmission line crossing the Intracoastal Waterway.

Gasoline, water, and provisions can be obtained in the town. A long fishing pier extends into the Gulf.

**Rollover Pass,** about 6.5 miles WSW of High Island, is a shallow inlet from the Gulf into East Bay, which is not passable for even the smallest of outboard craft because of very strong tidal currents, reported obstructions, and shifting bottom. The pass is bulkheaded with steel piling. The village of **Gilchrist** is on the pass. Gasoline is available in cans from a station near the pass, and water and ice can be obtained at several nearby bait stands.

**Heald Bank,** lying 34 miles E of Galveston and 27 miles offshore, is nearly 5 miles long in a NE and SW direction. Depths of 25 to 35 feet extend over the bank, and depths of 50 to 60 feet are found as close as 1.5 to 2 miles to the SE. In a heavy sea Heald Bank should be avoided by all vessels, including those of moderate draft which could pass over it in smooth water. A lighted whistle buoy is 3 miles SW of the bank. In 1965, a vessel reported striking a submerged object about 5.6 miles SE of the buoy. An unmarked 33-foot spot is about 11 miles SW of the bank.

The currents at Heald Bank are due largely to winds. In calm weather or with light breezes, little current is experienced. Wind velocities of 20 to 35 knots produce currents of about 0.5 to 1 knot, setting in a direction approximately fair with the wind. In February 1919, a velocity of 2.6 knots in a SW direction was observed; a N wind of about 45 knots was blowing at this time. From observations made during the first 6 months of 1915, the average drift was one-fourth knot, setting in a W direction.

**Chart 11323 (1282).-Bolivar Peninsula,** SW of High Island, extends to the Galveston Bay Entrance. The land is low with few prominent features. An abandoned lighthouse, a black conical tower 116 feet high, is on the S end of the peninsula. Numerous wrecks lie in the shoal water along the Gulf Coast off Bolivar Peninsula. It is reported that several fishing vessels have been wrecked on these obstructions.

**Galveston Entrance.-Vessels should approach Galveston Bay through the prescribed Safety Fairways.** (See 209.135, chapter 2.)

**Charts 11324 (518), 11325 (518-SC), 11327 (519), 11323 (1282), 11331 (885-SC), 11322 (887-SC), 11326 (152-SC).-Galveston Bay** is a large irregularly shaped shallow body of water on the coast of Texas, about 285 miles W from Southwest Pass and 690 miles NW from Dry Tortugas. The bay is about 30 miles long in a general NNE and SSW

direction, about 17 miles wide at its widest part, and has general depths of 7 to 9 feet. About midway of its length it is nearly divided into parts by **Red Fish Bar,** a chain of small islets and shoals, through which the Houston Ship Channel has been dredged. N of Red Fish Bar the bay is known as the Upper Bay and S as the Lower Bay. The NE end of the upper bay is Trinity Bay.

Galveston Bay is the approach to East and West Bays, Houston Ship Channel, and the cities of Galveston, Texas City, and Houston, as well as to numerous smaller towns and bayous.

**Galveston Entrance,** the approach to Galveston Bay, lies between two converging stone-rubble jetties about 4 miles long and 1.3 miles apart at the outer ends. From deep water in the Gulf, the N jetty extends to Bolivar Peninsula and the S jetty extends to the N end of Galveston Island.

**Dumping grounds** and **prohibited dumping grounds** are located in the Gulf of Mexico off the Galveston Bay entrance. (See 205.80 (a), (b) (12) and (13), and (c) (5), chapter 2, for limits and regulations.)

**Bolivar Roads** is the large deepwater area between the jetties extending W between Bolivar Peninsula on the N and Pelican Island and Galveston Island on the S. On the S and W it connects with the ship channels to Galveston, Texas City, and Houston. The Intracoastal Waterway crosses its NW side.

**Galveston** occupies the entire width of the E end of **Galveston Island.** The wharves are built along Galveston Channel on the N side of the city, and the S side fronts upon the Gulf from which the city is protected by a concrete seawall 17 feet high. Galveston, although widely known as the major seashore resort in the SW, is essentially and primarily a place of maritime commerce and industry.

The principal industries consist of shipping, boat building and repairing, grain elevators, machine shops, cotton compresses, nail and wire plant, tin smelter, food processing, meat packing, fishing, dairying, and agriculture.

The Port of Galveston offers a short route to the sea, and together with the deep and easily navigated channel and excellent port facilities enable Galveston to handle cargo most expeditiously and economically. The principal commodities handled at the port are shell, wheat, rice, flour, synthetic rubber, cotton, molasses, sugar, tea, petroleum products, scrap iron, lumber, wood pulp, paper products, coke, coal tar products, steel products, oil well pipe casing, machinery and supplies, sulfuric acid, alcohol, caustic soda, industrial chemicals, liquid and dry sulfur, stone and gravels, ores and concentrates, lead, zinc, copper, aluminum, bituminous coal, and general cargo.

Both foreign and domestic commerce are extensive, the principal exports are cotton, grain, flour, rice, sulfur, fertilizer chemicals, and metals. The main imports are bananas, plywood, seafood, creosote, raw sugar, and tea.

**Port Bolivar** has been abandoned as a port. The pier slips have shoaled; the only marine activity is an auto ferry operating between Galveston and Port Bolivar and several small shrimp-packing plants. In July 1972, the midchannel controlling depth in the ferry channel was 14 feet.

The current outside the jetties frequently has a velocity exceeding 1 knot. The set may be in any direction under the combined influence of the entrance currents and currents setting along the coast.

Daily predictions for Galveston Bay Entrance are published in the Tidal Current Tables.

**Pelican Island,** an artificial island, is on the N side of Galveston Channel and protects the channel from northers. A large shipyard, a radio station, an offshore drilling service facility, Texas A and M Maritime Academy, Texas University System's Moody Marine Institute, and a SEABEE and LASH barge marshalling area and ship wharf are located on the island. There are dikes along the N, E, and central part of the island. Seawolf Park, a city park and recreation area with a public mooring wharf, occupies the former quarantine station at the E tip of the island. The submarine CAVALLA is berthed adjacent to the park as a memorial to the submarine crews who lost their lives during World War II.

**Prominent features.**-Approaching the entrance to Galveston Bay, among the first objects sighted on a clear day will be the 363-foot high American National Insurance Co. Building at about 29°18.4'N., 94°47.4'W., which displays aircraft warning lights at night, the 240-foot grain elevator on the Galveston Channel at 28th Street, the numerous hotels and motels along the seawall, and a tall hotel on a pier. The 116-foot abandoned lighthouse on Bolivar Point, the Santa Fe Building, and the many buildings of the medical center and the University of Texas, show conspicuously on closer approach and are easily identified. Vessels approaching from E near the coast will first sight High Island, and those approaching from SW will probably first sight the hotels, a long seawall, and then the American National Insurance Co. Building and the grain elevator.

**Galveston South Jetty Light** (29°19.7'N., 94°41.6'W.), 50 feet above the water, is shown from a cream-colored cylindrical brick tower with black pilasters on skeleton structure near the outer end of the S jetty. A seasonal fog signal is at the light.

**Galveston Light** (29°19.7'N., 94°44.2'W.), shown from the loran tower at the Coast Guard station also provides special radio-direction-finder calibration service. (See Light Lists for operational information.)

**Galveston Bay Entrance Channel Lighted Whistle Buoy 1** (29°18.6'N., 94°38.1'W.), the sea buoy, is 3.2 miles off Galveston Jetty Light and marks the entrance to the channel.

**Boundary lines of inland waters.**-Lines established off Galveston Bay are described in 82.106 and 82.111, chapter 2,

A voluntary **Vessel Traffic System (VTS)** has been established in the Houston-Galveston area. The system is composed of **precautionary areas, reporting points,** and a **Vessel Traffic Center (VTC).**

The Vessel Traffic Center, operated continuously by the Coast Guard, maintains radiotelephone communications with vessels via VHF-FM channels 12 (156.60 MHz) primary, and 13 (156.65 MHz) secondary. The Vessel Traffic System will maintain a continuous guard only on these frequencies and answer on whichever frequency the call is received. Participating vessels are not required to guard channel 12 (156.60 MHz). Those vessels with that capability, however, are requested to make initial contact with the Vessel Traffic Center and transmit all subsequent routine reports on that frequency. Vessels without channel 12 (156.60 MHz) may continue to use channel 13 (156.65 MHz). The call sign is "Houston Traffic."

The purpose of the system is to prevent collisions and groundings and to protect the navigable waters from environmental harm resulting from collisions and groundings.

The center will process information received from vessels, and will disseminate information to other participating vessels operating in the Vessel Traffic System. It is the goal of the Vessel Traffic System to improve vessel transit safety by providing participating vessels advance information of other vessel movements occurring within the area of the Vessel Traffic System. **This system is not intended in any way to supersede or alter applicable Rules of the Road.**

The system is voluntary and is recommended for all vessels of 300 or more gross tons that are propelled by machinery; vessels of 100 or more gross tons that are carrying one or more passengers for hire; each commercial vessel of 26 feet or over in length, engaged in towing another vessel astern, alongside, or by pushing ahead; each ferry vessel operating in the area, and each dredge or floating plant.

For a complete detailed description of the system, mariners should obtain the latest edition of the U.S. Coast Guard's **Operating Manual, Houston-Galveston Vessel Traffic System,** available from the Commanding Officer, Coast Guard Vessel Traffic System Unit Houston/Galveston, Galena Park, Texas 77547.

**Channels.**-The Federal project provides for an Entrance Channel and an Outer Bar Channel both dredged to 42 feet from the Gulf to about 2 miles W of the outer end of the jetties; thence 40 feet in the Inner Bar Channel to Bolivar Roads, and thence 36 feet in Galveston Channel from the roads to Pier B at West 43rd Street in Galveston. (See Notice to Mariners and latest editions of charts for controlling depths.) The channels are well marked. Lighted ranges mark the Entrance, Outer Bar, and Inner Bar Channels.

**Anchorages.**-Vessels may anchor off the bar in the **Galveston Entrance Anchorages** just inshore of the intersection of the Galveston Safety Fairway with the Coastwise Fairway. (See 209.135, chapter 2, for limits and regulations.) An anchorage area, for temporary use only, has been established N of the realigned Inner Bar Channel W of the spoil areas in Bolivar Roads. (See 110.197, chapter 2, for limits and regulations.) In all instances, vessels must anchor sufficiently clear of all active channels so as not to interfere with navigation or the usefulness of any established aids to navigation.

Because of heavy traffic, Galveston Channel can be used only for temporary anchorage by vessels preparing to haul into the berth at wharves or after leaving the wharves before going to sea. Small craft anchoring in the designated areas should find the shoaler water so as to leave the deeper areas clear for larger vessels.

In Galveston Bay small craft can anchor anywhere outside of the dredged channels where the depth is sufficient. The water in the bay may be lowered as much as 3 feet by a norther, and vessels should anticipate this when selecting anchorage during the winter.

**Dangers.**-A considerable number of unmarked dangerous wrecks exist in the approaches to Galveston Bay Entrance. A spoil bank is S of the Outer Bar Channel, and an extensive shoal area is S of the channel between the jetties. Heald Bank and the offshore oil well structures are the principal hazards.

**Bridges.**-A rail and highway causeway crosses Galveston Channel and connects Galveston Island with Pelican Island; the bascule span has a clearance of 12 feet; the single bascule leaf overhangs the channel above a clearance of 75 feet when the bridge is open, and caution is necessary. (See 117.240 and 117.553, chapter 2, for drawbridge regulations and opening signals.) An overhead power cable close E of the bridge has a clearance of 85 feet. Galveston is connected to the mainland by three parallel causeways 1.75 miles long crossing the Intracoastal Waterway at the SW end of Galveston Bay. (See chapter 12 for clearances.)

**Tides and currents.**-The diurnal range of tide at Galveston Bay Entrance at the S jetty is 2.0 feet. The effect of the wind on the water level in this part of the Gulf and adjoining bays may be considerable. A level 2 to 4 feet above mean low tide may result from a strong wind blowing continuously for several days from the E and SE. A strong wind blowing steadily from the N for several days may lower the water to a level 2 or 3 feet below mean low tide. Daily predictions for Galveston Channel are given in the Tide Tables.

The currents are also modified frequently by the winds. E or SE winds may cause a continuous flood current between the jetties at the entrance for a period of a day or more, and W or NW winds sometimes set up a continuous outgoing current

for a similar period. The average velocity of the current between the jetties at strength is 1.7 knots on the flood and 2.3 knots on the ebb.

**Weather.**-The climate of the Galveston area is predominantly marine, with periods of modified continental influence during the colder months, when cold fronts from the NW sometimes reach the coast.

Because of its coastal location and relatively low latitude, cold fronts which do reach the area are very seldom severe and temperatures below 32°F. are recorded on an average only four times a year. The record low temperature of 8°F. occurred in February 1899.

Normal monthly maximum temperatures range from about 60°F. in January to near 88°F. in August, while minimums range from about 49°F. in January to the middle and upper seventies throughout the summer season. The record high temperature is 101°F., which occurred in July 1932.

A normal rainfall of about 41 inches, well distributed over the year, and the station location on an island, explain the high humidities which prevail throughout the year. Amounts of rainfall during the summer months may vary greatly on different parts of the island, as most of the rain in this season is from local thunderstorm activity. Hail is rare because the necessary strong vertical lifting is usually absent. There have been several instances when a monthly rainfall total amounted to only a trace, but these have been offset in the means by many monthly totals in excess of 15 inches. Winter precipitation comes mainly from frontal activity and from low stratus clouds, which produce slow, steady rains.

The island has been subject at infrequent intervals to major tropical storms of hurricane force. Three notable storms of this type occurred in 1900, 1915, and 1961 (Hurricane Carla). The first of these almost completely destroyed the city, but the building of a seawall on the Gulf side of the island after the 1900 storm minimized the danger of direct wave and swell action associated with this type of storm.

The prevailing winds are N from November to March, throughout which time northers occur frequently. These gales, although occasionally blowing with a velocity of over 35 knots, are not in themselves dangerous to vessels anywhere close to the coast because they blow offshore, but it is reported they are usually preceded by strong, gusty, onshore winds which cause heavy seas. The National Weather Service warning of their approach gives vessels ample time for preparation. From April to October the prevailing winds are S.

The National Weather Service maintains an office in Galveston; **Barometers** may be compared there or by telephone. (See appendix for address.) **Storm warning display** locations are listed on NOS charts and shown on the Marine Weather Services Charts published by the National Weather Service. (See page T-5 for **Galveston climatological table.**)

**Pilotage** is compulsory for all foreign vessels and U.S. vessels under register. Pilotage is optional for U.S. vessels in coastwise trade that have on board a pilot licensed by the Federal Government. The Galveston-Texas City pilot boat has a black hull with white superstructure with the word PILOT on each side of the superstructure. The pilot boat flys the code flag "P" by day and the standard pilot lights by night. The pilot boat monitors 2738 kHz and VHF-FM channel 16 (156.80 MHz) and the working channel 13 (156.65 MHz) continuously. Pilot boat call sign is WXA-357. The pilots carry portable radiotelephones. The sound and visual signals are four long blasts on the whistle or flashes on the signal light.

The Houston pilot boats have gray hulls and white superstructures. The pilot boats display the International Code flag "P" by day and the standard pilot lights by night. The pilot boats monitor 2738 kHz and VHF-FM channel 16 (156.80 MHz) and the working channel 12 (156.60 MHz) continuously. The pilot boats call signs are WI-3308 or WG-6780. The sound and visual signals are two long and three short blasts on the whistle or flashes on the signal light. The Houston pilots serve all ports above Texas City in Harris County.

The pilot boats come out when vessels are expected, and the pilots board off the sea buoy. Vessels should maintain steerage way and offer a good lee for the pilot to board. The pilots will advise vessels on the radiotelephone if special procedures are necessary. All pilots carry portable radiotelephones.

Pilots can be obtained by making a signal off the bar or an advance notice by cable, telegram, radio, or radiotelephone to Galveston-Texas City Pilots, telephone (713-765-9397), or to the Houston Pilots, telephone (713-645-2441), or through the ships' agents.

**Towage.**-Tugs up to 3,400 hp are available.

Quarantine, customs, **immigration,** and **agricultural quarantine** officials are stationed in Galveston. (See appendix for addresses.) Vessels subject to such inspections generally make arrangements in advance through ships' agents; officials usually board vessels at their berths.

**Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

A Public Health Service **hospital** is in Galveston. (See appendix for address.) The medical school and hospital of the University of Texas and other hospitals are in the city.

Galveston is a **customs port of entry.**

**Coast Guard.**-The **Captain of the Port** maintains an office in Galveston. A **marine inspection** office and a **vessel documentation** office are in Galveston. (See appendix for addresses.)

**Harbor regulations.**-The **Galveston Wharves,** which comprise piers, warehouses, wharves, export grain elevator, cotton compresses, terminal switching railroad, and special modern handling

equipment, is a municipally owned Port Authority, administered by the Board of Trustees appointed by the Mayor of the city. The operation of the wharves is under direction of a Port Director. The Board establishes tariff rates and regulations governing the wharves. The individual piers and terminals are administered by the firms operating them.

**Wharves.**-Galveston has more than 50 wharves and piers. Only the deep-draft facilities are described. (For a complete description of the port facilities refer to the Port Series, a Corps of Engineers publication.) The alongside depths are reported; for information on the latest depths contact port authorities. Almost all the facilities are on the S side of Galveston Channel and are owned and operated by the Board of Trustees of the Galveston Wharves, a city-owned corporation. All the deep-draft facilities have water, shore power, railroad, and highway connections. General cargo at the port is usually handled by ship's tackle; special handling equipment, if available, is mentioned in the description of the particular facility. Cranes up to 75 tons capacity are available in Galveston. A 500-ton floating derrick is available from Houston.

East End Container Terminal (29°19.0'N., 94°46.9'W.): 1,000-foot face, 40 feet alongside; W side, 845 feet long, 34 feet alongside; deck height, 11 feet; 7 acres of open storage, 40-ton container crane; receipt and shipment of containers.

Pier 14: 200 yards SW of Container Terminal; 253-foot face, W side 689 feet long, 32 feet alongside; E side 663 feet long, 36 feet alongside; deck height, 10 feet; 50-ton crane with hook, bucket, and 55-inch magnet, bucket unloading capacity 540 tons per hour; receipt and shipment of general and containerized cargoes and dry bulk commodities and ores and heavy lifts.

Piers 15, 16, and 18: 0.4 mile SW of Container Terminal; 1,203-foot face, E side 663 feet long; 32 feet alongside; deck height, 8 feet; 185,000 square feet covered storage; receipt and shipment of general cargo.

Pier 21: 0.6 mile SW of Container Terminal; 600-foot face, 31 feet alongside; W side 200 feet long, 30 to 10 feet alongside; deck height, 7 feet; 55,000 square feet covered storage, conveyors; receipt of bananas and seafood.

Piers 23-26: 0.9 mile SW of Container Terminal; 1,415-foot face, 32 feet alongside; E side 167 feet long, 32 to 16 feet alongside; deck height, 12 feet; 245,000 square feet of covered storage; receipt and shipment of general cargo.

Piers 27-29: 1.1 miles SW of Container Terminal; 1,478-foot face; 40 feet alongside; deck heights, 8 to 12 feet; 100,000 square feet covered storage, 12 grain loading spouts, two pneumatic grain suction pipes, loading rate 80,000 bushels per hour, unloading rate 6,000 bushels per hour, electric conveyors; receipt and shipment of grain and general cargo.

Pier 34: 1.4 miles SW of Container Terminal; E side 878 feet long; 34 feet alongside; deck height, 8 feet; fixed loading tower with loading spout with trimmer, conveyors loading 600 tons per hour, three gantry cranes with 3-cubic yard buckets; shipment of dry bulk sulphur.

Pier 35, Covered Barge Loading Terminal: 1.5 miles SW of Container Terminal; E side 770 feet long; 32 feet alongside; deck height, 11 feet; two 35-ton bridge cranes and one 5-ton bridge crane, 96,000 square feet covered storage; all weather loading of LASH and SEABEE barges.

Pier 36: 1.5 miles SW of Container Terminal; 642-foot face, 34 feet alongside; W side 1,205 feet long, 32 feet alongside; deck height, 11 feet; 300,000 square feet covered storage, conveyors; receipt of raw sugar, receipt and shipment of general cargo.

Piers 37-38: 1.7 miles SW of Container Terminal; 333-foot face, E side 1,182 feet long, W side 1,199 feet long; 32 feet alongside; deck height, 11 feet; 300,000 square feet covered storage, fixed bulk fertilizer loading tower, loading spout, conveyor, electric bagging machines, loading rate 600 tons per hour; receipt and shipment of general cargo and bulk fertilizer.

Piers 39-40: 1.8 miles SW of Container Terminal: 787-foot face, E side 1,173 feet long, W side 1,163 feet long; 32 feet alongside; deck height, 10 feet; 450,000 square feet covered storage; receipt and shipment of general cargo.

Pier 41: 1.9 miles SW of Container Terminal: 373-foot face, E side 1,195 feet long; 32 feet alongside; deck height, 11 feet; 460,000 square feet covered storage; receipt and shipment of general cargo.

Duval Corp., Pier B: 2.0 miles SW of Container Terminal; 575-foot face, 40 feet alongside; E side 1,390 feet long, 276 feet usable with dolphins, 20 to 15 feet alongside; W side 1,309 feet long, 12 feet alongside; deck height, 9 feet; sulphur loading tower with loading spout, conveyor; shipment of dry bulk and liquid sulphur; owned and operated by Duval Corp.

SEABEE Berth (29°18.7'N., 94°48.4'W.): S side of Pelican Island; 1,000 feet of berthing space with dolphins alongside offshore platform; 42 feet alongside; a barge marshalling area with depths of 14 feet is adjacent N of offshore platform; operated by Western Towing Co. and Lykes Brothers Steamship Co.

**Supplies.**-Provisions and marine supplies are available. Water for boiler use or drinking may be obtained at all piers. Bunker C and diesel oil are available by truck or barge; maximum loading rate is about 3,000 barrels per hour.

**Repairs.**-A large shipyard that specializes in ship conversions is on Pelican Island. The yard's 15,000-ton floating drydock can handle vessels up to 550 feet; cranes up to 80 tons are also available. There is berthing space where topside repairs or conversions can be made to 20 vessels at one time.

This yard has complete shops for all types of marine repairs to steel or wooden vessels. In 1972, it was reported that a 1,000-foot-long and 200-foot-wide drydock was under construction at the yard.

The port of Galveston has numerous marine repair shops and foundries capable of making repairs to the hull or machinery of steel or wooden vessels. A company has facilities to repair refrigerator equipment. In the slip E of the Container Terminal (Pier 9) are two boatyards with marine ways the largest of which can handle vessels up to 250 tons or 130 feet for general repairs. A machine and carpenter shop operates in connection with the yard. A marine repair plant, 1.7 miles W of the bridge between Galveston Island and Pelican Island, has a 1,000-ton vertical lift and related shops for the construction and repair of steel barges, tugs, and various types of small vessels.

**Salvage.**-Tugs, lighters, pumps, derricks, diving equipment, and other facilities are available for wrecking and salvage operations.

**Small-craft facilities.**-A marina, yacht club, and yacht yard are in a basin about 400 yards E of the Container Terminal (Pier 9). The marina is protected by a concrete breakwater and has five piers with covered and open berths for more than 400 craft; each berth has electrical and water connections. The slips and entrance channel had a reported controlling depth of 12 feet in September 1972. The yacht yard at the inner end of the basin has a lift that can handle craft up to 65 feet for hull, engine, and electronic repairs, or dry open or covered storage. Gasoline, diesel fuel, water, ice, marine supplies, and berths with electricity are available in the yacht basin. A launching ramp is available, and a mooring area is N of the marina.

**Communications.**-Galveston is served by a large modern airport, and close to 100 steamship lines that provide service to all ports of the world. In addition, several barge lines operate along the Intracoastal Waterway to other Gulf ports and to the Mississippi and other river systems. The terminal railroad connects with the six trunk line railroads serving the port. They are the Chicago, Rock Island, and Pacific; Fort Worth and Denver (Burlington); Atchison, Topeka, and Santa Fe; Missouri-Kansas, and Texas; Missouri-Pacific; and the Southern Pacific Railroads. Galveston is also the terminus for the Galveston-Houston, and Henderson Railway. Interstate and local buslines provide service and motor freight lines serve the port. A radio station provides ship-to-shore radio and radiotelephone service, and weather reports are broadcast.

**Texas City,** on the W side of Galveston Bay about 7 miles NW from Galveston, is a privately owned port of considerable commercial importance. It has extensive foreign and coastwise trade in petroleum, chemicals, fertilizer, and tin ore. Commodities handled through the port include shell, rice, wheat, flour, molasses, hides, synthetic rubber, naval stores, textiles, lumber, wood pulp paper products, petroleum products, steel products, salt, aluminum, zinc, copper, and tin ores, machinery, coal tar products, sulfuric acid, industrial chemicals, scrap iron, and fertilizer. A 23-foot storm levee has been constructed around the city.

**Prominent features.**-The Texas City Dike that extends about 4.5 miles into Galveston Bay, the three elevated tanks in the port area, and the numerous cracking towers of the oil refineries and chemical plants are conspicuous.

**Channels.**-Texas City Channel extends from deep water in Bolivar Roads through the lower end of Galveston Bay to a turning basin off the wharves at Texas City. A Federal project provides for a depth of 40 feet in the channel and basin. (See Notice to Mariners and latest editions of charts for controlling depths.) The channel is marked by lighted ranges, lights, and buoys.

**Texas City Canal** is a private industrial canal that extends S and W for about 2 miles to a turning basin. In September 1972, the reported controlling depth was 32 feet. The channel is marked by private lights and a **090°** lighted range.

Texas City Channel is protected by Texas City Dike on the N. The dike is earth-filled, protected by stone revetment, and is about 4.5 miles long. It is 900 feet N of the channel at the E end and about 2,300 feet N at the W end. The wharves are protected by a large spoil bank, known as **Snake Island,** extending along the E side of the turning basin.

There are several fish camps at the inner end of the Texas City Dike where water, ice, and launching ramps are available. A paved highway leads to a dry storage marina near the outer end of the dike on the N side. Gasoline, diesel fuel, water, ice, marine supplies, and a launching ramp are available. An 8-ton forklift can handle vessels up to about 30 feet for hull and engine repairs or dry covered and open storage. A depth of 6 feet was reported in the entrance channel and alongside the fuel pump in September 1972. A fishing pier is at the end of the dike.

About midway in Texas City Channel, a small-boat channel between the dike and the dredged channel leads NW to a landing and small-boat basin at the inshore end of the dike. The channel had a reported depth of about 6 feet, and is used by fishing and pleasure boats.

A natural small-boat channel about 5 to 7 feet deep, marked by daybeacons and buoys, leads S from the Texas City Channel to the Intracoastal Waterway through the lower Galveston Bay.

**Dangers.**-A sunken wreck reportedly covered 4 feet is off the entrance to North Slip.

**Towage.**-Vessels usually proceed without assistance from the bar to Bolivar Roads. Tugs up to 3,400 hp are available at Texas City for docking, undocking, and shifting.

Quarantine, **customs, immigration,** and **agricultural quarantine** officials are stationed in Gal-

veston. (See appendix for addresses.) Vessels subject to such inspections generally make arrangements in advance through ships' agents; officials usually board vessels at their berths.

**Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

The nearest Public Health Service **hospital** is in Galveston. Texas City has a county and a private hospital.

**Wharves.**-Texas City has over 35 wharves and piers. Only the deep-draft facilities are described. (For a complete description of the port facilities refer to the Port Series, a Corps of Engineers publication.) The alongside depths are reported; for information on the latest depth contact the private operator. The port's waterfront facilities are on the turning basin and along the Texas City Canal. Almost all facilities have highway, railroad, water, and electrical shore power connections. The Texas City Terminal Railway Co. owns most of the waterfront facilities in Texas City. 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 35-ton floating crane is available at Texas City, and a 500-ton floating derrick is available from Houston.

Monsanto Tanker Dock No. 1 (29°22.7'N., 94°53.4'W.): 100-foot face, 330 feet with dolphins; 35 feet alongside; deck heights, 16 and 12 feet; receipt of benzene and chemicals, shipment of acrylonitrile, styrene, and methanol; bunkering vessels; owned and operated by Monsanto Co.

Seatrain Lines Wharf: 200 yards W of Monsanto Dock No. 1; 500-foot face; 40 feet alongside; deck height, 12 feet; 125-ton electric hoist, 22-ton electric crane; receipt of liquid chemicals; operated by Monsanto Co.

Texas City Terminal Railway Co., Dry Cargo Dock No. 5: 350 yards S of Monsanto Dock No. 1; 400-foot face; 32-30 feet alongside; deck height, 15 feet; receipt and shipment of general and containerized cargoes, receipt of bagged tin ore; owned and operated by Texas City Terminal Railway Co.

Texas City Terminal Railway Co., Oil Tanker Dock No. 3: (29°22.4'N., 94°53.4'W.): 140-foot face, 283 feet with dolphins; 40 feet alongside; deck height, 16 feet; receipt of crude oil, shipment of petroleum products, and petrochemicals; bunkering vessels; operated by Marathon Oil Co. and Texas City Refining, Inc.

Texas City Terminal Railway Co., Oil Dock No. 2: SE end of Pier E; 88-foot face, 320 feet with dolphins; 34 feet alongside; deck height, 14 feet; receipt of crude oil, shipment of petroleum products, chemicals, and petrochemicals; bunkering vessels; operated by Marathon Oil Co., Texas City Refining, Inc., and Amoco Chemicals Corp.

Union Carbide Corp., Container Dock: 100 yards W of Oil Dock No. 2; 233-foot face; 34 feet alongside; deck height, 12 feet; straddle carrier, 30-ton traveling bridge crane; receipt and shipment of containerized cargo; owned and operated by Union Carbide Corp., Chemicals and Plastics Division.

Texas City Terminal Railway Co., Oil Dock No. 1: 100 yards W of Container Dock; 77-foot face, 152 feet with dolphins; 34 feet alongside; deck height, 14 feet; receipt of crude oil, receipt and shipment of petroleum products, chemicals, and petrochemicals; bunkering vessels; operated by Union Carbide Corp., Chemicals and Plastics Division; Marathon Oil Co., Texas City Refining, Inc.

Texas City Terminal Railway Co., Oil Dock No. 4: 100 yards S of Dock No. 1; 98-foot face, 284 feet with dolphins; 32 feet alongside; deck height, 14 feet; receipt of crude oil, receipt and shipment of petroleum products; bunkering vessels; operated by Marathon Oil Co., Texas City Refining, Inc.

Amoco Tanker Dock No. 1 (29°22.3'N., 94°53.3'W.): 80-foot face, 320 feet with dolphins; 38-36 feet alongside; deck height, 15 feet; receipt and shipment of crude oil, petroleum products, and asphalt; bunkering vessels; owned and operated by American Oil Co.

Amoco Tanker Dock No. 2: 200 yards S of Dock No. 1; 80-foot face, 320 feet with dolphins; 38-36 feet alongside; deck height, 15 feet; receipt of crude oil and petroleum products, shipment of petroleum products, ammonia, and asphalt; bunkering vessels; owned and operated by American Oil Co.

**Communications.**-The Texas City Terminal Railroad connects with the seven trunk line railroads that serve the city. They are: Atchison, Topeka, and Santa Fe; Galveston, Houston, and Henderson; Missouri-Kansas-Texas; Missouri-Pacific; Chicago Rock Island; Southern Pacific; and Fort Worth and Denver (Burlington Lines). Buslines and a motor freight line serve the city. Air service is available at the Houston Airport.

**Chart 11326 (152-SC).-East Bay,** is a large and shallow bay extending E about 16 miles from the S end of Galveston Bay and lying N of Bolivar Peninsula. The depths in the bay range from 2 to 7 feet. **Hanna Reef,** is a chain of low islands and shoals composed of broken shell. Only a heavy anchor will penetrate more than a few inches. The islands support no life. Breaker action is reported to be severe along the S side. The chain lies E of the Houston Ship Channel and partially separates Galveston Bay from East Bay. Small craft of about 3-foot draft can pilot their way between bays through two passes or around either end of the reef.

**Trinity Bay,** is a large body of water NE of the upper part of Galveston Bay. Depths in the bay proper range from 5 to 9 feet. Extensive oil-drilling operations are in progress in the Red Fish Bar, Cedar Point, and Trinity Bay areas. Numerous oil well structures and derricks are visible to the E of

the Houston Ship Channel. The derricks are moved as soon as wells are brought in or abandoned. Numerous pipes, piles, and abandoned oil wells which constitute a menace to navigation are in the N and W part of the bay between Trinity River and Umbrella Point.

**Caution.**-There are a number of fishing locations in Trinity Bay in the vicinity of which caution should be exercised as piles or other structures may exist. They are marked by quick flashing red lights.

**Lake Anahuac,** is separated from the N part of Trinity Bay by an earth dike which obstructs all navigation.

Although a Federal project authorizes a channel 9 feet deep from Houston Ship Channel to and in Trinity River, **Trinity River Channel,** does not lead into the river; it leads NE from Houston Ship Channel to **Smith Point,** thence follows the E shore N between a protective spoil bank and the mainland to a dead end where the spoil bank crosses the channel and joins the mainland at Anahuac. The channel is not maintained.

**Double Bayou,** 8 miles NE of Smith Point, flows into Trinity Bay and is used mainly by oil and fishing interests. A dredged entrance channel, marked by lights and daybeacons along the S side, leads to the mouth of the bayou. In 1973-October 1974, the controlling depth was 7 feet.

At a point 0.5 mile above its mouth, the bayou divides into East and West Forks and is navigable for respective distances of about 4 and 12 miles. **Double Bayou,** and **Eagle,** are settlements along the West Fork between the mouth and the highway bridge 3 miles from Trinity Bay. The bridge has a fixed channel span with a width of 10 feet and clearance of 14 feet. A marina at Double Bayou has covered berths and a marine railway capable of handling boats up to 55 feet for hull and engine repairs. A shipyard just above the marina builds barges and other commercial vessels. A marine railway at the yard can handle vessels up to 120 feet for general repairs. Diesel fuel, ice, and a launching ramp are available at seafood wharf on the West Fork near its junction with East Fork. A bridge crosses East Fork, 5 miles from the junction of the bayou.

**Anahuac Channel,** a dredged channel, leads from the upper part of Trinity Bay to Anahuac and **Browns Pass,** and is the entrance channel to Trinity River. In January 1975, the controlling depth was 5 feet. The channel is marked by lights, buoys, and daybeacons. Mariners should be on the lookout for floating logs.

**Anahuac,** is a town at the NE end of Trinity Bay, opposite the mouth of Trinity River. There was a reported depth of 6 feet at a small landing used for handling barge shipments of shell. Small shrimp boats tie up just above the shell wharf. Gasoline is available at service stations in the town. The **Chamber-Liberty Counties Navigation District Canal,** is used for irrigation purposes only. A highway connects Anahuac with Goose Creek and Houston.

**Trinity River** is one of the largest rivers in Texas, and empties into the NE end of Trinity Bay. Entrance to the river is through Anahuac Channel and Browns Pass, and not through Trinity River Channel. In March-April 1974, the controlling depth was 6 feet from the mouth of the river at Anahuac through **Browns Pass** to **Devers Canal,** about 17 miles above the mouth, thence to Liberty. Sulfur is moved by barge from **Moss Bluff,** about 10 miles above the river mouth, to Galveston Bay. A highway bridge with a fixed channel span having a clearance of 73 feet crosses the river about 6 miles above Anahuac. An overhead power cable with a clearance of 78 feet crosses the river about 3 miles below the highway bridge.

In the open waters of Trinity Bay about 2 miles W of Anahuac Channel, a 0.5-mile-long overhead power cable with a clearence of 29 feet is strung in a NW-SE direction on poles about 200 feet apart.

Off **Cedar Point,** a small dredged channel with a reported depth of 6 feet in September 1972 leads to an oil company dock in a basin.

Berths for tenders and crew boats are at the bulkhead at the head of the basin, and dolphins for mooring barges are on the W side of the basin. Several privately maintained fixed white lights mark the E side of the channel. A privately maintained fog signal is at the seaward end of a walkway that extends about 0.3 mile seaward from the basin.

**Chart 11328 (588).-Cedar Bayou,** is a crooked stream flowing in a S direction into the NW corner of Galveston Bay, 2.5 miles E of Morgans Point and 25 miles N of Galveston.

The principal commerce is in crude oil and shells, handled mostly in barges. A channel has been dredged across the flats from the Houston Ship Channel to the first bend above the mouth of the bayou. The channel is protected by submerged jetties at the mouth of the bayou. In 1972-1973, the controlling depth was 10 feet from the Houston Ship Channel to the first bend above the mouth of the bayou. Above the dredged channel the bayou had depths of about 6 feet in the natural channel to State Route 146 highway bridge, about 8.5 miles above the mouth.

The Cedar Bayou entrance channel across the flats is marked by a light and buoys. A light marks the offshore end of the submerged jetty on the N side of the entrance. About a mile inside the entrance between the jetties, the bayou is crossed by Tri City Beach Road highway bridge having a bascule span with a clearance of 13 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) The Missouri Pacific railroad bridge, about 6.1 miles above the entrance, has a vertical lift span that is on automatic operation; clearances are 13 feet down and 81 feet up. The lift

span is normally kept in a raised position, except for the passage of trains when it is lowered to a clearence of 13 feet. (See 117.550 chapter 2, for drawbridge regulations.)

Overhead power cables crossing the bayou between the mouth and the N side of the railroad bridge have a least clearance of 69 feet.

A highway bridge 9.7 miles above the entrance and a railroad bridge 13.4 miles above the entrance have fixed spans with a minimum width of 45 feet and clearance of 19 feet. A highway bridge crossing a cutoff between **Boaz Island** and the mainland has a 13-foot fixed span with a clearance of 6 feet. Only very small craft use the cutoff.

Shallow **Tabbs Bay** is at the NW end of Galveston Bay, and contains numerous oil well structures and overhead power cables. There are no defined channels; the average depth is reported to be less than 3 feet.

A channel from Houston Ship Channel follows the W end of **Hog Island** and Tabbs Bay to **Baytown** on the N shore. **Goose Creek** is navigable for craft drawing up to 5 feet to a highway bridge 2.8 miles above the entrance. The channel, unmarked and ill-defined, runs close aboard the N shore of the island N of the W end of Hog Island and leads to Goose Creek. Private poles and markers may at times mark the preferred route. Goose Creek contains numerous oil wells, pipelines, pilings, and other hazards; local knowledge is advised. The creek is used by oil well supply and commercial fishing vessels.

The highway bridge 2.8 miles above the entrance has a 36-foot fixed span with a clearance of 5 feet. Two highway and two railroad bridges between the entrance and this bridge have fixed spans with a minimum width of 32 feet and minimum clearance of 14 feet. Overhead power cables crossing the creek between the mouth and the highway bridge 2.8 miles above the entrance have a least clearance of 38 feet.

**Barbours Cut,** opposite Hog Island, extends about 1.2 miles W from Houston Ship Channel. A privately dredged triangular area is at the mouth of the cut at Morgans Point. The area is used for turning and mooring LASH/SEABEE vessels, and had a controlling depth of 42 feet in 1972.

An offshore wharf about 300 feet long is at the S edge of the triangular area. Additional LASH/SEABEE facilities are planned in the cut.

Above the LASH/SEABEE facility, a dredged channel leads to a turning basin at the head of the cut. In 1971-1973, the controlling depth was 16 feet to the turning basin, thence 21 feet in the basin. The basin provides excellent shelter for vessels up to 150 feet. A barge marshalling area N of the dredged channel had a controlling depth of 12 feet in March 1972.

Several private commercial wharves and an oil terminal are in the cut above the LASH/SEABEE facility. A marina, on the S side of the cut, has berths, gasoline, diesel fuel, water, ice, and a marine railway that can handle craft up to 65 feet for hull and engine repairs; machine and carpenter shops are available.

**Charts 11327 (519), 11326 (152-SC), 11323 (1282).**-Morgans Point is on the NW end of Galveston Bay on the W side of Houston Ship Channel. **La Porte,** a town 2 miles SW of Morgans Point, has rail and highway connections with other parts of the State.

From Morgans Point S to **Red Bluff,** (29°36.2'N., 95°59.0'W.) are summer homes with numerous boat landings along the shore. The Houston Yacht Club is 1.5 miles N of Red Bluff in a basin formed by two fingers of land built out from the shore. The club maintains an entrance light off the basin, 50 feet SE of the channel centerline, and a **219°** lighted entrance range. The channel leading to the yacht club basin had a reported controlling depth of 6 feet in September 1972. Gasoline, diesel fuel, water, ice, open and covered berths with electricity, a launching ramp, and an electric hoist are available. A submerged wreck is about 0.9 mile N of Red Bluff.

**Bayport** is a new deepwater port and industrial complex under development by the Port of Houston Authority. A channel, being dredged to 42 feet in 1974, leads from Houston Ship Channel close S of Atkinson Island to the shore about 0.9 mile NW of Red Bluff, thence W in a landcut to a turning basin of the same depth at the present site of State Highway 146. The channel is marked by a lighted range and lights. A liquid bulk terminal and two barge wharves are in operation.

**Clear Creek,** empties into the W side of Galveston Bay 20 miles NW of Galveston; 2 miles above its mouth the creek broadens into shallow **Clear Lake,** 2.5 miles long. A dredged channel leads from Galveston Bay through Clear Creek across Clear Lake to the highway bridge at **League City.** In August-September 1972, the controlling depth was 7 feet to the bridge at League City. The Clear Creek entrance channel and the creek and lake channels are well marked with lights, buoys, and daybeacons; the entrance channel is marked by a seasonal fog signal and a lighted **260°** range. A dredged side channel leads N from the mouth of Clear Creek about 0.6 mile along the S waterfront of **Seabrook.** In July 1970, the controlling depth was 7 feet. The channel from Galveston Bay to Clear Lake is reported to be highly congested with light commercial and pleasure-craft traffic, especially on weekends; a **speed limit** of 5 miles per hour is posted.

At the entrance to Clear Creek, an overhead power cable has a clearance of 99 feet. About 0.3 mile inside the entrance, two bridges cross the creek, State Route 146 highway bascule bridge with a clearance of 41 feet, and Southern Pacific Railroad (Texas and New Orleans) swing bridge with a clearance of 6 feet; the railroad swing bridge remains open until a train approaches, re-

ported to be twice daily. (See 117.240 and 117.245 (a) and (e) and (j) (33), chapter 2, for drawbridge regulations and opening signals.) Overhead power cables at the bridges have a clearance of 100 feet. About 6 miles above the entrance, overhead power cables have a least clearance of 55 feet.

**Seabrook**, a town on the N side at the entrance to Clear Creek, is headquarters for fishing and pleasure craft. **Kemah** is a town on the S side of the entrance to Clear Creek. Gasoline, diesel fuel, water, and provisions can be obtained on the waterfront at both towns.

There are several large yacht basins at the W end of Clear Lake, and numerous marinas and boatyards are on the lake, on both sides of Clear Creek, and on the Seabrook channel. Reported depths of 6 to 10 feet can be taken to the yacht basins. These facilities have stiff-leg cranes, mobile and fixed lifts, open and covered berths with electricity, storage facilities, marine supplies, and marine railways, the largest of which can handle crafts up to 110 feet; general and electronic repairs can be made. Most of the shrimp and fishing wharves and seafood packing plants are along the waterfront E of the bridges.

A privately maintained channel 3 miles SE of Kemah leads to a small dock at the headquarters of an oil company. The entrance is marked by a light. In 1956, the reported depth was 6 feet. The channel and facilities were inactive in September 1972.

**Dickinson Bayou** empties into **Dickinson Bay**, a small indentation in the W side of lower Galveston Bay, between **April Fool Point** and **Miller Point**, about 13 miles N of Galveston. A dredged channel leads from Galveston Bay through Dickinson Bay and Dickinson Bayou to the railroad bridge at Dickinson, a small settlement about 7 miles up the bayou. In 1966-71, the controlling depth was 6 feet. The entrance channel is marked by lights, buoys, and daybeacons.

Marinas and boatyards are at April Fool Point and at a basin about 1 mile NW of the point. Gasoline, diesel fuel, ice, marine supplies, launching ramps, cranes up to 10 tons, open and covered berths with electricity, and storage facilities are available; hull and engine repairs can be made.

About 1.2 miles above the mouth of Dickinson Bayou, State Route 146 highway bridge has a 40-foot bascule span with a clearance of 8 feet. The adjacent Southern Pacific railroad bridge has a swing span with a channel width of 40 feet and a clearance of 8 feet. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) Overhead power and telephone cables at the bridges have minimum clearances of 56 feet. In 1974, a fixed highway bridge with a design clearance of 45 feet was under construction across the bayou close eastward of State Route 146 highway bridge.

A marina, on the N side of the Dickinson Bayou just above the bridges, has berths for pleasure and fishing craft, gasoline, diesel fuel, and ice. The largest marine railway at the marina can handle craft up to 48 feet for hull and engine repairs and storage. An overhead power cable about 2.2 miles above the bridges has a clearance of 85 feet.

At Dickinson two bridges cross the bayou. The Missouri Pacific railroad bridge has a 23-foot fixed channel span with a clearance of 15 feet. State Route 3 highway bridge has a 30-foot fixed channel span with a clearance of 11 feet. The overhead power cable at the railroad bridge has a clearance of 42 feet. **Moses Lake**, a shallow lagoon S of Dickinson Bay, is used as a harbor of refuge by many small craft during hurricane warnings. The entrance to the lake is through a vertical lift tide gate that has a width of 56 feet and an open clearance of 51 feet; the twin supporting towers of the gate are visible from the Houston Ship Channel. A privately marked channel leads from Dickinson Channel through Moses Lake to Moses Bayou. In 1968, the channel had a reported controlling depth of 11 feet. Commercial traffic consists of chemical barges enroute to a plant on Moses Bayou. There are several marinas, small-craft launching ramps, and fish camps on a slip on the S side of the entrance to **Dollar Bay**. Gasoline, diesel fuel, ice, and provisions are available. A branch channel privately marked by poles with a reported depth of 4 feet in September 1972 leads from the main channel to the slip.

**Charts 11323 (1282), 11324 (518), 11325 (518-SC), 11327 (519), 11328 (588), 11329 (589), 11329 (590), 11326 (152-SC).-Houston Ship Channel** extends from Galveston Harbor across Galveston Bay and through parts of San Jacinto River and Buffalo Bayou to the city of Houston, a distance of 44 miles. The entrance to the channel is at the NW end of Bolivar Roads, between Port Bolivar and Texas City channels. The entrance is marked by a **318°** lighted range and by a lighted buoy on the NE side of the channel. The channel through the bay is marked by lights, lighted ranges, buoys, daybeacons, and a directional light at Baytown Bend.

The Federal project provides for a 40-foot channel from Bolivar Roads for about 42 miles to Brady Island, thence 36 feet for about 2 miles to and in Houston Turning Basin. (See Notice to Mariners and latest editions of charts for controlling depths.)

N of Bolivar Peninsula, spoil banks on both sides of the channel extend N to Red Fish Bar. About 1.5 miles below Red Fish Bar, a narrow channel with a depth of 8 feet and marked by stakes and an oil drum leads W to Dickinson Bayou. Another gap, 500 feet wide and 6 feet deep, opens W about 2.8 miles above Red Fish Bar. Along the E side of the channel N of Red Fish Bar, two openings through the continuous spoil bank permit passage into the NW portions of Galveston Bay. The first is about 1.8 miles above Red

Fish Bar and has a depth of 7 feet; the second **Five Mile Cut,** about 8 miles above Red Fish Bar and opposite Red Bluff, is a dredged cut which had a controlling depth of 8 feet in 1974. The channel is marked by buoys; the easternmost one is lighted.

On the opposite side of the channel from Five Mile Cut, a channel has been dredged W to Bayport harbor. In September 1972, the controlling depth was reported to be 10 feet in the channel and turning basin. The channel is marked by private buoys.

Part of the spoil material from the dredging of Houston Ship Channel shows above water and forms a dike protection for the channel; for several miles S of Morgans Point this dike is relatively high and is known as **Atkinson Island.** In 1972, it was reported that the spoil banks were beginning to encroach into the openings and caution was advised.

A barge assembly basin, 2,300 feet long, 150 feet wide and 12 feet deep, has been dredged into Atkinson Island S of Morgans Point and E of Houston Ship Channel. The entrances to the basin are E of Morgans Point and 1.3 miles S of the point. Barge moorings spaced 175 feet apart are on the E side of the basin. Both entrances to the basin are marked by lighted ranges. The complete route through the interconnecting entrance channels and the basin is known as Government Channel.

From Morgans Point to Lynchburg, a distance of 8 miles, the ship channel is marked by numerous lighted ranges and other aids. Above Lynchburg, lights are on the outside of curves as far as **Galena Park.**

A ferry operates across the Houston Ship Channel at Lynchberg. A high-level fixed highway bridge with a clearance of 135 feet crosses the ship channel at Manchester. Overhead power cables near **Mitchell Bay, Carpenter Bayou** and Galena Park have clearances of 162 feet or higher. There is a vehicular tunnel under the channel 2.4 miles from the upper end of Morgans Point Cut and another one between **Pasadena,** and Galena Park.

**Charts 11328 (588), 11329 (589), 11329 (590).-Morgans Point,** 23 miles NW of Bolivar Roads, marks the beginning of an extensive industrial area of oil refineries, cotton compresses, and other industrial plants lining the ship channel to Houston.

**Baytown,** 4 miles above Morgans Point on the NE side of the channel, is the site of the Humble Oil and Refining Company facilities. The oil company has a deepwater wharf and two deep-draft piers, with railroad and highway connections, and several barge wharves. Petroleum products and petrochemicals are received and shipped and vessels are bunkered at these facilities.

Pier 1 (29°43′27″N., 95°01′11″W.) is a 770-foot wharf with 820 feet of berthing space with dolphins; with 36 feet reported alongside. Deck height, 9 feet.

Pier 2, .015 mile N of Pier 1, is 432 feet long with 550 feet of berthing space with dolphins on the E and W sides; with 40 to 39 feet reported along the E side and 39 feet along the W side. Deck height, 9 feet.

Pier 5, 150 yards NW of Pier 2, is 400 feet long; with 40 to 39 feet reported along the E side and 39 to 25 feet along the W side. Deck height, 13½ feet.

Two overhead power cables crossing the channel about 0.3 mile above the Baytown facilities have a minimum clearance of 162 feet. The transmission towers are prominent.

About 1.5 miles above the Baytown facilities, a privately maintained channel leads in a SW direction from the main ship channel along the NW end of **Alexander Island** to the piers of a powerplant at the head of the basin. In August 1965, the controlling depth in the channel was 11 feet.

**Charts 11329 (589), 11329 (590).-San Jacinto River** branches N from the ship channel at **Lynchburg,** 8 miles above Morgans Point. It has a navigable depth of 5 to 6 feet for about 13.5 miles to the bridge on the Beaumont-Houston highway that has a fixed channel span having a clearance of 24 feet. In 1974, a fixed highway bridge with a design clearance of 24 feet was under construction just S of the Beaumont-Houston bridge. The overhead power cable near the entrance at Lynchburg has a clearance of 85 feet. Twin highway bridges, 1.8 miles above the mouth, have fixed spans with minimum clearance of 25 feet. The Missouri-Pacific railroad bridge, 4.2 miles above the mouth has a fixed span with clearance of 24 feet. **Highlands** and **Sheldon** are villages 5.5 and 13 miles, respectively, above Lynchburg.

**San Jacinto State Park,** on the S side of the channel 9 miles above Morgans Point, is the site of the battle by which the Republic of Texas won its independence. Landings are provided for small craft, and vessels should slow down to prevent wave wash and damage to boats. A monument 605 feet high is the most prominent object in the area. On and around its top are fixed red lights visible on clear nights from Galveston entrance. The U.S.S. TEXAS, historic battleship veteran of two World Wars, is moored permanently in a slip in the park area, just off the ship channel. A submerged breakwater extends across the entrance to the slip.

An overhead power cable crossing the channel about 500 yards above the TEXAS has a clearance of 165 feet.

About 0.7 mile above the TEXAS on the N side of the channel, Jacintoport Terminal slip extends about 0.6 mile W. Depths of 25 to 32 feet are in the slip. Bethlehem Steel Corp. has a wharf 1,500 feet long with 2,050 feet of berthing space with dolphins on the N side of the slip with depths of 32 feet reported alongside. Deck height is 14 feet. In addition to the steel company wharf the slip has several barge wharves. The terminal, formerly an ordnance depot, has several warehouses and additional open storage space.

On the S side of the channel, opposite Jacintoport Terminal slip, is a large deepwater basin with reported depths of about 40 to 50 feet. The head of the basin has an 830-foot-long pier with 600 feet of berthing space. Depths of 50 feet are reported alongside. A 6-million-bushel grain elevator is on the slip. On the W side of the basin is a general cargo wharf with 720 feet of berthing space with reported depths of 40 feet alongside. A transit shed with 64,000 square feet of covered storage is adjacent to the wharf.

On the N side of the channel, about 0.7 mile above Jacintoport slip, is the Cargill, Inc., pier providing two 750-foot berths with reported depths of over 44 to 46 feet alongside. A 4½ million-bushel grain elevator and a 6-million-gallon molasses mixing facility are adjacent to the pier.

There are chemical and liquid cargo handling wharves on the S side of the channel above the deepwater basin in **Tucker Bayou**, and at the mouth of **Patrick Bayou.**,

**Chart 11329 (590).-Boggy Bayou Basin,** on the S side of the channel about 2 miles above Jacintoport Terminal slip, is the site of the Shell Oil Company refinery. On the S side of the basin are four 600-foot tanker berths with depths of 40 feet reported alongside. All the berths have railway and highway connections, and freshwater is available. Petroleum products, petrochemicals, and chemicals are received and shipped, and vessels can receive bunker fuels.

**Traffic warning signals** to indicate when oil loading operations are in progress at the terminal are displayed both day and night from a 70-foot mast on the S side of the basin near the mouth. The night signal is a fixed amber light (the light blinks when extremely dangerous conditions exist); the day signal is an orange colored cylinder. When such signals are displayed, passing vessels shall reduce speed sufficiently to prevent any damage to vessels and equipment, and to prevent oil spills.

On the S side of the channel about a mile W of Boggy Bayou, there is a chemical plant and barge wharf that is marked by lights. Port Houston Shipyard, on the N side of the channel about 1.3 miles above Boggy Bayou, builds large chemical carrying barges.

**Greens Bayou,** enters the main ship channel from N at a point 2.1 miles above Boggy Bayou. A Federal project provides for a 36-foot channel to about 0.3 mile above the entrance, thence 15 feet for about 1 mile. (See Notice to Mariners and latest edition of the chart for controlling depths.) Above this point, the bayou is navigable for drafts of 8 to 10 feet for about 4 miles, thence drafts of 4 to 5 feet for another 5 miles.

The bayou is crossed by several fixed bridges and overhead pipelines above the limits of the Federal project; minimum clearance is 21 feet. Two overhead power cables cross below the bridges with an approximate clearance of 75 feet. There are shipyards, chemical plants, and barge terminals on the bayou.

The Port of Houston Authority bulk materials handling plant is on the E side of the bayou just inside the entrance. The facility has a 270-foot T-head layup berth and a 650-foot wharf with 36 feet reported alongside. The wharf is served by loading and unloading towers, chutes, and conveyors. Freshwater and electric shore power are available. Vessels can receive bunkers by barge while alongside. The plant has railway and highway connections.

A shipyard and floating drydock are on the W side of the bayou opposite the bulk materials plant.

Adams Terminal, on the S side of the ship channel about 0.3 mile W of Greens Bayou, is a large industrial complex owned and operated by Phillips Petroleum Company. The terminal has a 960-foot wharf on the ship channel and 1,780 feet of berthing space on the W side of the terminal slip; 22-35 feet is reported alongside. Deck heights are 8 feet. Bulk handling equipment, heavy lifts, and large storage yards and warehouses are at the terminal. Water and electric shore power are available. The terminal has railway and highway connections. General cargo, bulk ores, dry bulk commodities, and bagged and bulk fertilizers are handled.

The Armco Steel Corp. wharf, on the N side of the channel 1 mile W of Greens Bayou, has a 1,080-foot face with 36 to 41 feet reported alongside. Deck height is 20 feet. The wharf has railway and highway connections. Coal and scrap metals are received, and steel products are shipped.

On the S side of the channel about 1.4 miles W of Greens Bayou is the Olin Corp. plant. The plant has a 1,060-foot wharf with deck heights of 8 to 10 feet and depths of 30 to 32 feet reported alongside. Dry bulk fertilizers and phosphate rock are shipped.

On the N side of the channel, opposite the Olin Corp., are the Amerada Hess Petroleum Corp. wharves. Ship Dock No. 2 (29°44′30″N., 95°11′59″W.) has a 100-foot face with 300 feet of berthing space with dolphins; 32 feet is reported alongside. The wharf has a deck height of 13 feet at the center and 3 feet at each end. Ship Dock No. 1, 160 yards W of Dock No. 2, has a 60-foot face with 285 feet of berthing space with dolphins; 32 feet is reported alongside. The wharf has a deck height of 15 feet. Petroleum products are received and shipped, and vessels can receive bunker fuels alongside.

**Hunting Bayou,** on the N side of the channel 1.9 miles W of Greens Bayou, is the site of the Warrengas Terminal, where petroleum and natural gas are shipped. The two wharves on the NE side of the bayou's mouth have 90-foot faces with 300 feet of berthing space with dolphins. The wharves have a deck height of 15 feet; 36 feet is reported alongside. Water, and railway and highway connections are available.

**Cotton Patch Bayou** is on the S side of the channel about 0.2 mile above Hunting Bayou. A shell-handling plant with a 600-foot barge wharf is on the SE side of the bayou; depths of 6 to 9 feet are reported alongside the wharf. A marine repair wharf for barges and tugs 400 feet long is on the NE side of the bayou; depths of 12 to 13 feet are reported alongside. An 800-ton marine railway is at the inner end of the bayou.

Close W of Cotton Patch Bayou is the site of the General American Transportation Corp. tank storage terminal (Pasadena Wharf). The wharf has a 75-foot face, 230 feet of berthing space with dolphins, a deck height of 12 feet, and reported depths of 40 feet alongside. Petroleum products, petrochemicals, chemicals, molasses, and vegetable and fish oils are handled on the wharf, and vessels are bunkered.

**Washburn Tunnel,** crosses under the ship channel from **Galena Park,** to Pasadena about 0.9 mile above Hunting Bayou. Both Galena Park and Pasadena have large petrochemical industries.

The Crown Central Petroleum refinery and wharf is on the S side of the ship channel close E of the tunnel. The wharf has a 150-foot face, 310 feet of berthing space with dolphins, deck height of 10 feet, and depths of 38 feet reported alongside. Petroleum products are received and shipped, and vessels are bunkered.

About 1.1 miles above Hunting Bayou on the S side of the ship channel is the Champion Paper and Fibre plant and barge wharves.

On the N side of the ship channel at **Galena Park** is the Texaco refinery and slip. The slip has 250 feet of berthing space at the head, 685 feet on the E side, and 526 feet on the W side. The deck height is 15 feet, and depths of 20 to 30 feet are reported alongside. Crude oil and petroleum products are shipped.

Close W of the Texaco refinery is the General American Transportation Corp. Tank and Storage plant and wharf. The wharf has 275 feet of berthing space, deck height of 14 feet, and depths of 39 feet reported alongside. Two barge wharves are adjacent to the ship wharf. Petroleum products and petrochemicals are received and shipped, and vessels are bunkered. The basin off the berths was reported to have been dredged to 40 feet in 1965.

The Houston Light and Powerplant is on the S side of the ship channel opposite the Texaco slip. An overhead power cable crossing the ship channel just E of the plant has a clearance of 165 feet.

The Atlantic Richfield Co. refinery and wharves are on the S side of the ship channel about 0.5 mile above the powerplant. About 1,490 feet of berthing space with 40 feet reported alongside is available. Petroleum products and petrochemicals are received and shipped, and vessels are bunkered.

TEC Terminal and wharf are on the N side of the ship channel opposite the Atlantic Richfield Co. refinery. The wharf has a 220-foot face, 390 feet of berthing space with dolphins, and depths of 34 feet reported alongside.

Just W of the TEC Terminal are the Goodpasture, Inc., 8½-million-bushel grain elevator and wharf. The elevator is one of the most prominent landmarks on the Houston Ship Channel. The wharf provides 680 feet of berthing space with 42 feet reported alongside. Just W of the wharf, a slip with a 1,250-foot wharf on its E side has 1,010 feet of berthing space and depths of 38 feet reported alongside.

**Sims Bayou Turning Basin,** is off the S side of the ship channel close E of Sims Bayou. (See Notice to Mariners and latest edition of the chart for controlling depth.)

**Sims Bayou,** enters Houston Ship Channel about 2.7 miles above Hunting Bayou. The Harris County Houston Ship Channel Terminal railroad bridge crossing the bayou about 0.8 mile above the mouth has a 26-foot fixed span with a clearance of 18 feet. An overhead power cable crossing at the bridge has a clearance of 46 feet. A shell-handling wharf is on the N side just below the bridge. Between the bridge and the shell-handling wharf, several sunken shell barges are reported to block the bayou and prevent navigation above this point.

Port of Houston tanker facility, on the W side of Sims Bayou Turning Basin, has 273 feet of berthing space with 40 feet reported alongside its wharf.

U.S. Gypsum Co. plant and wharf are on the N side of the ship channel opposite the entrance to Sims Bayou. The wharf has 600 feet of berthing space with 28 feet reported alongside. Gypsum rock is received from self-unloading vessels.

Manchester Terminal, on the S side of the ship channel, is close W of the mouth of Sims Bayou. The terminal is one of the largest privately operated general cargo terminals on the Houston Ship Channel. The terminal wharf is 1,520 feet long with depths of 34 feet reported alongside. The terminal has 1¼ million square feet of covered storage, two cotton compresses, open storage, and railway and highway connections.

Close W of the Manchester Terminal is the Charter International Oil Co. Refinery. The ship wharf has 188 feet of berthing space with reported depths of 37 to 38 feet alongside. Several barge wharves are adjacent to the ship wharf. Gasoline, fuel oils, jet fuels, kerosene, and petrochemicals are shipped.

A large cotton compress and storage warehouses are on the N side of the ship channel opposite the Manchester Terminal.

The Southern Pacific Railroad Terminal slip and wharf are on the N side of the ship channel close W of the cotton compress. The terminal has three ship berths, one servicing specialized bulk cement carrier ships.

The U.S. Steel Corp. barge terminal is close W of the Southern Pacific Railroad Terminal.

The former U.S. Army Ordnance Dickson Gun Plant is on the N side of the Houston Ship Channel about a mile above Sims Bayou. The plant is now

inactive. The area N of the ship channel between the Coast Guard pier (29°43'40"N., 95°15'32"W.) and the U.S. Steel Co. wharf is foul. **Fidelity Island,** is a group of rocks awash in the middle of the area.

Port of Houston Authority Manchester general cargo terminal and Elco Shipside Elevator Company's 1½-million-bushel rice elevator are on the S side of the ship channel about 1.3 miles above Sims Bayou. The terminal has 1,447 feet of berthing space with reported depths of 25 to 32 feet alongside. In addition to handling general cargo and rice, the terminal has facilities for handling and storage for over 4 million gallons of chemicals and edible oils and 15 million gallons of molasses. The terminal has bulk material handling equipment, oil handling, and bunkering facilities.

A high-level fixed highway bridge with a clearance of 135 feet crosses the ship channel at Manchester, about 1.4 miles above Sims Bayou.

**Harrisburg,** about 2 miles below the Houston Turning Basin, comprises the industrial section of the city of Houston. **Harrisburg Bend,** a dredged channel around **Brady Island,** has unloading rigs for sand and shell, boat repair yards, and other facilities. In July 1974, the controlling depth for a midwidth of 50 feet was 6 feet in the channel. Cypress Street Bridge to Brady Island over the bend, 0.2 mile S of Brays Bayou, has a 40-foot fixed channel span with a clearance of 10 feet. The bend is crossed by an overhead power cable with a clearance of 67 feet, about 150 yards S of the bridge.

Shipyards on Brady Island and on Harrisburg Bend have marine ways that can handle vessels up to 270 feet long, 60 feet wide, and 18-foot drafts. General repairs are made on all types of vessels, but the yards specialize in work on towboats, barges, and other small commercial craft. Machine shops are nearby.

**Brays Bayou,** branches off the W entrance to Harrisburg Bend. A highway bridge just above the bayou mouth has a fixed span with a clearance of 23 feet. Three highway and two railroad bridges crossing the bayou above the first bridge have fixed spans with minimum channel widths of 31 feet and clearances of 12 feet. Overhead power cables crossing the bayou have a minimum clearance of 23 feet.

**Buffalo Bayou,** above the Houston Turning Basin, in August-October 1974, had controlling depths of 10 feet to the 69th Street highway bridge, thence 8 feet to the Lockwood Drive lift bridge, thence 6 feet to the Jensen Drive fixed highway bridge, about 0.8 mile, 2.2 miles, and 3.5 miles, respectively, above the Houston Turning Basin; and thence 5 feet for about another 2.6 miles in a natural channel to the head of navigation. It is used considerably by barge traffic. The upper light-draft channel through the bayou is crossed by many bridges of all types between the turning basin and Franklin Avenue. Minimum clearance is 21 feet for the bascule, swing, and vertical lift spans, and 9 feet for the fixed spans. (See 117.240 and 117.245 (a) through (e) and (j) (31), chapter 2, for drawbridge regulations and opening signals.) Numerous overhead pipelines and telephone and power cables cross the bayou; minimum clearance is 46 feet. The principal commodities handled on the bayou are shell, petroleum, sand and gravel, clay, steel products, and cotton.

**Houston,** the largest city in Texas, is at the head of Houston Ship Channel 22 miles above Galveston Bay and 44 miles from Galveston Entrance to the Gulf. The city is the principal distribution point for Texas and one of the main distribution points for the W and SW United States. Houston has many colleges and universities within its metropolitan area, among which are the University of Texas, Rice University, Texas Southern University, and other private and public colleges. It also has a large medical center with 16 participating institutions and medical organizations.

**Port of Houston** lies within Harris County and is one of the largest ports in the United States in total tonnage handled. The port extends along Houston Ship Channel from the turning basin at the head of the channel to Morgans Point and takes in Harrisburg, Manchester, Clinton Park, Galena Park, Pasadena, Lynchburg, and Baytown. The port also includes Buffalo Bayou, Sims Bayou, Hunting Bayou, Greens Bayou, Boggy Bayou, Goose Creek, Cedar Bayou, Barbours Cut, and the new industrial development and port facilities at Bayport on Galveston Bay near Red Bluff.

The principal imports include coffee, molasses, burlap, jute, lumber, wood products, newsprint, petroleum, gypsum, various ores and concentrates, steel products, and motor vehicles. The principal exports include wheats and various grains and sorghums, animal feeds, petroleum products, cotton, vegetable oils and fats, synthetic rubber, coke, clays and earths, scrap iron, steel products, machinery, coal tar products, caustic soda, alcohol, industrial chemicals, carbon black, and fertilizers.

There is one public and four privately owned grain elevators in the port with capacities of 1½ to over 8 million bushels. In addition, the port has numerous petroleum, petrochemical, and fertilizer plants, large cotton compresses with warehouses, shipyards, and steel mills.

**Anchorages.**-Vessels are prohibited from anchoring in the Houston Ship Channel or turning basin except in case of emergency, in which circumstances they shall anchor as near as possible to the channel edge or turning basin so as not to interfere with free navigation or obstruct the approach to any pier.

**Tides.**-The diurnal range of tide in the Houston Ship Channel at Morgans Point is 1 foot. At Houston there is practically no periodic tide but the waterfront is greatly influenced by winds.

**Weather.**-The climate of Houston is predominantly marine. The terrain includes numerous small streams and bayous, which together with the nearness to Galveston Bay favor the development of both ground and advective fogs. Prevailing winds are from the SE and S, except in January, when frequent passages of high-pressure areas bring invasions of polar air on prevailing N winds.

Temperatures are moderated by the influence of winds from the Gulf, which results in mild winters and, on the whole, relatively cool summer nights. Another effect of the nearness of the Gulf is abundant rainfall, except for rare extended dry periods. Polar air penetrates the area frequently enough to provide stimulating variability in the weather.

The average number of days with minimum temperatures of 32°F. or lower is only about 7 per year at the city's NWS office and about 15 per year at William P. Hobby Airport, which is about 10 miles SE of the city. Most freezing temperatures last only a few hours because they are usually accompanied by clear skies.

Monthly rainfall is evenly distributed throughout the year. In past years about 75 percent of the total precipitation has been between 30 and 60 inches. Since thundershowers are the main source of rainfall, precipitation may vary substantially in different sections of the city on a day-to-day basis.

Records of sky cover for daylight hours indicate about one-fourth of the days per year as clear with maximum of clear days in October. Cloudy days are relatively frequent from November to May, and partly cloudy days are more frequent from June through September.

Snow rarely occurs; however, on February 14-15, 1895, 20 inches of unmelted snow was measured.

Heavy fog occurs on an average of 16 days a year, and light fog occurs about 62 days a year in the city, but the frequency of heavy fog is considerably higher at William P. Hobby Airport.

Destructive windstorms are fairly infrequent, but both thundersqualls and tropical storms occasionally pass through the area.

The National Weather Service maintains an office at the Houston International Airport; **barometers** may be compared there or by telephone. (See appendix for address.)

(See page T-5 for **Houston climatological table.**)

**Towage.**-Tugs up to 1,700 hp are available at Houston.

Quarantine, customs, **immigration**, and **agricultural quarantine** officials are stationed in Houston. (See appendix for addresses.) Vessels subject to such inspections generally make arrangements in advance through ship's agents; officials usually board vessels at their berths.

**Quarantine is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)**

A Public Health Service **outpatient clinic** is in Houston, and a Public Health Service **hospital** is in Galveston. (See appendix for addresses.) Houston has also many private hospitals.

Houston is a **customs port of entry.**

**Coast Guard.**-The **Captain of the Port's** office, a **marine inspection** office, and a **vessel documentation** office are in Houston. (See appendix for addresses.)

**Harbor regulations.**-The Port of Houston is managed, governed, and controlled by the **Port of Houston Authority.** The regulations are enforced by the **Director of the Port** whose offices are in the Port Authority Building at 1519 Capital Avenue; telephone (713-225-0671). No vessel shall exceed a speed limit of 8 knots in any part of the harbor, or pass any dock, wharf, or floating plant at a greater speed than 5 knots. Smoking is prohibited on any wharf except in designated smoking areas, and is also prohibited on the open decks or in the hatches of any vessel in the harbor. These regulations are strictly enforced.

**Wharves.**-Houston has over 200 piers and wharves. Only the deep-draft facilities at Houston are described. (For a complete description of the port facilities, refer to the Port Series, a Corps of Engineers publication.) The alongside depths for the facilities described are reported; for information on the latest depths contact the operator. Unless otherwise mentioned, all the facilities described are owned and operated by the Port of Houston Authority. Most of the piers and wharves have water and electrical shore power connections, and highway and railroad connections.

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.

About 200 acres of open storage area, over 8 million square feet of covered storage, and 4 million cubic feet of cooler and freezer space are available in the port. Mobile cranes up to 200 tons and a floating derrick with a capacity of 800 tons are available at the port.

**N side Houston Ship Channel:**

Public Wharves Nos. 30 and 31 (29°43′32″N., 95°16′06″W.): 1,176-foot face; 36 feet alongside; deck height, 15½ feet; 140,000 square feet covered storage; receipt and shipment of general cargo.

Public Wharf No. 29: W of Public Wharf No. 30; 600-foot face; 36 feet alongside; deck height, 15½ feet; 5 acres of open storage; 40-ton container crane; receipt and shipment of general and containerized cargo.

Public Wharves Nos. 27 and 28: NW of Public Wharf No. 29; 1,200-foot face; 36 feet alongside; deck height, 15½ feet; 144,000 square feet covered storage; receipt and shipment of general cargo, receipt of steel products.

Public Wharf No. 26: N of Public Wharf No. 27; 600-foot face; 36 feet alongside; deck height, 15½ feet, 2 acres of open storage; 40-ton container crane; receipt and shipment of general and containerized cargo.

Public Wharves Nos. 24 and 25: N of Public Wharf No. 26; 1,200-foot face; 36 feet alongside; deck height, 15½ feet; 144,000 square feet covered storage; receipt and shipment of general cargo.

Public Wharf No. 23: N of Public Wharf No. 24; 600-foot face; 36 feet reported alongside; deck height, 15½ feet; 2 acres of open storage; 40-ton container crane; receipt and shipment of general and containerized cargo.

Public Wharves Nos. 21 and 22: N of Public Wharf No. 23; 1,200-foot face; 36 feet alongside; deck height, 15½ feet; 144,000 square feet covered storage; receipt and shipment of general cargo.

Public Wharf No. 20: N of Public Wharf No. 21; 600-foot face; 36 feet alongside; deck height, 15½ feet; 2 acres of open storage; receipt and shipment of general cargo and structural steel products.

Public Wharves Nos. 18 and 19: N of Public Wharf No. 20; 1,777-foot face; 36 feet alongside; deck height, 15½ feet; 133,000 square feet covered storage, 9 acres open storage; receipt and shipment of general cargo.

Public Wharf No. 17: N of Public Wharf No. 18; 600-foot face; 36 feet alongside; deck height, 15½ feet, 1½ acres of open storage; one 27½-ton container crane and one 50-ton gantry crane; receipt and shipment of general and containerized cargo.

Public Wharf No. 16: N of Public Wharf No. 17; 603-foot face; 36 feet alongside; deck height, 15½ feet, 1½ acres of open storage; one 27½-ton container crane and one 50-ton gantry crane; receipt and shipment of general and containerized cargo.

Public Wharf No. 15: N of Public Wharf No. 16; 480-foot face; 32 feet alongside; deck height, 15½ feet; 44,000 square feet covered storage; 60-ton crane and grain gallery with eight loading spouts; receipt and shipment of general cargo, shipment of grain; operated by Louis Dreyfus Corp.

Public Wharf No. 14: N of Public Wharf No. 15; 480-foot face; 32 feet alongside; deck height, 15½ feet; grain gallery with five loading spouts; receipt and shipment of general cargo, shipment of grain.

**E side of Turning Basin:**

Public Wharves Nos. 12 and 13: N of Public Wharf No. 14; 990-foot face; 30 feet alongside; deck height, 15½ feet; receipt and shipment of general cargo.

Public Wharf No. 11: N of Public Wharf No. 12; 530-foot face; 30 feet alongside; deck height, 15½ feet; 41,000 square feet covered storage; receipt and shipment of general cargo.

Public Wharf No. 10: N of Public Wharf No. 11; 700-foot face; 30 feet alongside; deck height, 15½ feet; 48,000 square feet covered storage; receipt and shipment of general cargo.

**S side of Turning Basin:**

Public Wharf No. 4 (29°44′52″N., 95°17′24″W.): 779-foot face; 30 feet alongside; deck height, 8½ feet; 42,000 square feet covered storage; receipt and shipment of general cargo.

Public Wharf No. 3: E of Public Wharf No. 4; 802-foot face; 30 feet alongside; deck height, 9 feet; 25,000 square feet covered storage; receipt and shipment of general cargo.

**S side of Houston Ship Channel:**

Public Wharf No. 2 (29°44′47″N., 95°17′12″W.): 519-foot face; 30 feet alongside; deck height, 12½ feet; 38,000 square feet covered storage; receipt and shipment of general cargo.

Public Wharf No. 1-W: SE of Public Wharf No. 2; 603-foot face; 30 feet alongside; deck height, 14 feet; 28,000 square feet of covered storage; receipt and shipment of general cargo, shipment of tallow.

Public Wharf No. 1-E: SE of Public Wharf No. 1-W; 42-foot face, 175 feet of berthing space with dolphins; 28-30 feet alongside; deck height, 16½ feet; receipt of molasses.

Public Wharves Nos. 41 through 48: 500 yards SE of Public Wharf No. 1-E; 3,428-foot face; 30-32 feet alongside; deck height, 15½ feet; 730,000 square feet covered storage, 1½ acres of open storage; 75-ton crane, clamshell buckets, electric magnets; receipt and shipment of general cargo, shipment of cotton.

PETCO Docks: S of Public Wharf No. 48; 800-foot face; 27-35 feet alongside; deck height, 18 feet; 111,000 square feet covered storage; receipt and shipment of general cargo; owned by the Baptist Health Education and Research Foundation, operated by Petty Terminal Corp.

New Terminal Warehouse Corp. Wharf: S of PETCO Docks; 480-foot face; 30 feet alongside; deck height, 19 feet; receipt and shipment of general cargo, receipt of dry bulk cargo.

**Supplies.**-All types of marine supplies and services are available at Houston. Freshwater is available at all the wharves and piers. Vessels can receive bunker fuels at many of the oil companies wharves or by oil barges.

Small-craft supplies and services are available at Barbours Cut and at Houston.

**Repairs.**-A shipyard adjacent to Greens Bayou has a floating drydock with a lifting capacity of 9,000 tons. The drydock is 488 feet long on the keel blocks, 101 feet wide, and has a depth of 23 feet over the keel blocks. Houston has machine shops, foundries, and other repair facilities that can handle most above- and below-waterline repairs.

**Communications.**-The **Port Terminal Railroad** connects with all terminals in the port, and is owned by the Port of Houston Authority and operated by the Port Terminal Railroad Association. The members of the association are the six trunk line railroads serving the port and city. They are the Burlington Northern, Missouri Pacific, Rock Island, Santa Fe, Southern Pacific, and Missouri-Kansas-Texas Line (Katy) Railroads. Over 100 steamship lines offer cargo service from Houston to world ports, and some 90 tanker operators serve the port.

Millions of tons of cargo are moved annually in the coastwise service through the Port of Houston via the Intracoastal Waterway by common carrier

barge lines, 20 specialized cargo, and many private barge operators. There are over 30 major motor freight carriers and numerous specialized truck lines. Buslines operate from two terminals and there is local bus service.

Several airlines provide passenger, freight, and mail service, and one carrier handles only air cargo from Houston Intercontinental Airport.

**Chart 11323 (1282).**-From Galveston Entrance to San Luis Pass, a distance of 27 miles, the Gulf coast trends in a general SW by W direction. The SW end of Galveston Island is low and sandy, with no conspicuous natural marks. Except in the vicinity of the Galveston Entrance, the coast has fairly uniform depth with few outlying dangers, and can be approached to within about 3 miles by deep-draft vessels.

**Charts 11325 (518-SC), 11324 (518), 11322 (887-SC), 11323 (1282).-West Bay** is a shallow body of water which extends 16 miles SW from the SW part of Galveston Bay, between Galveston Island and the mainland. The bay proper is of no commercial importance.

The Intracoastal Waterway crosses the E end of West Bay between **North Deer Island** and **Tiki Island.** A marina, in a basin enclosed by timber breakwaters, is on the S side of the E end of Tiki Island. A privately dredged channel, marked by privately maintained daybeacons and with a reported controlling depth of 4½ feet in 1973, leads to the marina from the Intracoastal Waterway, 0.3 mile SW from the twin causeways connecting Virginia Point and Galveston. In September 1972, depths of 5 feet were reported in the basin. The marina has open and covered slips for about 120 boats up to 50 feet long, water, electricity, gasoline, diesel fuel, ice, some marine supplies, a complete marine service station, and an 80-ton mobile lift that can handle craft up to 50 feet. Hull and engine repairs can be made, and salvage equipment is available.

Tiki Island is being developed as a resort home project. A number of lagoons have been dredged into both the N and S sides of the island. From the marina, a dredged access channel with depths of 7 feet reported in September 1972, leads around the N side of the island to a turning basin. A fixed bridge that connects Tiki Island with the mainland crosses this channel about 300 yards N of the marina; clearance is 14 feet. An overhead power cable with a clearance of 37 feet crosses the channel just N of the bridge. Another privately dredged channel with a reported controlling depth of 8 feet in September 1972 leads from the SW side of the marina basin along the SE side of the Island to a junction with a dredged spur channel near Wilson Point; the spur channel connects with a natural channel that joins the Intracoastal Waterway N of North Deer Island.

**Offatts Bayou** extends from off the S side of West Bay to the SW limits of Galveston. The entrance channel leaves the Intracoastal Waterway about 0.3 mile W of the causeway and leads close around **Teichman Point.** Off the Point the channel divides, one channel leading to the Galveston Airport and the other into the bayou. The channels are marked by daybeacons. The bayou is frequented by small pleasure and fishing boats and some commercial traffic out of Galveston. A yacht club is on the S side of the bayou. Several commercial bait camps are around the bayou, and a city park is on the S shore.

In 1973, the reported controlling depth was 14 feet in the channel from the waterway to the fork at Teichman Point. From there the controlling depth leading to the turning basin near the airport is about 7 feet.

There are two boatyards at Teichman Point and several marinas in Offatts Bayou. The largest marine railway can handle craft up to 65 feet for hull and engine repairs or dry open or covered storage. Gasoline, diesel fuel, water, marine supplies, open and covered berths with electricity, launching ramps, and fixed lifts up to 4 tons are available. A fill for 61st Street, Galveston, crosses the bayou near its head. An opening in the fill provides a passage for small boats to a small lagoon E of 61st Street. A fixed bridge with a horizontal clearance of 38 feet and a vertical clearance of 9 feet crosses the opening.

**Chocolate Bay** extends about 2.5 miles NW from the W end of West Bay to the mouth of **Chocolate Bayou.** The Intracoastal Waterway crosses the mouth of Chocolate Bay. A barge assembly basin with mooring buoys, is on the S side of the Intracoastal Waterway on the N side of Alligator Head, the E entrance point to Chocolate Bay; depths of about 16 feet are reported in the basin. The basin is intended only for temporary mooring of barges.

A privately dredged channel, marked by buoys and daybeacons, leads N from the Intracoastal Waterway to the Monsanto Chemical Co. plant basin on Chocolate Bayou, 7.3 miles above the Intracoastal Waterway. In August 1971, the controlling depth was 8 feet to the Monsanto basin. It is reported that shell barges and pleasure craft navigate the natural channel in the bayou above the Monsanto basin to a highway bridge near the town of **Liverpool,** 13 miles above the Intracoastal Waterway. There are shell-handling wharves at and just below **Snug Harbor,** about 1.6 miles below the highway bridge.

The State Route 1561 fixed bridge crosses Chocolate Bayou 5.5 miles above the Intracoastal Waterway with a clearance of 50 feet. The least known clearance of the overhead power and telephone cables across the bayou is also 50 feet.

Chocolate Bayou is used mostly by small pleasure craft. Most of the land on both sides has been developed into resort homes. The water is brackish

to fresh in the upper reaches, and is pumped from the bayou into nearby rice fields. Depths in the bayou are reported to average 8 feet or more, but are greatly affected by winds and are considerably less with N winds, which prevail during the winter months. During hurricanes, the bayou is reported to afford protection from waves and wind, but some danger still exists from heavy rain runoff.

There are marinas and yacht basins on the bayou above the chemical plant. Gasoline, diesel fuel, water, marine supplies, open and covered berths with electricity, a launching ramp, and lifts are available. Boats up to 35 feet can be handled on flatbed trailers for general repairs.

The principal commodites carried by barge on the bayou are shell, petroleum products, and industrial chemicals.

**Scholes Field,** the airport for Galveston, is on the S side of the entrance to Offatts Bayou. The red and white checkered water tank is prominent.

**Bermuda Beach** and **Palm Beach** are summer resorts on the Gulf shore about 5 and 6.5 miles SW of Scholes Field. The homes along the Gulf shore on the W half of Galveston Island are all raised on piles and are very distinctive.

**Pirates Cove** and **Jamaica Beach** are resorts about 5.7 and 8 miles, respectively, SW of Scholes Field on the bay side. Numerous canals have been dredged to provide waterfront homes. Privately dredged and marked channels lead to these resorts from West Bay. The reported controlling depth in the Pirates Cove channel was 5 feet in 1969-71. The channel leading to Jamaica Beach had a reported controlling depth of 4 feet in 1974. This channel is the approach to a marina at which gasoline, diesel fuel, water, ice, berths with electricity, and a restaurant are available. Jamaica Beach is the site of the Karankawa Indian burial ground.

**Sea Isle** is a resort about 5.5 miles E of San Luis Pass. A privately dredged entrance channel, with a reported controlling depth of 2½ feet in 1974, leads S from the bay to three boat slips or lagoons. The entrance channel is marked by a private lighted entrance range and other aids. The ruins of a 3,000-foot pier are E of the entrance channel.

**Bay Harbor** is a resort about 4 miles E of San Luis Pass. A privately dredged channel with a reported controlling depth of 5 feet in September 1972 leads S to a boat basin on the N shore of the island. A privately lighted entrance range and daybeacons mark the entrance channel.

**San Luis Pass,** an unmarked channel 0.2 mile wide and with a reported depth of 5 feet, leads NW from the Gulf and passes between the shoals S from Galveston Island and E from San Luis Island. The pass should be approached from the SE as the deepest water lies nearer **San Luis Island.** It is not recommended for strangers. Fishermen acquainted with the pass may sometimes be hired to pilot vessels, but the shoal waters of West Bay and **Christmas Bay** limit passage to lightdraft craft.

A fixed highway bridge and causeway across San Luis Pass connects Galveston Island with San Luis Island; clearance is 29 feet.

Off the NE side of San Luis Island are depths up to 22 feet; this deeper area offers protected anchorage for small craft, but the bottom is hard sand. The best anchorage is in **Cold Pass** on the W side of San Luis Island. A campground is on San Luis Island about 0.4 mile NW of the highway bridge. There is a marina on a dredged basin at the campground at which gasoline, provisions, a launching ramp, ice, and water are available. The basin and entrance channel from Cold Pass had a reported controlling depth of 6 feet in September 1972.

A depth of 5 feet can be carried from San Luis Pass to the W side of San Luis Island, thence S in Cold Pass to **Moodys Island** and W and NW into Christmas Bay; a draft of 4 feet can then be taken to and through **Bastrop Bay.** Privately maintained aids mark the channel from the W end of Cold Pass to **Christmas Point,** and a privately marked channel crosses Bastrop Bay and joins the Intracoastal Waterway.

A channel has been dredged in Bastrop Bayou by private interests from the Intracoastal Waterway, Mile 382.2W, to the fixed highway bridge at Mims, Tex. Landcuts eliminate the bends in the bayou and bypass Cox Lake. Controlling depth was reported to be about 7 feet in 1969. Total length of the channel from Intracoastal Waterway to the fixed highway bridge is about 4.7 miles; bridge has a clearance of 45 feet. Small-craft facilities are available at various fishing camps along the Bastrop Bayou Channel. Gasoline, diesel fuel, water, ice, limited berthing, and launching ramps are available at marinas near the highway bridge. A 5-ton fixed lift capable of handling boats up to 27 feet is also available.

A channel between Bastrop Bay and **Mud Island** connects Christmas Bay and West Bay; formerly a section of the Intracoastal Waterway, this channel has been abandoned and is no longer maintained. A shallow dredged channel from the S end of Christmas Bay leads into and through **Drum Bay** and thence SW to a connection with the Intracoastal Waterway. This channel is used by small fishing craft with drafts of 2 to 3 feet.

# 11. SAN LUIS PASS TO THE RIO GRANDE

This chapter describes the Texas Gulf Coast from San Luis Pass to the Rio Grande, a distance of about 238 miles, and Matagorda, Tres Palacios, Lavaca, Aransas, and Corpus Christi Bays and their tributaries. Also discussed are the deepwater ports of Freeport, Point Comfort, Lavaca, Victoria, Corpus Christi, Mansfield, and Brownsville, and many of the smaller barge ports.

**Chart 11300 (1117).**-From San Luis Pass to the entrance to Matagorda Bay at Pass Cavallo, the coast trends for 80 miles in a general SW by W direction. From Pass Cavallo it curves gently SW for 100 miles to latitude 27°N., where the trend is S; thence it curves gently a little E of S for 58 miles to the mouth of the Rio Grande. Throughout its whole distance the coast encloses a chain of shallow bays or lagoons, some of considerable size. These are separated from the Gulf by long, narrow islands and peninsulas which are generally low and sandy, with few natural distinguishing marks. Some of the bays and lagoons may be entered from the Gulf through dredged passes protected by jetties, and others through small passes partly obscured by bars with little depth on them.

**Shipping Safety Fairways and Fairway Anchorages.**- A system of shipping safety fairways has been established along the Gulf Coast to provide safe lanes for shipping that are free of oil-well structures. Vessels approaching the passes and entrances to ports, or bound along the Gulf Coast between San Luis Pass and Brazos Santiago should proceed in the charted shipping safety fairways. Caution should be exercised when approaching or navigating in these fairways as they are unmarked.

**Fairway Anchorages** have been established off some of the entrances to the ports, which will be generally free of oil-well structures. (See 209.135, chapter 2, for limits of the **fairways** and **anchorages**, and the regulations governing them.)

**Boundary lines of inland waters.**-The lines established from Galveston to the Rio Grande are described in 82.111, and 82.116, chapter 2.

**Dangers.**-The coast has fairly uniform depths with few outlying dangers except in the vicinity of the passes and off the mouth of the Brazos River where shoaling to 18 feet is reported as far as 5 miles offshore; otherwise, vessels of any draft can approach to within 2.5 miles of the shore. Other reported dangers are about 20 miles SW of the entrance to the Brazos River and consist of occasional ridges of soft mud having as little as 4 fathoms over them, with general surrounding depths of 5 to 5½ fathoms. Oil wells may be encountered offshore, especially in the vicinity of Freeport Harbor. Mariners are cautioned to give them a wide berth especially when drilling operations are in progress.

**Caution.**-Hurricane Beulah in September 1967 caused considerable damage in the Gulf Coast area. Mariners are advised to exercise extreme caution as depths may vary from those charted and mentioned in the Coast Pilot. In addition, Hurricane Beulah created many new cuts or passes through the beach. Many of these cuts were reported in the stretch of beach extending N from about 6 miles N of Port Mansfield Channel for a distance of 20 miles. These openings in the beach should not be used for navigation.

The **danger zone** of an Air Force gunnery, bombing, and rocket range is in the Gulf of Mexico off Matagorda Island. (See 204.162, chapter 2, for limits and regulations.)

**Currents.**-Along the W side of the Gulf of Mexico between Tampico and Corpus Christi is a N flow which in the vicinity of the 100-fathom curve off the mouth of the Rio Grande has an average velocity of nearly 0.5 knot.

Strong currents caused by winds would be expected to set somewhat to the right of the wind direction or, near the coast, in a direction parallel to the shoreline, current velocities of 0.5 to 1 knot being produced by wind velocities of 20 to 40 miles per hour.

However, it has been reported that at times strong currents set W toward the coast and the possibility of being carried inshore by such currents should be guarded against. The grounding of a vessel at a location 9 miles SW of Aransas Pass was reported caused by strong W currents that accompanied winds from the N and NE.

**Charts 11321 (1283), 11322 (887-SC).-Freeport Harbor,** lying 40 miles SW of Galveston entrance, is the harbor for the town of **Freeport.** The area is known locally as Brazosport. The principal industry is the Dow Chemical Corporation which operates two large plants. Other industries are oil, sulfur, and shrimp. Oil and chemical products are the principal exports. Old Brazos River has been dammed about 7 miles above the jettied entrance. Below the dam, the old river channel is now a tidal estuary and the harbor is protected against flood conditions in the river.

**Prominent features.**-The buildings of the large chemical plant and the smoke rising from the stacks are prominent. An elevated bridge and a tall tank also are outstanding. On closer approach, Freeport Entrance Light and the water tanks in Freeport can be identified. At night the glow from the many lights at the chemical plant and the ob-

struction lights on the radio towers at Freeport are conspicuous. **Freeport Entrance Light** (28°56.4'N., 95°18.1'W.), 69 feet above the water, is shown from a steel tower at the Coast Guard station on the N side of the entrance channel. A marker radiobeacon is at the light.

**Vessels should approach Freeport Harbor through the prescribed Safety Fairways.** (See 209.135, chapter 2.)

**Channels.**-The ship channel has been improved by construction of jetties on either side of the entrance. Federal project depths are 38 feet in the channel from deep water to the seaward end of the jetty, thence 36 feet to and in the upper turning basin, thence 30 feet to and in Freeport Harbor turning basin, thence 25 feet to and in Stauffer turning basin. (See Notice to Mariners and latest editions of charts for controlling depths.)

Above Stauffer turning basin, a depth of 10 to 12 feet can be carried to the wharves at Freeport.

**Anchorages.-Vessels should anchor off the entrance to Freeport Harbor in the Freeport Fairway Anchorage.** (See 209.135, chapter 2.)

Anchorage can also be found in the harbor anywhere the depth is suitable; however, there is insufficient swinging room for large vessels.

**Dangers.**-About 6 miles SW of the entrance to Freeport Harbor, Brazos River has generated a shoal extending about 5 miles into the Gulf off the mouth of the river. This area is foul and should be given a wide berth. It is reported that several vessels have stranded in this vicinity and that the depths are considerably less than charted. The bottom is soft mud, indicating that silting from the river has occurred.

Oil drilling structures may be erected in the Gulf near the approach to Freeport Harbor. Mariners should be on the lookout for these structures and give them a wide berth.

**Bridges.**-No bridges cross the channel from the entrance to the upper turning basin. An overhead power cable with a clearance of 63 feet crosses the harbor just above the Stauffer turning basin. A fixed highway bridge with a clearance of 60 feet crosses the harbor about 0.4 mile above the turning basin; overhead telephone cables at the bridge have clearances of 107 feet. The Missouri-Pacific railroad bridge, with a swing span having a clearance of 11 feet, crosses the harbor about 1 mile above the turning basin. (See 117.240, and 117.245 (a) through (e) and (j)(35), chapter 2, for drawbridge regulations and opening signals.) A highway bridge that has a 36-foot fixed channel span and a clearance of 20 feet is about 0.3 mile above the railroad bridge. An overhead power cable at the bridge has a clearance of 58 feet.

**Tides and currents.**-The diurnal range of tide at Freeport Harbor entrance is 1.8 feet. The current off the entrance generally sets to the W, with a countercurrent near the beach, largely influenced by the direction of the wind. The bar is rough with an E breeze.

Strong cross winds and currents at the jetty entrance make navigation difficult for larger vessels. Difficulty in navigation is experienced with larger vessels at the junction with the Intracoastal Waterway when strong currents are flowing from the canal, and in the comparatively sharp curve at the Freeport Harbor turning basin. Large vessels are difficult to turn in the smaller upper turning basin.

**Storm warning signals are displayed.** (See chart.)

**Pilotage** is compulsory for all foreign vessels and U.S. vessels under register in foreign trade. Pilotage is optional for coastwise vessels that have on board a pilot licensed by the Federal government. Vessels are taken in day or night. Pilots board off the sea buoy (Freeport Entrance Lighted Bell Buoy 1). The pilot boat is 41 feet long, with black hull and white superstructure and the name BRAZOS PILOTS in white letters on both sides of the hull. The pilot boat is equipped with radiotelephone and monitors 2182 kHz and 2738 kHz and VHF-FM channels 6 (156.30 MHz), 12 (156.60 MHz), 13 (156.65 MHz), 14 (156.70 MHz), and 16 (156.80 MHz). Pilots carry portable radiotelephones and use channel 14 (156.70 MHz) as the working frequency. Pilots can be obtained by prior arrangement through ships' agents, 24-hour notice of time of arrival is requested. Until channel modifications are completed, vessels over 600 feet long are brought in only during daylight.

**Towage.**-Tugs up to 1,020 hp are available at Freeport.

**Quarantine, immigration,** and **agricultural quarantine** officials come from Galveston. **Customs** officials are stationed in Freeport. (See appendix for addresses.) Vessels subject to such inspections generally make arrangements through ships' agents; officials usually board vessels at their berths.

**Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

The U.S. Public Health Service maintains a **contract physician's office** in Freeport. (See appendix for address.) Freeport has a hospital.

Freeport is a **customs port of entry.**

**Harbor regulations.**-The Navigation and Canal Commissioners of the Brazos River Harbor Navigation District have jurisdiction and control of the navigable waters of the district. The district includes that portion of Brazoria County W of the W bank of Chocolate Bayou. A **speed limit** of 8 m.p.h. for all vessels proceeding in the channels and 5 m.p.h. while passing the wharf, dock, or moored craft is enforced. The general manager acts as Port Director. The Terminal Superintendent assigns berths on application for the facilities operated by the Brazos River Harbor Navigation District.

**Wharves.**-Freeport has more than 50 wharves and piers. Only the deep-draft facilities are described. (For a complete description of the port facilities refer to the Port Series, a Corps of Engineers publication.) The alongside depths are re-

ported; for information on the latest depths contact the operator. Almost all the piers and wharves have highway, railway, water, and shore power connections. 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 floating stiff-leg derrick is available for heavy lifts by special arrangements.

Dow Chemical Co. Wharf A-8: W side of entrance to Dow Chemical Co. Barge Canal; 61-foot face, 380 feet with dolphins; 36 feet alongside; receipt and shipment of chemicals and petrochemicals; owned and operated by Dow Chemical Co., Texas Division.

Dow Chemical Co. Wharf A-5: 500 yards WNW of Dow Chemical Co. Barge Canal; 260-foot face, 320 feet with dolphins; 34 feet alongside; deck height, 16 feet; 16,000 square feet covered storage; receipt and shipment of general cargo; owned and operated by Dow Chemical Co., Texas Division.

Dow Chemical Co. Wharf A-4 and A-4A: 0.1 mile W of Wharf A-5; 115-foot face, 330 feet with dolphins; 34 feet alongside; deck height, 12 feet; receipt of waste glycol and benzene, shipment of chemicals and petrochemicals; owned and operated by Dow Chemical Co., Texas Division.

Phillips Petroleum Co. Wharf No. 2 (28°56.0′N., 95°19.9′W.): 163-foot face, 383 feet with dolphins; 33 feet alongside; receipt and shipment of petroleum products; bunkering vessels; owned and operated by Phillips Petroleum Co.

Phillips Petroleum Co. Wharf No. 3: 0.1 mile N of Wharf No. 2; 90-foot face, 425 feet with dolphins; 35 feet alongside; deck height, 10 feet; receipt and shipment of petroleum products; bunkering vessels; owned and operated by Phillips Petroleum Co.

Brazos Harbor Dock A: W side of Freeport Harbor turning basin; 252-foot face; 30 feet alongside; deck height, 16 feet; 36,000 square feet covered storage; receipt and shipment of general cargo; owned and operated by Brazos River Harbor Navigation District.

Brazos Harbor Wharf No. 1: N side of Freeport Harbor turning basin; 650-foot face; 30 feet alongside; deck height, 16 feet; 57,000 square feet covered storage; receipt and shipment of general cargo; owned and operated by Brazos River Harbor Navigation District.

Brazos Harbor Wharf No. 2: N side of Freeport Harbor turning basin; 600-foot face; 30 feet alongside; deck height, 16 feet; 58,000 square feet covered storage; receipt and shipment of general cargo, bulk and bagged fertilizer, fishmeal, and liquid bulk and packaged chemicals; owned and operated by Brazos River Harbor Navigation District.

**Supplies.**-Gasoline, diesel fuel, marine bunkers, water, ice, and most marine supplies are available at Freeport.

**Repairs.**-The Port of Freeport has no facilities for making major repairs or for drydocking deep-draft vessels; the nearest such facilities are at Galveston. Freeport has several shipyards. The shipyard on the W side of the harbor, 0.3 mile above the Stauffer turning basin, has a 300-ton floating drydock capable of handling vessels up to 110 feet long, 30-foot beam, and 10-foot draft. A marine railway at the yard can handle vessels up to 115 feet. Another shipyard is on the Intracoastal Waterway, 1.7 miles NE of the Freeport Harbor Channel. A marine railway at this yard can handle vessels up to 300 feet and 1,000 tons. All of the yards can make complete hull and engine repairs, and all have gas freeing and barge cleaning facilities. A salvage company at Freeport has a 500-ton floating A-frame lift and salvage equipment.

**Small-craft facilities.**-Small craft can find excellent protection in the harbor at Freeport. Numerous small piers and wharves are along the waterfront. There are numerous small-craft facilities along the Intracoastal Waterway between the Freeport Harbor Entrance Channel and the entrance to Oyster Creek. Marine lifts up to 80 tons and 60-foot marine railways are available for complete repairs and storage. Gasoline, diesel fuel, open and covered storage, launching ramps, ice, provisions, and marine supplies are available.

**Communications.**-The Missouri-Pacific Railroad serves the Freeport area. Numerous trucklines operate from the port, and buslines offer frequent service to Houston and other points. An airline has scheduled air service to Houston. Good paved roads and highways radiate to all points.

**Charts 11321 (1283), 11322 (887-SC).-Brazos River** enters the Gulf through the diversion channel about 6 miles SW of Freeport Harbor entrance. Because of logs, shoaling, and general foul ground, the mouth of the river is not used as an entrance. The Intracoastal Waterway crosses the river 1.6 miles above the mouth. A depth of 8 feet at ordinary river stage is available to **Bolivar Landing,** 36 miles upriver from the Intracoastal Waterway. Most of the traffic on the river consists of offshore oil supply vessels enroute to or from their base on the E side of the river, about 0.8 mile below the State Route 36 highway bridge, and chemical barges enroute to and from the wharf of a chemical company, about 2 miles above this highway bridge.

Overhead power cables having a minimum clearance of 47 feet cross Brazos River between the Intracoastal Waterway and the highway bridge about 4 miles above the waterway. The highway bridge has a swing span with a clearance of 18 feet at low river stages and 10 feet at high river stages. (See 117.240 and 117.245 (a) through (e) and (j)(36), chapter 2, for drawbridge regulations and opening signals.) A railroad bridge and a highway bridge at **Brazoria,** and a highway bridge at **East Columbia,** cross the river about 20 miles and 26 miles, respec-

tively, above the waterway; minimum clearance of the fixed channel spans is 33 feet at low-river stages and 5½ at high-river stages. An overhead power cable crosses the river about 0.8 mile above the highway bridge at Brazoria; clearance is not known.

**San Bernard River** flows into the Gulf 3.5 miles SW from the mouth of Brazos River. San Bernard River is obstructed at the mouth by a shifting sandbar over which the channel depths vary from 3 to 5 feet. From the Intracoastal Waterway, 0.8 mile above the mouth, the channel has been dredged to a point near the West Columbia highway bridge 22 miles above the Intracoastal Waterway. In July-November 1974, the controlling depth was 6 feet for about 3.3 miles above the Intracoastal Waterway, thence 9 feet for about another 19.3 miles to the West Columbia highway bridge.

Some critical reaches in the river are caused by narrow widths or sharp bends. Complaints have been made that tows navigating the river have damaged wharves and the vessels moored to them; operators are advised to reduce speed to avoid wave-action damage. When towing barges in tandem, particular care must be taken to prevent any part of the tow striking the banks, boats, or structures along the banks.

There are several fishing camps along the San Bernard River in the vicinity of the narrows, about 0.8 mile above its junction with the Intracoastal Waterway, and at Churchill. Gasoline, ice, and launching ramps or lifts are available at these facilities. A fuel dock on the Intracoastal Waterway just W of its intersection with the San Bernard River has gasoline, diesel fuel, and ice available at its dock which has a reported depth of 6 feet alongside.

Between the waterway and the upstream limits of the improvement, San Bernard River is crossed by draw and fixed bridges; the minimum clearance is 13 feet. Clearance of overhead cables is 38 feet. There is a fuel dock at which gasoline, diesel fuel, and water are available on the W side of the river's junction with the Intracoastal Waterway. A reported depth of 5 feet was alongside the facility in September 1972.

Cedar Lakes, East Matagorda Bay, Caney Creek, Live Oak Bayou, Old Gulf, Colorado River, and Matagorda are described in chapter 12.

**Charts 11316 (1284), 11317 (522), 11319 (889-SC).-Matagorda Bay** is a large body of water separated from the Gulf by **Matagorda Peninsula.** Depths in the bay range from 5 to 13 feet, averaging 10 to 12 feet over the greater part. Considerable oil development and fishing are carried on in the bay and its main tributaries Tres Palacios and Lavaca Bays.

**Matagorda Light** (28°20.2'N., 96°25.4'W.) is 90 feet above the water and shown from a black conical tower on **Matagorda Island,** about 1.5 miles W of Pass Cavallo. The light is 7 miles SW of the Matagorda Ship Channel, the recommended entrance to Matagorda Bay.

**Vessels should approach Matagorda Bay through the prescribed Safety Fairways.** (See 209.135, chapter 2.)

**Matagorda Ship Channel** is a 22-mile-long deepwater channel from the Gulf to and through a landcut in Matagorda Peninsula thence through Matagorda and Lavaca Bays to the public and private terminals at Point Comfort. The entrance to the landcut is protected by jetties. The channel is well marked. The Federal project provides for a depth of 38 feet through the Sea Bar Channel and Jetty Channel, thence 36 feet through the landcut and Matagorda and Lavaca Bays to a turning basin of the same depth at Point Comfort. (See Notice to Mariners and latest editions of charts for controlling depths.)

**Matagorda Ship Channel Approach Lighted Whistle Buoy MSC** (28°12.0'N., 96°05.2'W.), about 18 miles SE of the jetties, marks the entrance to the Safety Fairway.

**Matagorda Ship Channel Entrance Lighted Whistle Buoy 1A,** 2.5 miles SE of the jetties, marks the channel approach. A lighted **316°38'** range and lighted buoys mark the entrance channel through the jetties and landcut, and lighted ranges, lights, and buoys mark the bay channel.

**Anchorages.-Vessels should anchor off the bar in the Matagorda Fairway Anchorages on either side of the safety fairways.** (See 209.135, chapter 2.) With N winds or smooth sea, fair anchorage is available in 4 to 12 fathoms.

Good anchorage for small craft may be found on the W side of Pass Cavallo in **Saluria Bayou** in 7 to 10 feet. The entrance to the bayou is marked by a light.

The usual storm anchorages for small boats in Matagorda Bay area are: the Harbor of Refuge S of Port Lavaca, in depths of about 12 feet; **Chocolate Bay,** with depths of 3 feet; Lavaca Bay, on the E side to the N of the causeway, with depths of 4 to 5 feet; Lavaca River with depths of about 5 feet across the bar; Carancahua Bay with depths of 3 feet across the bar; and Tres Palacios Bay, off Palacios, with depths of 4 to 5 feet. Small craft should not anchor in Matagorda Bay in the vicinity of the landcut through Matagorda Peninsula as strong currents and turbulent water are reported in this area.

**Pass Cavallo,** 108 miles SW of Galveston Entrance, an entrance to Matagorda Bay from the Gulf, is 1.3 miles wide between Matagorda Island and Matagorda Peninsula. The pass is obstructed by a bar that is subject to frequent changes in location and depths. The depths vary from 3 to 8 feet. With a sea or swell running outside, there is virtually a continuous line of breakers across the bar. The pass is not recommended for strangers and is used only by a few local vessels that draw less than 5 feet and have thorough local knowledge.

Inside the bar, the channel, marked by lights, extends along the E shore to Matagorda Island, passing about 0.5 mile E of Saluria and Big Bayous, and thence off the Port O'Connor jetties into the open waters of the bay.

**Pelican Shoal,** marked by a light, and other unmarked shoals lie along the E side of the pass. There is a passage with a depth of 9 feet or more through these shoals in a NE direction, from off Saluria Bayou. This channel is particularly subject to change. The ruins of West Shoal Lighthouse along the S side of this passage is submerged and unmarked. A daybeacon marks the N side of the passage. The ruins of old East Shoal Lighthouse, about 0.3 mile to the NE of the daybeacon, are charted as being submerged. These obstructions are to be avoided.

**Tides and currents.**-The diurnal range of tide in Pass Cavallo is 1.4 feet, 0.5 foot at Port O'Connor, and 0.7 foot at Port Lavaca. The level of the water surface is largely dependent on the winds, and during strong northers may be depressed 2 feet or more. The tidal current in Pass Cavallo is believed to attain a velocity of 2 knots with currents of 5 knots reported. It is reported to be very strong in the landcut through Matagorda Peninsula, especially on the runoff of the ebb after strong S winds. The current in Matagorda Ship Channel may attain a velocity of over 3 knots. Daily predictions of the tidal current may be found in the Tidal Current Tables, Atlantic Coast.

**Pilotage.**-Pilots are available for Matagorda Bay day or night. The pilots board vessels within 1 mile of the sea buoy from a 39-foot steel vessel with a black hull and a white superstructure with the word PILOT on both sides of the hull and across the front of the deckhouse. The pilot boat is equipped with VHF-FM channels 16 (156.80 MHz), 6 (156.30 MHz), and 13 (156.65 MHz); the pilot boat monitors channel 16 (156.80 MHz) 2 hours before the vessel is expected. Channels 6 and 13 are used as working frequencies. Pilots can be obtained by prior arrangements through the ships' agents, 24-hour and 4-hour notices of time of arrival are requested.

**Halfmoon Reef** extends about 3 miles off **Palacios Point,** the SW point of the tongue of land extending between the E and N portions of Matagorda Bay. This is a shell reef 100 to 500 yards wide, covered about 1 foot at low tide over the greater portion of its length. Halfmoon Reef Light is at the outer end of the reef. Palacios Point Light is at the inshore end and marks the inshore side of a channel across the inner end of the reef.

**Tres Palacios Bay,** about 4 miles N of Palacios Point, is a shallow bay on the NE side at the center of Matagorda Bay. A dredged channel leads from the Intracoastal Waterway through Matagorda Bay and Tres Palacios Bay to two turning basins at the head of the harbor at the town of Palacios. In December 1973, the controlling depths were 10 feet from the Intracoastal Waterway to the basin at Palacios, thence in October 1974, 11 feet in the City (E) Basin, thence 10 feet in the entrance to the Municipal (W) Basin, thence 10 feet for a midwidth of 240 feet in the Municipal Basin. Buoys, lights, and daybeacons mark the channel; two breakwaters protect the harbor entrance.

**Palacios,** a fishing and farming community, is on the W side of Tres Palacios Bay. Two elevated water tanks in the town show prominently from the bay.

Palacios has two freezer plants, an oil terminal, a grain and feed mill, and a concrete plant. The town has a hospital. The Southern Pacific Railroad, a busline, and a motor freight line serve the town. State Route 35, the main coastal highway passes through the town.

The E and W turning basins at the head of the harbor at Palacios are operated by the Board of Directors of Navigation District No. 1 of Matagorda County through a **harbormaster,** who has offices at the harbor. Berthing facilities are available. A trailer roll-on/roll-off ramp is available at the basins. In September 1972, a 2,000-ton marine railway was under construction E of the E basin. The railway was scheduled to be completed during summer 1973.

A boat basin for small pleasure craft is on the N side of the town. The dredged entrance channel to the basin has a controlling depth of 4 feet. The larger of two shipyards, at the head of E turning basin, has a marine lift that can handle vessels up to 75 feet for general repairs. Gasoline, diesel fuel, water, ice, and marine supplies are available.

A privately dredged channel about 3.5 miles W of Tres Palacios Bay leads N to a State-maintained saltwater experimental station. In 1967, the channel had a reported depth of 9 feet. A marked fish haven, known as Gadwall Reef, is off the W side of the channel near its head.

**Carancahua Bay,** 6 miles W of Tres Palacios Bay, is a shallow, unimportant body of water frequented only by small pleasure boats and oil-drilling equipment. A privately dredged channel, marked by piling on its W side, leads through the entrance. In 1968, it was reported that the channel had a controlling depth of 6 feet, and that there were depths of 3 to 7 feet inside the bay. It was further reported that numerous wellheads, oyster shell reefs, platforms, and other obstructions, some marked by private lights, occupied the bay making navigation hazardous. Numerous beach houses are on both sides of the bay. State Route 35 highway bridge crossing the bay 7 miles above the entrance has a fixed channel span with a width of 18 feet and a clearance of 13 feet.

**Keller Bay,** an arm on the E shore of Lavaca Bay, is the site of oil exploration and development. Shell is barged through a privately maintained and marked channel to **Olivia,** a small farming community on the E side of the bay. Barges drawing 6 feet are brought in to Olivia.

**Garcitas Creek,** emptying into the head of Lavaca Bay, has a privately maintained and marked channel to the town of **La Salle.** Shell barges drawing 6 feet are brought in from Port Lavaca.

**Lavaca Bay,** an arm of Matagorda Bay at its NW corner, has a general depth of 5 to 7 feet with several reefs near the head of the bay. A dredged channel leads NW from the Matagorda Ship Channel off **Gallinipper Point** for about 3.5 miles to City Harbor in **Lynn Bayou Turning Basin** at Port Lavaca. The channel is marked by lights, buoys, and daybeacons. In April-November 1974, the controlling depth was 12 feet in the channel, thence 10 feet in the turning basin.

A dredged side channel, marked by daybeacons, about 1.6 miles above Gallinipper Point leads SW from the Port Lavaca Channel for about 1.4 miles to N-S and E-W basins at the **Harbor of Refuge** S of Port Lavaca. In April-November 1974, the controlling depths were 12 feet in the channel with 10 feet in the N-S basin and 11 feet in the E-W basin.

About 2.3 miles above the entrance to Port Lavaca Channel, a dredged channel leads N through Lavaca Bay to the entrance to Lavaca River and through the river to Red Bluff, on the Navidad River, a distance of about 17.5 miles. The channel is marked by buoys and lights to the mouth of the river, thence by buoys to the junction of the Navidad River about 9 miles above the mouth of Lavaca River. In April 1974, the controlling depth was 4 feet to Red Bluff.

State Route 35 highway causeway, crossing Lavaca Bay from **Noble Point** to Point Comfort, has a fixed span over the navigation channel with a clearance of 43 feet. About 0.5 mile of the former highway bridge adjacent to the SW end of the causeway has been retained as a fishing pier. An overhead power cable crossing Lavaca Bay about 500 yards NW of the causeway has a clearance of 69 feet over the channel. State Route 616 highway bridge having a removable span with a clearance of 18 feet and the Missouri-Pacific railroad bridge having a swing span with a clearance of 12 feet cross Lavaca River near its junction with the Navidad River in the vicinity of the towns of **Vanderbilt** and **Lolita.** (See 117.240 and 117.245 (a) through (e) and (j)(38), chapter 2, for drawbridge regulations and opening signals.) Several overhead power cables cross the Lavaca River between its mouth and the bridges near its junction with the Navidad River; least clearance is 59 feet.

**Point Comfort,** on the E side of Lavaca Bay, is the site of the ship and barge wharves of a large aluminum company, the Calhoun County Navigation District's general cargo facilities, and an electric powerplant.

**Customs, immigration,** and **agricultural quarantine** officials are stationed in Corpus Christi. (See appendix for addresses.) Vessels subject to such inspection generally make arrangements in advance through ships' agents; officials usually board vessels at their berths.

**Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

The U.S. Public Health Service maintains a **contract physician's office** in Port Lavaca. (See appendix for address.)

Port Lavaca-Point Comfort is a **customs port of entry.**

**Towage.**-A 1,800 hp tug is available.

**Wharves.**-The Calhoun County Navigation District Public Dock, on the N side of the Point Comfort turning basin, has a 250-foot marginal wharf with 36 feet reported alongside. The wharf, used for the receipt and shipment of general cargo, has 30,000 square feet of covered storage, 6 acres of open storage, railway and highway connections, and water.

The Alcoa Bauxite Pier 300 yards N of Point Comfort, has 900 feet of berthing space along the N and S sides with 39 feet reported alongside. The pier is used to receive bauxite and chemicals and to ship chlorine, carbon paste, and fluoride. Gantry cranes and a conveyor system can handle 2,000 tons of cargo per hour. Vessels moor bow in at this facility. Freshwater and shore power are available.

The Alcoa Bulk Loading Terminal, 700 yards N of the bauxite pier, a 500-foot wharf with 36 feet reported alongside, is used to receive and ship bauxite and chemicals.

A 900-foot barge wharf with 12 feet reported alongside is 0.5 mile N of the bulk loading terminal.

**Supplies.**-Some marine supplies and provisions are available at Port Lavaca. Bunker C fuel oil can be obtained by barge from Corpus Christi or Houston on 6 days advance notice. Light diesel oil is available by tank truck.

**Port Lavaca** is a city on the W shore of Lavaca Bay in a fishing, farming, and industrial area. The municipal harbor (28°37.3'N., 96°37.5'W.) is under the jurisdiction of the Port Lavaca Port Commission. The local regulations are administered by the city manager. There are several boat basins along the waterfront S of the municipal harbor; depths of 6 to 14 feet are reported in the basins. These facilities are maintained by the port commission, and local fishing, dredging, and oil companies. Gasoline, diesel fuel, water, marine supplies, provisions, and ice are available. Engine and above-the-waterline repairs can be made. A hospital is in the city.

The Harbor of Refuge is S of Port Lavaca. The marginal barge wharves of a chemical company and a fertilizer company are along the N side of the harbor.

Port Lavaca-Point Comfort is a **customs port of entry.**

The U.S. Public Health Service maintains a **contract physician's office** in Port Lavaca. (See appendix for address.)

**Port O'Connor** is a small settlement at the SW end of Matagorda Bay N of Pass Cavallo.

The town is approached via the Intracoastal Waterway route between two jetties which extend into the bay and are marked by lights at their outer ends. The channel through the jetties favors the S jetty. Mariners are cautioned to keep in the channel as the entire width between the jetties is not dredged and shoal areas with rocky bottom lie outside the channel. Vessels should make their entrance approach well E of the jetties and through the buoyed Intracoastal Waterway. Along the Matagorda Bay shore, 0.4 mile NW of the jetties, are the piles of an old pier. Numerous docks and slips for shrimp boats and pleasure craft are along the N side of the waterway at Port O'Connor. Gasoline, diesel fuel, water, ice, and provisions are available. An improved highway leads to Port Lavaca and Seadrift. **Storm warning signals are displayed.** (See chart.)

**Charts 11313 (1285), 11319 (889-SC), 11315 (891-SC).-Espiritu Santo** and San Antonio, Mesquite, and Aransas Bays are a series of shallow bodies of water extending SW along the coast for a distance of 50 miles from Pass Cavallo to Aransas Pass, separated from the Gulf by Matagorda Island and **San Jose (St. Joseph) Island.** The bays are filled with islands, reefs, and shoals, and are of little commercial importance except as a link in the Intracoastal Waterway.

**Espiritu Santo Bay** has depths up to 8 feet. In the E part of the bay a dredged ferry channel extends from the waterway S to the Matagorda Air Force Range, a military base on Matagorda Island. The channel is marked by lights, daybeacons, and buoys. In 1968, the controlling depth was 9 feet. The bay is entered from Matagorda Bay through the Intracoastal Waterway and the ferry channel.

**San Antonio Bay** has depths up to 5 and 6 feet. It is separated from Espiritu Santo Bay by the **First Chain of Islands,** through which are South Pass and Steamboat Pass. **South Pass,** an old unmarked dredged cut, has a depth of about 4 feet. The channel extends between two islands and close to the privately maintained markers on the N side of the S island. **Steamboat Pass,** 1.5 miles to the N, has less than 3 feet of water.

The Intracoastal Waterway crosses San Antonio Bay from the vicinity of **Grass Island** to **False Live Oak Point.** The spoil banks on both sides of the channel have several openings. Small islets are in the spoil bank area.

Numerous reefs, some of which bare at low water, are in and about the bay, particularly in the upper end. They make navigation difficult, and local information is essential.

N of **Swan Point** and **McDowell Point** the delta of Guadalupe River divides the head of San Antonio Bay into **Guadalupe Bay** and **Mission Lake** on the E, and **Hynes Bay** on the W. **Goff Bayou** and **Schwing Bayou** flow into Mission Lake.

**Guadalupe River** empties into the N end of San Antonio Bay. A depth of about 2 feet can be carried from the bay into the N fork of the river. Snags and driftwood make navigation almost impossible, but there are navigable depths as far as the San Antonio River, about 10 miles above the mouth.

A dredged channel leads from the Intracoastal Waterway NW along the E side of San Antonio Bay, thence through landcuts along the E side of Guadalupe Bay, Mission Lake, and Green Lake, thence in a dredged cut to a turning basin at the **Port of Victoria** about 30 miles above the Intracoastal Waterway, and about 6 miles below the city of **Victoria.** In April 1974, the controlling depths were 7 feet for a midwidth of 50 feet from the Intracoastal Waterway to the turning basin at the Port of Victoria, thence 6 feet in the basin.

State Route 35 fixed highway bridge with a clearance of 50 feet, the Missouri-Pacific railroad lift bridge with a clearance of 22 feet down and 50 feet up, and a fixed highway bridge with a clearance of 49 feet, cross the channel 15 miles, 25 miles, and 27.6 miles, respectively, above the Intracoastal Waterway. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) Least clearance of overhead power and telephone cables crossing the channel is 53 feet.

About 5.3 miles above the Intracoastal Waterway, a dredged channel leads E from the channel to Victoria to a turning basin at the town of **Seadrift.** In December 1973, the controlling depths were 9 feet from the Victoria Channel to the turning basin, thence 7 feet in the basin.

The facilities in the basin are under the control of the Calhoun County Navigation District. Mooring dolphins are along the N side of the basin, and a wharf is on the S side of the basin. The facilities are used to unload shell from barges and to load and unload barge shipments of general cargo. In addition, there are service wharves and seafood processing plants in the basin. Gasoline, diesel fuel, water, ice, and some provisions are available. There are two marine railways on the basin. The largest can handle boats up to 50 feet for general repairs.

**Seadrift,** a small fishing and farming community, has highway and railroad connections.

A private channel about 0.3 mile S of the channel to Seadrift, privately marked by stakes, leads to a resort housing development at Swan Point. A depth of 3½ feet was reported in the channel in September 1972.

About 12 miles above the Intracoastal Waterway, a privately dredged channel, with a reported controlling depth of 9 feet in 1965, leads to a basin at a large chemical plant at Long Mott.

**Long Mott** is a small town on Mission Lake that has railroad and highway connections.

**Mesquite Bay** lies between **Ayres Reef** and **Third Chain of Islands,** and is of no commercial importance except for fish and oysters. The buildings of a ranch are on Matagorda Island opposite the SE corner of the bay. A small water tank about 35 feet high shows prominently from the Gulf.

A marked channel leads from the Intracoastal Waterway at the E end of Aransas Bay across Carlos Bay into Mesquite Bay.

**Cedar Bayou,** separating Matagorda Island from San Jose Island, leads in a S direction from the SE corner of Mesquite Bay toward the Gulf. A bar has closed the outlet to the Gulf.

**Charts 11313 (1285), 11314 (892-SC).-Aransas Bay,** 15 miles long and 3 to 4 miles wide, is used extensively as a shrimping ground. The Intracoastal Waterway crosses the bay, and opposite Rockport turns W to and through Redfish Bay; at the turn, the channel of the Intracoastal Waterway Alternate Route continues to Lydia Ann Channel. A privately maintained channel near Blind Pass, at the SE end of the bay, is marked by lights and buoys. The periodic tide throughout the bay has a diurnal range less than 0.5 foot, the variation in water level depends principally on the wind. Many piles along the S side of the Intracoastal Waterway do not show at high water; they are very dangerous, and caution should be used near this edge of the waterway.

**St. Charles Bay,** an arm of Aransas Bay extending N, is the site of considerable hunting and sport fishing, but commercial fishing is prohibited. There are numerous homes in the vicinity of Hail Point on the W side of the bay near the entrance. A depth of 2 to 3 feet is found through the entrance with somewhat greater depths and numerous reefs inside. The bay is used by small craft as a refuge during tropical storms. A small marina about 0.4 mile N of Hail Point has gasoline, a launching ramp, and ice. The facility is used by boats drawing 3 feet or less.

A privately maintained channel, marked by daybeacons, 2 miles NW of **Hail Point,** leads to two loading docks about 0.8 mile E of the N end of the Copano Bay causeway. The channel had a reported controlling depth of 5 feet in 1972. A privately marked channel branches off from this channel for about 1.1 miles E to lagoons at **Neptune Harbor** and Goose Island State Park. A State-maintained launching ramp is available at the State park.

A yacht basin near the N end of the causeway at **Lamar** has storage facilities for boats up to 36 feet. There is a marine way capable of handling vessels up to 30 feet. Owners must arrange for their own repairs. A privately maintained and marked channel to the basin had a reported controlling depth of 7½ feet in October 1972. Gasoline, diesel fuel, water, ice, marine supplies, open and covered berths, and a launching ramp are available in the basin.

**Copano Bay,** a NW extension of Aransas Bay, is used principally as a center for hunting and sport fishing. No commercial fishing, except oystering, is permitted. Extreme caution is required to navigate the bay because of the numerous unmarked reefs. Depths up to 8 feet are found in the bay with 6 to 7 feet in the narrow sloughs or channels between the reefs. Numerous oil wells and pipelines fill the bay.

Good anchorage for small craft is available in the bight S of **Redfish Point,** inside the bay on the S side at the entrance. Storm anchorages for drafts up to 3 or 4 feet may be had in the S end of the bay in the small bight at the NE corner of **Port Bay.** Slightly greater draft can find good protection in the extreme NE corner of Copano Bay in the bight off Redfish Point. Soft mud bottoms are at these anchorages.

State Route 35 highway causeway across the entrance to Copano Bay has a fixed span with a clearance of 50 feet. Sections of a former bridge, close W of the causeway, remain as fishing piers.

**Mission Bay,** on the N shore of Copano Bay, is of no importance; only small skiffs can enter.

**Bayside** is a small resort town on the NW shore of Copano Bay. A large hotel shows prominently from the bay. Highway and telephone communications are available.

**Aransas River,** emptying into the NW end of Copano Bay, is shallow and navigable only for small craft of 1 foot or less. The State Route 136 highway bridge across the mouth has a fixed channel span with a width of 17 feet and a clearance of 9 feet. There is a small marina on the W side at the S end of the bridge. The channel leading to the facility had a reported controlling depth of 4 feet in October 1972, and was privately marked by stakes. Water, ice, open and covered berths, and a launching ramp are available. Overhead power and telephone cables at the bridge have clearances of 17 feet.

The ruins of a bridge cross Port Bay about 1.5 miles above the entrance. An overhead power cable crossing at the bridge ruins has a clearance of 20 feet. State Route 881 highway bridge crossing Port Bay about 4 miles above the entrance has a 13-foot fixed span with a clearance of 5 feet; an overhead power cable crosses at the bridge.

There are fish camps along Live Oak Peninsula between Port Bay and Redfish Point where provisions, berths, and lodging are available.

**Fulton,** a small village on the W shore of Aransas Bay, is the site of a commercial fish harbor and yacht basin protected by a dike and breakwater. The harbor is entered from Aransas Bay through a dredged channel marked by lights and daybeacons. In September 1974, the controlling depths were 7½ feet in the entrance channel and 6 feet in the basin. In 1968, it was reported that the channel lights were not highly visible when approaching from the Intracoastal Waterway. It was further reported that when making the harbor local residents bear on a prominent, isolated old mansion which fronts on the beach close W of the harbor; a large water tower about 1 mile W of the mansion should not be used. Berth assignments and ship movements in the harbor are under the direction of a **harbormaster** who maintains an office in Rockport. A **No Wake** speed limit is enforced in the harbor.

The harbor at Fulton is used as a base by numerous shrimp boats and trawlers. A marina and boatyard are available in the harbor. The boatyard has a machine shop and a mobile lift that can handle craft up to 55 feet and 7-foot draft for general repairs. Berths, gasoline, diesel fuel, water, ice, launching ramps, and marine supplies are available.

**Key Allegro,** a resort center built on filled-in marshland, is about a mile S of Fulton. **Little Bay** between the key and **Live Oak Peninsula** is shoal. Two private channels have been dredged into Little Bay to the lagoons and a marina on the W side of the key. The N channel had a reported depth of 6 feet in October 1972. A hump-backed highway bridge crossing the channel from the key to the mainland has a 25-foot fixed span with a minimum clearance of 8 feet. The S entrance channel had a reported depth of 6 feet in October 1972. Privately maintained lights and daybeacons mark the S channel. The marina has open and covered berths and launching ramps. Gasoline, diesel fuel, water, ice, and marine supplies are available. Depths of about 6 feet were reported alongside the fuel pier in October 1972.

A side channel branching off from the S Key Allegro Channel leads W to a boat basin at a State park on the long sandspit that extends E from Rockport Harbor. The reported depth in the channel was 3½ feet in October 1972. The channel is privately marked by stakes. A launching ramp is at the park.

**Rockport** is a commercial fishing and resort town on the W shore of Aransas Bay. A water tank shows prominently from Aransas Bay. A spoil bank area extends along the NW side of the Intracoastal Waterway, through which are several openings marked by daybeacons. Natural depths of 10 to 13 feet lead to the light marking the approach to the harbor. A dredged channel leads from Aransas Bay to a basin in the harbor. The basin is about 0.3 mile long and protected by a concrete seawall. In September 1974, the controlling depths were 7½ feet in the entrance channel and 5½ feet in the basin. To enter, pass about 50 yards E of the approach light and head directly toward the light on the seawall at the basin entrance. The channel is marked by daybeacons on the W side. **Storm warning signals are displayed.** (See chart.)

There are excellent facilities in the basin for yachts and other craft. The marine laboratory of the Texas Game and Park Commission is at the N end of the basin. A marina and boatyard are in the basin. Gasoline, diesel fuel, water, ice, marine supplies, and open and covered berthing space for more than 100 yachts and commercial vessels are available. The boatyard builds steel tugs, trawlers, and shrimp boats up to 100 feet, and has a vertical lift that can handle vessels up to 110 feet for general repairs. Berth assignments and ship movements are under the direction of a **harbormaster,** who maintains an office at the NE end of the basin. A **No Wake** speed limit is enforced in the harbor.

About 1 mile S of Rockport, another privately owned shipyard is operated only for repairing company tugs and barges; however, this shipyard will handle other craft up to 100 feet in emergencies, provided the ways are open.

Rockport has highway connection with Port Lavaca and Corpus Christi and railroad connections to the interior.

**Cove Harbor** and **Palm Harbor,** 2.5 and 4 miles, respectively, S of Rockport, are discussed in chapter 12.

**Lydia Ann Channel,** along the NE side of Harbor Island, connects the S end of Aransas Bay with Aransas Pass. The entrance from Aransas Bay is via the section of the dredged channel formerly part of the Intracoastal Waterway. In September 1966, depths of about 12 feet were available in the channel. The stranded wreck of the S.S. JOHN WORTHINGTON lies on the E side of the channel E of the abandoned lighthouse. This ship was torpedoed during World War II, and then towed into Lydia Ann Channel for salvage. Barges and other craft tieup alongside the wreck.

**Charts 11309 (523), 11314 (892-SC), 11307 (1286).-Aransas Pass,** 154 miles SW of Galveston Entrance and 113 miles N of the mouth of the Rio Grande, is the principal approach from the Gulf to Aransas and Corpus Christi Bays and their tributaries. The pass lies between San Jose Island on the N and Mustang Island on the S. **Harbor Island,** directly opposite the inner end of the pass, separates Aransas Bay from Corpus Christi Bay.

Two jetties extend into the Gulf from San Jose and Mustang Islands. There are several submerged spurs in the bend of the N jetty, and three submerged spurs extend from the S jetty. Small craft are cautioned not to pass over these spurs. A submerged wreck, covered 24 feet, lies to the S of the channel inside the jetties.

A fish haven, marked by a buoy, is 5.5 miles SE of the entrance and 1.4 miles SW of the sea buoy.

The approach to Aransas Pass is marked by a lighted whistle buoy, 5.5 miles offshore, and a lighted buoy 1.5 miles off the N jetty. The entrance channel is marked by a lighted buoy at the submerged outer end of each jetty, a **301°** lighted range, lighted buoys, and lights.

**Prominent features.**-The water tank at Port Aransas is the first object sighted in approaching Aransas Pass in the daytime. Also prominent are a condominium apartment and other buildings at Port Aransas. The abandoned lighthouse, a 60-foot high red brick octagonal tower on Harbor Island, and the buildings at Port Aransas will be sighted as the pass is approached. The 78-foot-high tower of a rear range light, toward the S end of San Jose Island, shows prominently from the Gulf.

The flashing white and green rotating aerolight at the naval air station on Encinal Peninsula on the S side of Corpus Christi Bay is reported visible from the Gulf and from Corpus Christi Channel in the bay.

**Aransas Pass Light** (27°50.3'N., 97°03.5'W.), 85 feet above the water, is shown from an 82-foot skeleton steel tower at the Aransas Pass Coast Guard Station. A radiobeacon is at the light. The station is equipped for special radio-direction-finder calibration. (See the Light List for operational information.)

**Vessels should approach Aransas Pass through the prescribed Safety Fairways.** (See 209.135, chapter 2.)

**Channels.**-The entrance channel through Aransas Pass is protected by jetties. A Federal project provides for an outer bar channel 42 feet deep, a jetty channel 42 feet deep decreasing to 40 feet in the inner part, and an inner basin at Harbor Island with a depth of 40 feet.

**Corpus Christi Channel** extends from Aransas Pass to Corpus Christi on the W side of Corpus Christi Bay. For about 4 miles, at the E end, it extends through Turtle Cove between Harbor Island on the N and Mustang Island on the S; thence across Corpus Christi Bay to Corpus Christi. The channel is straight except for a 15° bend at about its midway point just S of Ingleside Cove. The Federal project depth is 40 feet to the Viola Turning Basin, 28.5 miles from the outer bar.

**La Quinta Channel** branches N from Corpus Christi Channel, and follows the NE side of Corpus Christi Bay to a turning basin at the town of La Quinta. Federal project depth is 40 feet in the channel and basin.

(See Notice to Mariners and latest editions of charts for controlling depths for the above deep-draft channels.)

**Jewel Fulton Canal** branches off La Quinta Channel about 2 miles NW of its junction with Corpus Christi Channel. The canal extends about 0.8 mile NE to a turning basin in Kinney Bayou. The controlling depth was 11 feet in 1974. The entrance channel is marked by a light and daybeacons.

**Encinal Channel** branches off from Corpus Christi Channel about 0.6 mile W of the La Quinta Channel junction. It extends about 7 miles S to a turning basin at the naval air station on **Encinal Peninsula** on the S side of Corpus Christi Bay. The controlling depths were reported to be about 10 feet in the channel and 12 feet in the basin in October 1972. The channel is seldom used.

**Anchorages.**-Vessels should anchor off Aransas Pass in the Aransas Pass Fairway Anchorages. (See 209.135, chapter 2.)

Inside Aransas Pass, there is no suitable anchorage for deep-draft vessels. Light-draft vessels up to about a 10-foot draft can anchor in Lydia Ann Channel N of Inner Basin. Also, lighter draft vessels can anchor in Corpus Christi Bay in depths up to 13 feet and behind the breakwater off Corpus Christi in depths up to 15 feet. Under certain conditions, ships are anchored to short scope in the turning basins.

**A special small vessel anchorage area** has been established in Corpus Christi Bay. (See 110.1 and 110.75, chapter 2, for limits and regulations.)

**Tides and currents.**-The diurnal range of tide at Aransas Pass is 1.7 feet. In Corpus Christi and Redfish Bays the periodic tide is too small to be of any practical importance.

The currents at times have velocities exceeding 2.5 knots in Aransas Pass; they are greatly influenced by winds. Predictions may be obtained from the Tidal Current Tables.

Winds from any E direction make a rough bar and raise the water inside as much as 2 feet above normal. Winds from any W direction have an opposite tendency. A sudden shift of the wind from S to N makes an especially rough bar for a short time. During summer months, S winds prevail, becoming moderate to fresh in the afternoon.

**Weather.**-Although located on the Gulf, Corpus Christi has an intermediate climate between that of the humid subtropical region to the NE and those of the semiarid region to the W and SW.

Normal rainfall for Corpus Christi is about 28 inches a year. Peak rainfall months are May and September, and the winter months have the least amounts. The season of tropical storms is from June to November and affects the rainfall during this period, otherwise these months are usually dry. Several months during the years of record have had no rainfall or only a trace. Since records began in 1887, snow has fallen on an average of about 1 day every 2 years.

There is little change in the day-to-day weather in the summer, except for an occasional rain shower or a tropical storm in the area. Maximum temperatures range in the high eighties to low nineties, except for brief periods in the high nineties, occasioned by a shift in the wind direction from the prevailing SE to S and SW. The sea breeze during the afternoon and evening moderates the heat of the summer day. Minimum temperatures are usually in the low seventies. The record maximum temperature in Corpus Christi was 105°F. The maximum temperatures usually occur about noon, with afternoons more pleasant than mornings in that they are usually cloudless and windy. In the summer season, the region receives near 80 percent of possible sunshine.

The fall months of September and October are essentially an extension of the summer months. November is a transition to the conditions of the coming winter months, with greater temperature extremes, stronger winds, and the first occurrences of "northers". The winters are relatively mild. Temperatures below 32°F. seldom occur near the bay. January is the coldest month with a normal monthly temperature of 57.4°F. and a prevailing N wind. The most extreme occurrences of cold

weather are those in which daytime maxima do not exceed 32°F., which occur on the average of not more than about once every 3 to 4 years.

Relative humidity, because of the nearness of the Gulf of Mexico, is high throughout the year. However, during the afternoons the humidity usually drops to 50 and 60 percent.

Severe tropical storms average about one every 10 years. Lesser strength storms average about one every 5 years. The city of Corpus Christi has a feature not found in most other coastal cities. A bluff rises 30 to 40 feet above the level of the lowlands areas near the bay. This serves as a natural protection from high water. Protection for the main city is now furnished by seawalls. The chief hurricane months are August and September, although tropical storms have occurred as early as June and as late as October. Most of the storms pass either to the S or E of the city. Tornadoes are of infrequent occurrence in the area. Hail occurs about once a year.

The National Weather Service maintains an office in Corpus Christi where **barometers** may be compared, or they may be compared by telephone. (See appendix for address.)

(See page T-6 for **Corpus Christi climatological table.**)

**Storm warning display** locations are listed on NOS charts and shown on the Marine Weather Services Charts published by the National Weather Service.

**Pilotage** is compulsory for all foreign vessels and U.S. vessels under register in foreign trade. Pilotage is optional for coastwise vessels that have on board a pilot licensed by the Federal Government. The Aransas-Corpus Christi pilots maintain an office and lookout on the S jetty. The pilot boat is a 50-foot steel vessel with a black hull and white superstructure with the word PILOT on each side of the deckhouse. The pilot boat shows the standard pilot lights at night and the International Code flag "P" by day. The pilots board vessels between the sea buoy and Buoy No. 3.

The pilots monitor 2738 kHz and VHF-FM channels 12 (156.60 MHz) and 16 (156.80 MHz) continuously, and the pilots carry portable VHF-FM radiotelephones and use channels 12 (156.60 MHz) and 13 (156.65 MHz) as working frequencies.

Pilot services are available 24 hours a day, and arrangements for pilot services are usually made through the ships' agents. A 2-hour advance notice of time of arrival is requested.

The harbormaster, pilot station, pilot boat, and all tugs and pilots maintain radio communications on VHF-FM channels 12 (156.60 MHz) and 16 (156.80 MHz) for docking, undocking, and all harbor movements.

**Towage.**-Tugs up to 1,700 hp are available at Corpus Christi and serve all of the Corpus Christi Bay area. The tugs are equipped with VHF-FM radiotelephones and use channels 12 (156.60 MHz), 13 (156.65 MHz), and 16 (156.80 MHz). Divers and salvage equipment are available.

**Quarantine, customs, immigration,** and **agricultural quarantine** officials are stationed in Corpus Christi. (See appendix for addresses.) Vessels subject to such inspections generally make arrangements through ships' agents; officials usually board vessels at their berths.

**Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

The U.S. Public Health Service maintains a **contract physician's office** in Corpus Christi. (See appendix for address.) There are several modern hospitals in Corpus Christi.

Corpus Christi is a **customs port of entry.**

**Coast Guard.**-The **Captain of the Port,** a **Marine Inspection** office, and a **vessel documentation** office are in Corpus Christi. (See appendix for addresses.)

**Port of Corpus Christi** (see also chart 11311 (524)) is on the W side of Corpus Christi Bay about 20 miles from the outer end of the jetties at Aransas Pass. The port limits include all of Nueces County, Tex. Corpus Christi Main Harbor includes all of the waterfront facilities along the Industrial Canal, Tule Lake Channel, and Viola Channel, including the turning basins from Corpus Christi Turning Basin to Viola Turning Basin. Harbor Island, Port Aransas, Port Ingleside, and La Quinta are included in the port area.

The principal imports are crude oil, molasses, bauxite, chrome, zinc, bulk ores, petroleum products, paints and pigments. The principal exports include wheat and other grains, sorghums, flour, animal feeds, flax seed, cotton, petroleum products, zinc spelter, aluminum products and ores, coal tar products, caustic soda, industrial chemicals, synthetic rubber, carbon black, canned food, machinery, and general cargo. There is considerable local and coastwise movements of petroleum products, shell, sand and gravel, cement, various ores and metals, coal tar products, alcohol, sulfuric acid, and industrial chemicals.

**Harbor regulations.**-Nueces County Navigation District No. 1 has jurisdiction and control over the Port of Corpus Christi, and is operated by a Port Commission. The **Port Director** is in charge of operations of the port including all of the waterfront, slips, turning basins, wharves, landings, and equipment, and facilities of the port under control of the Port Commission. The harbormaster assigns berths and enforces the regulations established by the Port Commission. VHF-FM channels 12 (156.60 MHz), and 16 (156.80 MHz), (Call Letters KKQ-769) are monitored continuously from the harbormaster's office at Wharf No. 1, on the S side of the Corpus Christi Turning Basin. A **speed limit** of 4 knots is enforced in the harbor.

**Wharves.**-Corpus Christi has more than 70 piers and wharves. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to the Port Series, a Corps of Engineers publication.) The alongside depths for the

facilities described are reported; for information on the latest depths contact the operator. Water and electrical shore power connections are available at most piers and wharves. Almost all the facilities have highway and railroad connections.

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.

Over 45 acres of open storage space, 2 million square feet of covered storage, and over 900,000 cubic feet of cold storage space are available in the port. Mobile cranes up to 35 tons, a 45-ton floating crane, and a 100-ton stiff-legged derrick are available at the port.

**Harbor Island:**

American Petrofina Dock (27°50'40"N., 97°03'40"W.): 260-foot face, 395 feet with dolphins; 40 feet alongside; deck height, 13 feet; shipment of crude oil; bunkering vessels; owned and operated by American Petrofina Corp.

Humble Pipe Line Co. Dock No. 1: 300 yards SW of American Petrofina Dock; 233-foot face, 325 feet with breasting platform; 40 feet alongside; deck height, 14 feet; shipment of crude oil; bunkering vessels; owned and operated by Humble Pipe Line Co.

Humble Pipe Line Co. Dock No. 2: 0.3 mile SW of American Petrofina Dock; 233-foot face, 325 feet with breasting platform; 28 feet alongside; deck height, 14 feet; receipt of crude oil; loading barges for bunkering vessels; owned and operated by Humble Pipe Line Co.

**Port Ingleside:**

Sun Pipe Line Co. Wharf (27°49'10"N., 97°11'58"W.): 144-foot face, 965 feet with dolphins; 42 to 40 feet alongside; deck height, 12 feet; receipt and shipment of crude oil and occasionally petroleum products; owned and operated by Sun Pipe Line Co.

**La Quinta:**

Reynolds Metals Co., Sherwin Plant, Alumina Dock (27°52'43"N., 97°15'38"W.): 400-foot face, 960 feet with dolphins; 40 feet alongside; deck height, 9 feet; fixed loading tower with loading chute, conveyor system, loading rate 750 tons per hour, 35-ton mobile crane with 1½-cubic yard bucket; shipment of bulk and bagged alumina, aluminum pigs and billets, and scrap carbon; receipt and shipment of fuel oil; bunkering vessels; owned and operated by Reynolds Metals Co.

Reynolds Metals Co., Sherwin Plant, Pier: 200 yards W of Alumina dock; 60-foot face, E and W sides 705 feet long; 40 feet alongside; deck height, 10 feet; electric traveling unloading tower with 2½-ton bucket on W side, conveyor, unloading rate about 360 tons per hour, hopper and conveyor system for self unloading vessels; receipt of bauxite and caustic soda and fuel oil, shipment of fuel oil; bunkering vessels; owned and operated by Reynolds Metals Co.

**N side Corpus Christi Turning Basin:**

Port of Corpus Christi, Cargo Dock No. 9: 150 yards NW of highway bridge; 660-foot face, 775 feet with dolphins; 34 feet alongside; deck height, 15 feet; 32,000 square feet covered storage, cranes up to 30 tons, electric magnets and buckets; receipt and shipment of general cargo, receipt of molasses; owned and operated by Nueces County Navigation District No. 1.

Port of Corpus Christi, Cargo Dock No. 10: 375 yards NW of highway bridge; 362-foot face; 34 feet alongside; deck height, 15 feet; 28,000 square feet covered storage; cranes up to 30 tons, electric magnets and buckets; receipt and shipment of general cargo; owned and operated by Nueces County Navigation District No. 1.

Port of Corpus Christi, Cargo Dock No. 11: 450 yards NW of highway bridge; 300-foot face, 350 feet with dolphins; 34 feet alongside; deck height, 15 feet; cranes up to 30 tons, electric magnets, and buckets; receipt and shipment of lead and zinc ores, aluminum pigs, zinc, scrap metal, iron and steel products, and newsprint; owned and operated by Nueces County Navigation District No. 1.

Port of Corpus Christi, Oil Dock No. 1: 0.4 mile WNW of highway bridge; 220-foot face, 290 feet with dolphins; 38 feet alongside; deck height, 12 feet; receipt and shipment of crude oil and petroleum products, shipment of petrochemicals, receipt of brine; owned and operated by Nueces County Navigation District No. 1.

Port of Corpus Christi, Oil Dock No. 2: 0.45 mile WNW of highway bridge; 151-foot face, 200 feet with dolphins; 32 feet alongside; deck height, 12 feet; receipt and shipment of crude oil, petroleum products, and liquid fertilizers; owned and operated by Nueces County Navigation District No. 1.

**S side of Corpus Christi Turning Basin:**

Port of Corpus Christi, Wharves Nos. 1 and 2: 175 yards W of highway bridge; 641-foot face; 32 feet alongside; deck height, 15 feet; 64,000 square feet covered storage; receipt and shipment of general cargo; owned and operated by Nueces County Navigation District No. 1.

Port of Corpus Christi, Wharves Nos. 3, 4, 5, and 6: 0.25 mile W of highway bridge; 1,246-foot face; 30 feet alongside; deck height, 15 feet; 131,000 square feet covered storage; receipt and shipment of general cargo; owned and operated by Nueces County Navigation District No. 1.

Port of Corpus Christi, Wharf No. 8: 0.45 mile W of highway bridge; 440-foot face; 32 feet alongside; deck height, 15 feet; 44,000 square feet covered storage, 15 acres of open storage; receipt and shipment of general cargo; owned and operated by Neuces County Navigation District No. 1.

Port of Corpus Christi, Wharves Nos. 14 and 15: 0.55 mile W of highway bridge; 938-foot face, 1,038 feet with dolphins; 34 to 30 feet alongside; deck height, 15 feet; 72,000 square feet covered storage, 1.3 acres of open storage, 100-ton stiff-

legged derrick; receipt and shipment of general cargo; owned and operated by Nueces County Navigation District No. 1.

Port of Corpus Christi, Oil Dock No. 5: 0.7 mile W of highway bridge; 72-foot face; 250 feet with dolphins; 32 feet alongside; deck height, 14 feet; receipt of petroleum products; bunkering vessels, loading barges for bunkering vessels; owned and operated by Nueces County Navigation District No. 1.

Mobil Oil Corp. Wharf: 0.8 mile W of highway bridge; 70-foot face, 200 feet with dolphins; 36 feet alongside; deck height, 12 feet; receipt and shipment of petroleum products, shipment of crude oil; owned and operated by Mobil Oil Corp.

Southwestern Oil and Refining Co. Wharf No. 3: 1.25 miles W of highway bridge; 110-foot face, 225 feet with dolphins; 40 feet alongside; deck height, 15 feet; receipt of crude oil, receipt and shipment of petroleum products, petrochemicals, and chemicals; bunkering vessels; owned and operated by Southwestern Oil and Refining Co.

**N side Industrial Canal:**

Corpus Christi Public Grain Elevator Wharf: 1.55 miles W of highway bridge; 205-foot face, 360 feet with dolphins; 35 feet alongside; deck height, 14 feet; grain gallery with conveyors and five loading spouts, loading rate 80,000 bushels per hour, 5½-million-bushel grain elevator; shipment of grain; owned and operated by Nueces County Navigation District No. 1.

**S side Industrial Canal:**

Southwestern Oil and Refining Co. Wharf No. 2: 1.2 miles W of highway bridge; 109-foot face, 300 feet with dolphins; 40 feet alongside; deck height, 10 feet; receipt of crude oil, receipt and shipment of petroleum products and petrochemicals; bunkering vessels; owned and operated by Southwestern Oil and Refining Co.

Champlain Refining Corp., Ship Dock: 1.5 miles W of highway bridge; 111-foot face, 324 feet with dolphins; 40 feet alongside; deck height, 14 feet; receipt of crude oil, receipt and shipment of petroleum products; bunkering vessels; owned and operated by Champlain Refining Corp.

**S side Avery Point Turning Basin:**

PPG Industrial Pier: 1.9 miles WNW of highway bridge; 100-foot face, 520 feet with dolphins, E and W sides 520 feet long, 440 feet of berthing space; 30 feet alongside; deck height, 15 feet; 21,000 square feet covered storage; conveyor system, loading rate 200 tons per hour, receipt and shipment of liquid caustic soda, shipment of bulk and packaged chemicals; owned and operated by PPG Industries, Inc.

**S side Tule Lake Channel:**

Port of Corpus Christi, Oil Dock No. 4: 2.15 miles W of highway bridge; 143-foot face, 225 feet with dolphins; 40 feet alongside; deck height, 16 feet; receipt and shipment of crude oil and petroleum products, shipment of petrochemicals; bunkering vessels, loading barges for bunkering vessels; owned and operated by Nueces County Navigation District No. 1.

Port of Corpus Christi, Oil Dock No. 7: 2.3 miles WNW of highway bridge; 143-foot face, 230 feet with dolphins; 40 feet alongside; deck height, 16 feet; receipt and shipment of crude oil and petroleum products, shipment of petrochemicals; bunkering vessels, loading barges for bunkering vessels; owned and operated by Nueces County Navigation District No. 1.

Port of Corpus Christi, Oil Dock No. 11: 2.45 miles WNW of highway bridge; 143-foot face, 290 feet with dolphins; 40 feet alongside; deck height, 16 feet; receipt and shipment of crude oil and petroleum products, shipment of petrochemicals; bunkering vessels owned and operated by Nueces County Navigation District No. 1.

An emergency yellow strobelight has been established on Oil Dock 11 to warn approaching traffic in the event of a liquified flammable gas spill, fire, or other hazardous conditions.

Producers Grain Corp., Elevator Wharf: 1.1 miles above Upper Harbor Bridge; 340-foot face, 460 feet with platforms; 40 feet alongside; deck height, 10 feet; grain gallery with conveyor and five loading spouts, loading rate 40,000 bushels per hour, 6¼-million bushel grain elevator and warehouse; shipment of grain; owned and operated by Producers Grain Corp.

**N side Tule Lake Channel:**

Port of Corpus Christi, Bulk Materials Dock: 0.4 mile above Upper Harbor Bridge; 396-foot face; 38 feet alongside; deck height, 12 feet; traveling unloading tower with 7 cubic yard buckets, unloading rate 1,000 tons per hour; receipt of bulk ores and other dry bulk commodities; owned and operated by Nueces County Navigation District No. 1.

**S side Viola Turning Basin:**

Port of Corpus Christi, Oil Dock No. 8 (27°50′31″N., 97°31′16″W.): 87-foot face; 230 feet with dolphins; 41 feet alongside; deck height, 14 feet; receipt and shipment of petroleum products, shipment of petrochemicals; bunkering vessels, loading barges for bunkering vessels; owned and operated by Nueces County Navigation District No. 1.

Port of Corpus Christi, Oil Dock No. 9: 225 yards W of Dock 8; 57-foot face, 350 feet with dolphins; 32 feet alongside; deck height, 12 feet; receipt of crude oil, receipt and shipment of petroleum products, shipment of petrochemicals; bunkering vessels; owned and operated by Nueces County Navigation District No. 1.

**Supplies.**-Water is available at all berths, and bunker fuels are available at the oil wharves and by barge at other berths. General and marine supplies are available; unusual items can be obtained from Galveston or Houston.

**Repairs.**-Corpus Christi has no facilities for making major repairs or for drydocking deep-draft vessels; the nearest such facilities are at Galveston. Several well-equipped firms are available

for making above-the-waterline repairs to vessels. Shafts up to 25 feet in length can be produced by a local firm. The largest marine railway can handle keeled vessels up to 650 tons and flat bottom craft up to 1,000 tons; length of cradle, 140 feet, clear width of cradle at top of keel blocks, 52 feet.

Regulations have been established by the Nueces County Navigation Commission governing the repairing of ships, particularly "hot work". Copies of these regulations can be obtained from the port officials.

**Communications.**-Three trunk railroads, the Missouri-Pacific, Southern Pacific, and Texas-Mexican, serve the port. Numerous motor freight lines operate from the port, and buslines serve the city. Airlines provide transportation from Corpus Christi International Airport NW of the city. Over 100 shipping companies provide water transportation to ports on the Gulf, Atlantic, and Pacific Coasts, and all world ports. Taxi and local bus service is available.

**Port Aransas** is a small commercial fishing and resort town on the N end of **Mustang Island** at the inner end of Aransas Pass. A marked dredged channel leads to a turning basin just inside the pass. In May 1974, the controlling depth was 12 feet in the entrance channel and 11 feet in the basin.

There are boatyards and a municipal marina in the basin. Lifts can handle craft up to 50 feet for general repairs or storage. Gasoline, diesel fuel, freshwater, ice, marine supplies, provisions, open and covered berths, and launching ramps are available. A 1,200-foot fishing pier extends into the Gulf about 0.5 mile S of Aransas Pass. An automobile ferry operates between Port Aransas and Harbor Island. A Coast Guard station is at Port Aransas.

**Storm warning signals are displayed.** (See chart.)

**Harbor Island** lies at the head of Aransas Pass. There are large oil-handling plants on the E end of the island. A turning basin has been dredged for nearly 2,000 feet along the N side of the ship channel. Berthing space for three large vessels is available at the three open piers. A highway from the terminals crosses Morris and Cummings Cut and Redfish Bay, and leads to the town of Aransas Pass on the mainland.

Pilings, some submerged, of a former mooring slip were reported N of Harbor Island on the W side of Lydia Ann Channel.

From the Inner Basin off Harbor Island, a dredged channel leads NW to a basin off the town of **Aransas Pass**, with a connecting channel leading into **Conn Brown Harbor.**

In December 1974, the controlling depths were 11 feet in the channel leading to the turning basin off the town of Aransas Pass, then 11 feet in the turning basin, thence 12 feet in the connecting channel to Conn Brown Harbor, and 11 feet in the harbor.

A canal crossing the W end of Aransas Pass Channel extends along the E side of the town, sheltered from Redfish Bay by a spoil bank. S of the causeway the canal offers good protection to small boats. The channel and harbor to the N of the causeway have several seafood processing plants. A large fishing fleet operates out of the town.

There are boatyards and marinas in the harbor. The largest marine railway can handle craft up to 110 feet for general repairs or storage. Gasoline, diesel fuel, water, ice, marine supplies, open and covered berths, and launching ramps are available.

A **speed limit** of 4 m.p.h. is enforced in the channel and harbor from Harbor Island to the town of Aransas Pass. The town has both highway and railroad connections to all parts of the State.

The U.S. Public Health Service maintains a **contract physician's office** in Aransas Pass. (See appendix for address.)

**Storm warning signals are displayed.** (See charts.)

**Corpus Christi Bayou,** at the S end of Aransas Bay, provides small craft a shortcut from Aransas Bay via **Morris and Cummings Cut** to Corpus Christi Bay. The bayou entrance is marked by a daybeacon on the S side of the channel, and has a controlling depth of about 4 feet; the channel is crooked and difficult to follow, as only a few piles mark the channel. The controlling depth through Morris and Cummings Cut is about 4 feet. About midway, this cut is crossed by a dredged channel from Aransas Pass to the town of Aransas Pass. In Morris and Cummings Cut just S of the dredged channel, the width is 24 feet through the draw of a bridge from which the bascule span has been removed. About 0.1 mile S of the dredged channel, the fixed span of a highway causeway bridge has a width of 28 feet and a clearance of 8 feet. Overhead power cables crossing at the bridges have a clearance of 28 feet.

A privately maintained and marked channel leads from the S end of Morris and Cummings Cut to a basin at the S end of the town of Aransas Pass; the reported controlling depth in 1972 was about 5 feet.

**Redfish Bay** is shallow; it extends N along the mainland from Corpus Christi Bay to Aransas Bay. The dredged channel of the Intracoastal Waterway is adjacent to the mainland shore, traversing the bay N to S and joining Corpus Christi deep-draft channel at Port Ingleside.

**Corpus Christi Bay** is a large body of water, roughly elliptical in shape, lying to the W of Mustang Island and connected with Aransas Pass by the Corpus Christi Channel. The bay is about 15 miles long in an E and W direction and 11 miles wide at its widest part. About the E end of the bay the depths are 8 to 11 feet, and most of the rest of the bay has depths of 12 to 13 feet.

A **seaplane restricted area** is in Corpus Christi Bay. (See 207.188, chapter 2, for limits and regulations.)

**Shamrock Cove,** on the SE side of Corpus Christi Bay, affords good anchorage for small boats in depths of 7 to 8 feet, soft mud bottom. Shoals extend about 0.2 mile W and 0.3 mile S of **Shamrock Point.** In 1971, a 2-inch steel pipe, showing at low water, was reported near midentrance in Shamrock Cove, about 0.4 mile ESE of Shamrock Point.

In **Port Ingleside,** on the N shore of Corpus Christi Bay about 7.5 miles W of Aransas Pass, is a privately owned oil terminal. There are piers in a basin and a deep-draft wharf N of the Corpus Christi Channel.

A barge assembly basin with attendant mooring buoys and depths of 14 feet in March 1970, is off the S side of the Corpus Christi Channel opposite the oil piers at Port Ingleside. This basin is intended for the temporary moorings of barges.

La Quinta deep-draft channel is along the E side of Corpus Christi Bay, branching off Corpus Christi deep-draft channel about 8.5 miles W of Aransas Pass, and leads N through **Ingleside Cove** and **Donnel Reef** to the piers of a large aluminum plant in the turning basin at the town of La Quinta.

**Ingleside on the Bay,** a fishing community on the E shore of Ingleside Cove, has a marina at the S end of the cove that can accommodate boats up to 50 feet. Gasoline, diesel fuel, water, and open and covered berths are available. The unmarked channel leading to the facility had a reported controlling depth of about 5 feet in October 1972.

**Jewel Fulton Canal** is a dredged channel which leads from La Quinta Channel into **Kinney Bayou.** In 1974, the controlling depth was 11 feet. The channel is marked by daybeacons. There are marinas, fish wharves, and a public boat harbor and pier in the harbor. A 30-ton mobile hoist can handle boats up to 50 feet for repairs or storage. Gasoline, diesel fuel, water, ice, marine supplies, open and covered berths, and launching ramps are available.

In Ingleside Cove, S of Donnel Reef, there is good small-boat anchorage in depths of 9 to 10 feet.

**Nueces Bay** has depths of only 1 to 2 feet, and is of little importance; it is a tributary of Corpus Christi Bay, partially separated from it by sandspits. **Indian Point** and **Rincon Point,** the NE and SW entrance points, respectively, to Nueces Bay, are connected by U.S. Route 181 highway causeway. **Rincon Canal,** a privately maintained channel, leads NW from Corpus Christi Bay to the Rincon Industrial Park complex at the SE end of Nueces Bay inside Rincon Point. The channel connects with a series of spur channels which front the E side of the complex and lead into it. In 1972, the main channel and connecting channels were reported dredged to 12 feet. The Industrial Park, in various stages of construction, will serve as a shallow-draft commerce terminal. A bascule span, maintained in the closed position, of the causeway over the main channel has a clearance of 50 feet. (See 117.245 (j)(39), chapter 2, for drawbridge regulations.) The poles of a former power cable extend across the entrance to Nueces Bay below the causeway, and the piling of a former railroad bridge remain, except for removed sections at both ends.

A privately maintained channel, with reported depths of about 4 feet, leads to a marina at the NE end of the causeway. Covered berths for boats up to 40 feet, gasoline, oil, and marine supplies are available. A 10-ton lift can handle boats up to 40 feet for hull and engine repairs. A public launching ramp is near the marina. The channel is narrow and difficult to follow, and local knowledge is essential. **Nueces River** emptying into the W part of Nueces Bay is navigable for shallow-draft boats for a distance of 9 miles to a dam. The river is of no commercial importance.

**Chart 11311 (524).-Corpus Christi Harbor,** on the N side of Corpus Christi, consists of inland basins connected by an industrial canal. The basins and connecting canal are landlocked and well protected.

**Corpus Christi,** (see also chart 11309 (523)) on the W side of Corpus Christi Bay and 18 miles from Aransas Pass, is the most important city commercially on the Texas coast SW of Galveston. The principal industries are in seafood processing, agriculture, livestock, meat packing and freezing, petroleum products, petrochemical and industrial chemicals, natural gas, manufacture of plastics, steel products, aluminum, zinc, machinery, oil field equipment, paper products, agricultural fertilizers, cement, gypsum products, textiles, and the shipment of wheat, cotton, and general cargo.

The city has several hospitals, a large municipal auditorium, and a large boat harbor.

**Bridges.**-U.S. Route 181 highway bridge over the entrance to Corpus Christi Turning Basin has a fixed span with a clearance of 138 feet over a center width of 300 feet. The combination highway and railroad bridge over the Industrial Canal, about 1.5 miles W of Avery Turning Basin, has a vertical lift span with a clearance of 9 feet down and 138 feet up. (See 117.240, chapter 2, for drawbridge regulations and opening signals.) An overhead power cable crosses the canal midpoint between Corpus Christi Turning Basin and Avery Point Turning Basin; clearance 165 feet.

**Small-craft facilities.**-The bay waterfront at Corpus Christi is protected by a breakwater nearly 2 miles long. Depths in most of the area behind the breakwater range from 5 to 17 feet, not including the ship channel crossing the N end. The main entrance is through the ship channel. Depths of 5 to 6 feet can be carried S inside the breakwater to three large piers of the municipal marina, about 0.7 mile S of the ship channel; boats should pass inshore of the center of this protected waterway. There are four openings in the breakwater S of the ship channel. The northernmost two are very shallow and

are not used, with depths of 1 foot to bare, and the third opening was reported to have shoaled to about 4 feet in October 1972; the southernmost opening, which provides a direct entrance to the marina from the bay, has depths of about 7 feet and is marked on its N side by a light.

There is a **dockmaster** who assigns berths. His office is on the center pier. A municipal patrol and rescue boat operates from the marina. The patrol boat can be contacted through the Port of Corpus Christi harbormaster or the Corpus Christi police. The boat monitors VHF-FM channel 16 (156.80 MHz) when underway and is also equipped with VHF-FM channels 6 (156.30 MHz), 12 (156.60 MHz), and 26 (157.30 MHz).

The marina is opposite the center of the city and has excellent accommodations for yachts and small vessels. Protected berths for 300 craft are available in depths of 6 to 11 feet. Gasoline, diesel fuel, oil, water, and launching ramps are available; a repair yard has facilities for handling boats up to 40 feet, using a mobile hoist.

A repair yard on the N side of the Industrial Canal portion of the harbor channel has a 100-ton vertical lift capable of handling vessels up to 85 feet for repairs.

The Corpus Christi Yacht Club is at the marina.

**Storm warning signals are displayed.** (See chart.)

A **special anchorage area** has been designated in the area S of the municipal marina. (See 110.1 and 110.75, chapter 2, for limits and regulations.)

**Chart 11300 (1117).-Laguna Madre** is a shallow body of water extending S from Corpus Christi Bay for a distance of 100 miles. Depths range from zero to 9 feet with reefs and mudflats throughout. The Intracoastal Waterway traverses Laguna Madre from Corpus Christi Bay to Port Isabel, Tex. (See chapter 12.) **Padre Island,** a low barren, storm-swept strip of sand beach, separates Laguna Madre from the Gulf. Most of the island is part of the **Padre Island National Seashore** and subject to the rules and regulations of the U.S. Department of Interior's National Park Service.

**Storm warning signals are displayed.** (See chart.)

A natural fishing reef marked by a State-maintained buoy is 1.5 miles offshore about 15.6 miles N of Port Mansfield jetties. Another natural fishing reef marked by a State-maintained buoy is 4.5 miles offshore about 11.2 miles N of the jetties.

**Charts 11304 (1287), 11305 (896-SC).-Port Mansfield,** 70 miles S of Corpus Christi Bay, is a commercial fishing and popular sport fishing and recreational center, and a base for oil exploration in Laguna Madre. A water tank at the town is prominent.

**Vessels should approach Port Mansfield through the Port Mansfield Safety Fairway.** (See 209.135, chapter 2.)

An 8.6-mile dredged channel leads W across Laguna Madre from the Gulf at a point 78 miles S of Aransas Pass and 31 miles N of Brazos Santiago to Port Mansfield. The jettied entrance is marked by a lighted bell buoy 0.7 mile offshore and by buoys off the ends of the N and S jetties; the channel is marked by lights and daybeacons.

A dredged channel through the jetties and landcut leads across Laguna Madre to a turning basin and a shrimp boat and small-craft basin at Port Mansfield. In June 1974-January 1975, the controlling depths were 12 feet in the bar and jetty channels, thence 14 feet to the Intracoastal Waterway, thence 14 feet to the turning basin, thence 12 feet in the shrimp boat basin, and 8 feet in the small-craft basin.

**Anchorages.**-Vessels may anchor off the entrance to Port Mansfield on either side of the safety fairway.

Port Mansfield has a port director; a **harbormaster** assigns berths. There are berthing facilities, open storage space, commercial fish houses, and a transit shed with covered storage space. The basins have been bulkheaded, and vessels up to 128 feet can be berthed at finger piers in the shrimp basin. There are about 200 covered berths and several open berths in the small-craft basin.

There are two marinas where berths with electricity, gasoline, diesel fuel, ice, water, and limited marine supplies are available. A boatyard at the head of the shrimp boat basin builds steel shrimp boats. In October 1972, the marine railways at the yard were inoperative but were to be repaired in the near future. When in operation, boats up to 85 feet can be handled.

A **speed limit** of 4 knots is enforced in the harbor. An improved highway connects with the nearest railroad shipping point at **San Perlita,** 14 miles distant, and with **Raymondville,** the nearest town of any size, 28 miles distant. Raymondville has a hospital, telegraph communications, and rail and highway connections.

**Storm warning signals are displayed.** (See charts.)

**Charts 11301 (1288), 11303 (897-SC).-Arroyo Colorado** enters Laguna Madre through **Arroyo Colorado Cutoff,** a dredged channel, 90 miles S from Corpus Christi. A dredged channel leads from the Intracoastal Waterway through Arroyo Colorado Cutoff and Arroyo Colorado to a turning basin at Port Harlingen, 22 miles from the mouth. In November-December 1974, the controlling depth was 12 feet to the turning basin and 10 feet in the turning basin at Port Harlingen.

A barge assembly basin with attendant mooring buoys and depths of about 14 feet is on the N side of Arroyo Colorado Cutoff about 1.7 miles W of the Intracoastal Waterway. This basin is intended for the temporary mooring of barges.

**Arroyo City** is a small village on the S bank about 6.5 miles W of the Intracoastal Waterway. There are fish camps and a small marina at the village. Gasoline, water, ice, open and covered berths

with electricity, and launching ramps are available. A fixed 10-ton lift can handle craft for hull and engine repairs.

An overhead power cable with a reported clearance of 75 feet is about 1 mile N of Rio Hondo.

**Rio Hondo** is a small town on the Arroyo Colorado, about 20 miles above its mouth. There are privately operated wharves for the unloading of petroleum products and chemicals, and limited berthing facilities for pleasure craft. Water is available at a small pier. Ice by truck and provisions are available. There are railroad and highway connections to the N part of the state.

State Route 106 highway bridge at Rio Hondo has a vertical lift span with a clearance of 27 feet down and 73 feet up. (See 117.240 and 117.245 (a) through (e) and (j)(41), chapter 2, for drawbridge regulations and opening signals.) Overhead power and telephone cables close S of the bridge have clearances of 63 feet.

**Port Harlingen,** under the jurisdiction of the Arroyo Colorado Navigation District known as the Port Commission, is E of Harlingen and about 2 miles above Rio Hondo. A Port Director is in charge of operations and enforces the regulations established by the Port Commission. A **speed limit** of 8 knots in the channel and 4 knots in the turning basin is enforced. The Port Director assigns berths. There are two reinforced concrete wharves 650 feet and 100 feet long, three oil unloading piers, and aggregates and fertilizer wharf. A transit shed on the largest wharf has 12,000 square feet of covered storage, with a rail siding at a loading platform in the rear of the shed. All the wharves had a reported depth of 12 feet alongside in October 1972. Forklifts, crawler cranes, a grain elevator, and a compressed gas and oil storage facility are available. Water is available at the large wharf. Gasoline and diesel fuel are available by truck. The principal imports are petroleum products, steel products, and chemicals. The principal exports are grain, chemicals, and crude petroleum. There are railroad and highway connections to **Harlingen** and the interior. At Harlingen and **San Benito** there are hospitals, a grain elevator, railroad and bus transportation and communication facilities.

**Charts 11301 (1288), 11302 (898-SC).-Brazos Santiago,** the approach to Port Isabel and Port Brownsville, is a narrow pass from the Gulf to the lower end of Laguna Madre, between the S end of Padre Island and the N end of **Brazos Island.** It lies 236 miles SSW from Galveston entrance, 106 miles S from Aransas Pass, and 6 miles N from the mouth of the Rio Grande.

**Prominent features.**-In approaching Brazos Santiago on a clear day, the radiobeacon antenna at the Coast Guard station and the water tank and Port Isabel Light are the first objects sighted. Soon thereafter the mariner will pickup Brazos Santiago Light and the Coast Guard station inside the entrance on the N side. The red light on top of the radiobeacon antenna of the Coast Guard station is prominent at night. On clear nights it is reported to be visible 20 or more miles offshore. The large motels on Padre Island N of the entrance are prominent.

**Port Isabel Light** (26°04.6′N., 97°12.4′W.), 91 feet above the water, is shown from the white conical brick tower; the light is maintained by the State.

**Brazos Santiago Light** (26°04.4′N., 97°09.8′W.), 52 feet above the water, is shown from the dwelling of the Coast Guard station at the N side of the entrance to Laguna Madre. The radiobeacon antenna is near the light.

**Storm warning signals are displayed.** (See chart.)

**Vessels should approach Brazos Santiago through the Brazos Santiago Safety Fairway or the Coastwise Safety Fairway.** (See 209.135, chapter 2.)

**Channels.**-The pass has been improved by the construction of two rubble mound jetties extending nearly 1 mile into the Gulf and by dredging a channel between them from deep water in the Gulf. Federal project depths are 38 feet through Brazos Santiago, 36 feet across Laguna Madre to the junction of the channels leading to Port Brownsville and Port Isabel, 36 feet to Port Isabel turning basin, and 36 feet from the junction to the **Brownsville Turning Basin.** (See Notice to Mariners and latest editions of charts for controlling depths.)

The entrance is marked by a lighted whistle buoy about 2 miles E of the jetties, a lighted **269°30′** entrance range, a lighted bell buoy off the submerged part of the N jetty, and a lighted bell buoy off the end of the S jetty. The channels are marked by lighted ranges, lights, daybeacons, and lighted buoys.

In the 16-mile channel to Brownsville Turning Basin, **Boca Chica Cutoff Passing Basin** is 7 miles and **Goose Island Passing Basin** 11.3 miles above the outer end of the entrance jetties.

Private interests have dredged a ship basin at the S end of Padre Island just inside Brazos Santiago entrance. The basin had shoaled to a reported depth of 9 feet in July 1972. There is a large motel-marina (boatel) in the basin where gasoline, diesel fuel, water, ice, open and covered berths, some marine supplies, and surfaced launching ramps are available.

**Anchorages.-Vessels should anchor in the Brazos Santiago Fairway Anchorages on either side of the safety fairway.** (See 209.135, chapter 2.)

Directly off the entrance to Brazos Santiago, the bottom is soft and affords fair anchorage with good holding ground; farther N and S the bottom is harder. After entering the pass, ships must proceed to the wharves. Once inside Brazos Santiago, there is no satisfactory anchorage for deep-draft vessels.

**Tides and currents.**-The diurnal range of tide is 1.4 feet at Brazos Santiago and 1.3 feet at Port Isabel. The variation in the water level is largely dependent on the wind.

**Dangers.**-An unmarked dangerous wreck is 4.5 miles N of the sea buoy, and a fish haven is 1.3 miles N of the sea buoy.

**Weather.**-The climate of Brownsville is partly manmade. The prevailing winds of the area are from the Gulf of Mexico, but do not produce a truly marine climate. The region could be classified as semiarid because of the lack of rainfall, and the result of the low elevation of the area which fails to give the air from the Gulf sufficient lift to cause condensation, and of considerable subsidence of the winds aloft due to the presence of mountains starting about 100 miles to the W. The manmade, and most important, climate of this region is that irrigation has changed the entire lower Rio Grande Valley into a semitropical area.

The normal annual rainfall of about 26 inches is poorly distributed, with maxima in May, June, and September. Most of the precipitation comes in the form of thunderstorm activity, and often a single thunderstorm will account for the entire month's rainfall. Some extreme rainfalls have occurred when hurricanes were in the vicinity. However, the frequency of hurricanes in this area is very small, and the general path is a N and S one just off the coast in the Gulf.

Temperatures in summer and fall are not extremely high, but are fairly constant in the lower nineties during the daytime, and in the middle seventies at night. The prevailing onshore winds from the Gulf moderate the temperatures. The highest temperature recorded at Brownsville was 104°F. in 1947.

Winter temperatures are mild, with the normal daily minimum for January, the coldest month, being 52.2°F. Frequently an entire winter will pass without a temperature as low as the freezing point occurring. The coldest temperature of record was 12°F. in 1899.

Snow seldom occurs in Brownsville, however, local newspaper records reveal that 6 inches of snow blanketed the area in 1895.

Glaze is rare in Brownsville, but, during a cold wave in 1951, ice accretion was 1 to 1½ inches for the most severe glaze of record.

The National Weather Service maintains an office in Brownsville where **barometers** may be compared, or they may be compared by telephone. (See appendix for address.) (See page T-6 for **Brownsville climatological table.**)

**Storm warning display** locations are listed on NOS charts and shown on the Marine Weather Services Charts published by the National Weather Service.

**Pilotage** is compulsory for all foreign vessels and U.S. vessels under register in foreign trade. Pilotage is optional for coastwise vessels that have on board a pilot licensed by the Federal Government. The Brazos Santiago Pilots maintain a station on Padre Island near the Port Isabel Coast Guard Station. The pilot boat has a black hull with a white superstructure and a buff mast. The pilot boat shows the standard pilot lights at night and the International Code flag "H" by day. The pilots board vessels in the vicinity of the sea buoy.

The pilot station monitors 2738 kHz and 2182 kHz and VHF-FM channels 13 (156.65 MHz), and 16 (156.80 MHz) continuously. The pilot boat monitors VHF-FM channels 12 and 16. The pilots carry portable citizen band radiotelephones.

Pilot services are available 24 hours a day, and arrangements for pilot services are usually made through the ships' agents. A 24-hour notice of time of arrival is requested.

**Quarantine, customs, immigration,** and **agricultural quarantine** officials are stationed in Brownsville. (See appendix for addresses.) Vessels subject to such inspections generally make arrangements through ships' agents; officials usually board vessels at their berths.

**Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

The U.S. Public Health Service maintains a **contract physician's office** in Brownsville. (See appendix for address.) There is a hospital in Brownsville.

Brownsville is a **customs port of entry.**

**Coast Guard.**-The **Captain of the Port** has an office at Port Isabel, and a **vessel documentation office** is in Brownsville. (See appendix for addresses.)

**Towage.**-Two tugs of 1,200 and 1,440 hp are available at Brownsville for docking and undocking vessels, coastwise towing, or for salvage work.

**Harbor regulations.**-The Port Commission of the Brownsville Navigation District has jurisdiction and control over the Brownsville Ship Channel and turning basin, all wharves, transit sheds, loading equipment, and machinery owned or operated by it. The Port Commission establishes rules and regulations governing the port. The Port Director is in charge of operations, and the **harbormaster** assigns berths and enforces the regulations. A **speed limit** of 8 knots in Brownsville Ship Channel and 4 knots in the turning basin is enforced.

**Port Brownsville,** about 14.5 miles from the inner end of Brazos Santiago, is the port for the city of Brownsville. Exports include cotton, cotton products, lead, agricultural implements, zinc, sulfate, ores, chemicals, petroleum products, and citrus fruit. Imports are fruit, steel products, manganese ore, and general cargo. Offshore oil rigs are constructed in Port Brownsville.

**Brownsville,** about 5 miles WSW of Port Brownsville, is a fast growing metropolis and the largest city in the rich agricultural section on the N side of the lower Rio Grande Valley that extends 100 miles W from the river mouth. Noted as a resort city, it is also a gateway to Matamoros, Mexico, on the opposite side of the Rio Grande.

**Wharves.**-The port of Brownsville has more than 40 piers and wharves. Only the deep-draft facilities are described. (For a complete descrip-

tion of the port facilities, refer to the Port Series, a Corps of Engineers publication.) The alongside depths for the facilities described are reported; for information on the latest depths contact the operator. All the facilities described are owned and operated by the Brownsville Navigation District of Cameron County. All the facilities have highway, railroad, and water connections. Almost all have electrical shore power connections.

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.

About 93 acres of open storage space, 1,800,000 square feet of covered storage, and over 2 million cubic feet of cold storage space are available in the port.

**N side of Brownsville Ship Channel:**

Brownsville Navigation District, Oil Dock No. 3 (25°57′35″N., 97°22′47″W.): 120-foot face, 320 feet with piers; 34 feet alongside; deck height, 14½ feet; receipt and shipment of petroleum products and chemicals.

Brownsville Navigation District, Oil Dock No. 2: 0.6 mile W of Dock No. 3; 110-foot face, 420 feet with dolphins; 31 feet alongside; deck height, 14½ feet; receipt and shipment of crude oil and petroleum products.

Brownsville Navigation District, Oil Dock No. 1: 0.8 mile W of Dock No. 3; 110-foot face, 420 feet with dolphins; 32 feet alongside; deck height, 14½ feet; receipt and shipment of crude oil and petroleum products.

**N side of Turning Basin:**

Brownsville Navigation District, Dock No. 8: 0.4 mile E from end of basin; 480-foot face; 30 feet alongside; deck height, 13 feet; 47,000 square feet covered storage; receipt and shipment of general cargo and crude oil.

Brownsville Navigation District, Dock No. 7: 0.3 mile E from end of basin; 520-foot face, 625 feet with dolphins; 30 feet alongside; deck height, 13 feet; 52,000 square feet covered storage; receipt and shipment of general cargo.

Brownsville Navigation District, Dock No. 2: 0.2 mile E from end of basin; 420-foot face, 465 feet with projection; 31 feet alongside; deck height 14½ feet; 48,000 square feet covered storage; receipt and shipment of general cargo.

Brownsville Navigation District, Dock No. 1: 0.1 mile E from end of basin; 425-foot face; 31 feet alongside; deck height, 14½ feet; 48,000 square feet covered storage; receipt and shipment of general cargo.

Brownsville Navigation District, Dock No. 4: NW end of basin; 425-foot face; 31 feet alongside; deck height, 14½ feet; 42,000 square feet of covered storage; receipt and shipment of general cargo.

**W end of Turning Basin:**

Brownsville Navigation District, Dock No. 3: 450-foot face; 31 feet alongside; deck height, 14½ feet; 47,000 square feet covered storage; receipt and shipment of general cargo.

**S side of Turning Basin:**

Brownsville Navigation District, Dock No. 5: SW end of basin; 300-foot face; 25 feet alongside; deck height, 11½ feet; receipt and shipment of dry bulk commodities including ores, metals, and general cargo.

Brownsville Navigation District, Dock No. 6: 0.1 mile E from end of basin; 420-foot face; 25 feet alongside; deck height, 8 feet; receipt and shipment of dry bulk commodities including ores, metals and general cargo.

Brownsville Navigation District, Dock No. 9: 0.15 mile E from end of basin; 100-foot face, 23 feet alongside; E side 500 feet, 23 to 14 feet alongside; deck height, 10 feet; receipt and shipment of dry bulk commodities including ores, metals, and general cargo.

Brownsville Navigation District, Dock No. 10: E side of S slip; 650-foot face; 30 feet alongside; deck height, 12 feet; receipt and shipment of dry bulk commodities including ores, metals, and general cargo.

Brownsville Navigation District, Dock No. 11: 0.25 mile E from end of basin; 600-foot face; 30 feet alongside; deck height, 12 feet; receipt and shipment of dry bulk commodities including ores, metals, and general cargo.

Brownsville Navigation District, Dock Nos. 12 and 13: 0.4 mile E from end of basin; 1,120-foot-face; 30 feet alongside; deck height, 12 feet; 195,000 square feet covered storage; receipt and shipment of general cargo, shipment of scrap metal.

**S side of Brownsville Ship Channel:**

Brownsville Navigation District, Grain Elevator Wharf (25°57′21″N., 97°22′55″W.): 400-foot face; 36 feet alongside; deck height, 12 feet; two traveling grain loading towers with conveyers and loading spout, loading rate 600 long tons per hour each tower; 3¼ million bushel grain elevator; shipment of grain.

**Supplies.**-All manner of marine supplies and provisions are available at the port. Freshwater is available at all the wharves. Gasoline, diesel fuel, and kerosene are available at the oil wharves. Bunker fuels can be delivered by barge from Corpus Christi by special arrangements.

**Repairs.**-Port of Brownsville has no facilities for making major repairs or for drydocking deep-draft vessels; the nearest such facilities are at Galveston. Several firms are available for making above-the-waterline repairs to vessels. Shafts up to 24 feet long can be produced by a local firm. The largest marine railway can handle vessels up to 200 tons.

**Small-craft facilities.-Brownsville Fishing Harbor** N side of the channel, 3.6 miles below the head of the turning basin at Port Brownsville. In July 1974, the channel leading into the Brownsville Fishing Harbor had a controlling depth of 15 feet, thence

depths of 13 feet in the harbor. Berthing facilities are usually leased to fishing companies and facilities for private yachts are very limited. There are seafood processing plants, marine supply outlets, and marine engine repair facilities in the fishing harbor. Two shipyards have marine ways, the larger capable of handling vessels up to 90 feet for general repairs. Gasoline, diesel fuel, water, ice, launching ramps, open and covered berths, and marine supplies are available. There is bus and taxi service from the basin to Brownsville. Most of the public facilities for yachts are at Port Isabel.

**Communications.**-Brownsville is connected with points in both the United States and Mexico by three trunkline railroads; the Missouri Pacific, the Southern Pacific, and the National Railways of Mexico. Switching service within the port is done by the Missouri Pacific Railroad. Several barge lines offer service at the port. Numerous motor freight lines operate out of the port and Brownsville. Steamship agencies represent numerous lines that offer service to all ports of the world. Airlines operate from the Rio Grande Valley International Airport about 4 miles E of the city, with daily scheduled flights to all parts of the United States. There is local taxi and bus service, and interstate bus service to all points.

**Port Isabel,** about 2.5 miles W from Brazos Santiago, is an important point for the shipping of petroleum products by barge and the receipt of barge shipments of sand and gravel. It has a large shrimp boat fleet, and the town is widely patronized as a resort for sport fishing and recreation.

**Channels.**-A marked, dredged channel leads from the Intracoastal Waterway, along the N side of the city, to the Port Isabel small-boat basin. In March-December 1974, the controlling depths were 7 feet from the Intracoastal Waterway to the basin entrance, thence 6 feet in the entrance to the basin, and 6 feet in the basin.

Another marked, dredged channel leads from the Intracoastal Waterway just W of the pontoon bridge, then N to the side channels of the **Industrial Channel** which is used principally by fishing vessels. In June 1973, the controlling depths were 12 feet in the side channels.

The deep-draft Port Isabel Channel departs the Laguna Madre Channel about 2.8 miles above the jetties and leads N for 1.2 miles to the turning basin at Port Isabel. A Federal project provides for a channel 36 feet deep from the Laguna Madre Channel to and in the turning basin at Port Isabel. (See Notice to Mariners and latest editions of charts for controlling depths.) The Intracoastal Waterway is described in chapter 12.

In 1972, a causeway with a fixed span over the Intracoastal Waterway, with a design clearance of 73 feet, was under construction between Port Isabel and Padre Island. A causeway at the S end of Laguna Madre, between Padre Island and Long Island, has a 38-foot fixed channel span with a clearance of 18 feet. Overhead power and telephone cables crossing Laguna Madre on both sides of the causeway have clearances of 39 feet.

**Wharves.**-There are over 25 piers and wharves at Port Isabel. Most are of shallow draft and are used mainly by the seafood industry and for marine services and repairs. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to the Port Series, a Corps of Engineers publication.) The deep-draft facilities on the turning basin are owned by the Port Isabel-San Benito Navigation District and are managed by a **port director,** who assigns berths and controls the movement of vessels. A **speed limit** of 4 knots in the harbor and 8 knots in the ship channel is enforced.

The Port Isabel Turning Basin Oil Wharf, on the N side of the turning basin, has a 96-foot face with 375 feet of berthing space with dolphins; 35 feet is reported alongside. The wharf is used for the shipment of crude oil.

The Port Isabel Turning Basin General Cargo Wharf, on the W side of the turning basin, has a 500-foot face with 30 feet reported alongside. About 50,000 square feet of covered storage and 72,000 square feet of open storage space are available. The wharf is used for the receipt and shipment of general cargo, and the shipment of crude oil. Both deep-draft wharves have highway, freshwater, shore power, and pipeline connections.

**Supplies.**-Port Isabel has no waterfront facilities for bunkering deep-draft vessels; fuel can be supplied to vessels berthed in the turning basin by tank barges from Corpus Christi. Gasoline, diesel fuel, and marine lubricants are available to fishing boats and other small vessels.

**Repairs.**-Port Isabel has no facilities for making major repairs or for drydocking deep-draft vessels; the nearest such facilities are at Galveston. Several firms are available for making above- and below-the-waterline repairs to smaller vessels. The largest marine railway can handle vessels up to 140 feet and 800 tons for general repairs.

**Small-craft facilities.**-There are several marinas at Port Isabel. Gasoline, diesel fuel, water, ice, marine supplies, open and covered berths with electricity, and launching ramps are available. The largest marine railway can handle vessels up to 140 feet and 800 tons for hull, engine, and electronic repairs.

**Storm warning signals are displayed.** (See chart.)

The U.S. Public Health Service maintains a **contract physician's office** in Port Isabel. (See appendix for address.)

**Communications.**-Port Isabel has highway connections, and the Port Isabel Municipal Airport is about 8 miles NW of the city.

**Del Mar Beach,** on Brazos Island, is a swimming and fishing resort.

The **Rio Grande** empties into the Gulf of Mexico 6 miles S of Brazos Santiago. The International

Boundary and Water Commission states (December 28, 1953) that the river forms the International boundary between the United States and Mexico for 1,241 statute miles; further, that the total length of the boundary is 1,935 statute miles from the Gulf of Mexico to the Pacific Ocean. No survey of the river has been made recently, but access to the river over the entrance bar is limited to skiffs and small boats; inside, the channel is changeable. The International Boundary Commission has several dams on the Rio Grande to prevent freshwater from wasting into the Gulf.

The E coast of Mexico is described in H.O. Publication 20, Sailing Directions for the East Coasts of Central America and Mexico, published by the Defense Mapping Agency Hydrographic Center.

# 12. INTRACOASTAL WATERWAY, CALOOSAHATCHEE RIVER TO BROWNSVILLE

This chapter describes the **Intracoastal Waterway**, a toll-free "canal", from Caloosahatchee River, Fla., to Brownsville, Tex. The waterway except for a 140-mile stretch, Anclote River to Carrabelle, Fla., is a protected route inside the W coast of Florida and behind the Gulf Coast. The waterway is discussed in two sections: Caloosahatchee River to Anclote River, a distance of 150 statute miles; and Carrabelle to Brownsville, a distance of 1,059 statute miles. The outside route is described in chapter 5.

Also discussed in this chapter are the alternate routes of the Intracoastal Waterway: Algiers Alternate Route; Landside Route; Morgan City-Port Allen Alternate Route; and Atchafalaya River Route.

Supervision of the Intracoastal Waterway's construction, maintenance, and operation is divided among four U.S. Army Engineer Districts: Jacksonville, Mobile, New Orleans, and Galveston. (See appendix for addresses.)

**Mileage.**-The first section of the waterway is zeroed in 26°30.6'N., 82°01.1'W., near the mouth of the Caloosahatchee River at its junction with Okeechobee Waterway.

**Distances along the Intracoastal Waterway are in statute miles to facilitate reference to the small-craft charts; all other distances are in nautical miles. Mileage conversion tables are on page T-20.**

**Channels.**-The Federal project for the Intracoastal Waterway, Caloosahatchee River to Anclote River, provides for a channel 9 feet deep and 100 feet wide. Although effort is made to maintain the project depth, the channels may shoal several feet in places between maintenance dredgings. (See Local Notice to Mariners for controlling depths.) Additional information can be obtained from the U.S. Army District Engineers offices. (See appendix for addresses.)

**Bridges.**-Minimum overhead clearances of fixed bridges in this section of the waterway are 149 feet at **Mile 98.1.** Minimum horizontal clearance is 49 feet at the swing bridge at **Mile 34.1.**

General drawbridge regulations and opening signals for bridges over this section of the waterway are given in 117.240, chapter 2. Special drawbridge regulations for certain bridges that supplement the general regulations are referenced with the area description of the waterway.

**Overhead cables.**-Minimum clearance of overhead cables crossing this section of the waterway is 78 feet at **Mile 38.5.**

**Ferries.**-Cable ferries still cross the Intracoastal Waterway at several places. The cables are suspended during crossings and are dropped to the bottom when ferries moor. **Do not attempt to pass a moving cable ferry.**

**Aids to navigation.**-Intracoastal Waterway aids have characteristic yellow markings that 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.)

**Tides.**-The mean tide level along this section of the waterway is from 0.5 to 1.5 feet. In most areas the tide level is greatly affected by the winds both in time and height.

**Weather.-Storm warning signals** are displayed at various places along the waterway and connecting channels. Display locations are listed on NOS charts and shown on the Marine Weather Services Charts published by the National Weather Service.

**Chart 11427 (856-SC).**-From near the mouth of the Caloosahatchee River, the waterway crosses San Carlos Bay and enters Pine Island Sound, between Pine Island and Sanibel Island.

Strong cross currents are encountered in San Carlos Bay especially during ebb of spring tides between Pine Island Sound Daybeacon 2A and Daybeacon 8.

At **Mile 3.8,** an overhead power cable with a clearance of 26 feet, submerged at the waterway, crosses San Carlos Bay from St. James City to Woodrings Point.

A marina on Tarpon Bay, operated by the **J.N. "Ding" Darling National Widlife Refuge,** has berths with electricity, gasoline, water, ice, and a launching ramp.

**Pine Island Sound,** between Pine Island and the outer islands, is the main thoroughfare between San Carlos Bay and Charlotte Harbor. Numerous small islands, keys, for the most part uninhabited, and shoals abound in the sound. The waterway through the sound is marked by lights and daybeacons.

**Pine Island,** between Pine Island Sound and Matlacha Pass, is about 13 miles long and about 2.5 miles wide at the N end. There are a number of seasonal and year-round settlements on the island.

**St. James City** is a small fishing and residential community on the S end of Pine Island, opposite **Mile 4.0.** In May 1972, the entrance channel had a reported controlling depth of 6 feet, and within the canal depths were 6 to 9 feet. Gasoline, diesel fuel, water, and some marine supplies can be obtained at a small pier which had 6 feet reported alongside. There is a 5-ton hoist, a launching ramp, and a marine railway that can handle craft up to 30 feet for hull and engine repairs.

There are several marinas and fish camps on **Monroe Canal** and **Henley Canal** at St. James City where berths with electricity, gasoline, diesel fuel,

water, ice, and some marine supplies can be obtained. Private daybeacons mark the entrance to **Long Cutoff,** which leads to the canals. In May 1972, the reported controlling midchannel depth was 3 feet. A road leads from St. James City to the N end of Pine Island and connects with a road across Little Pine Island and Matlacha Pass to Fort Myers.

At **Mile 8.0,** an overhead power cable with a clearance of 85 feet over the waterway and 32 feet elsewhere crosses Pine Island Sound.

Opposite **Mile 10.0, Blind Pass,** which separates Sanibel Island from Captiva Island, enters Wulfert Channel and Pine Island Sound. Blind Pass is described in chapter 4.

**Captiva** is a small fishing village on Captiva Island, W of **Mile 12.1** about 3 miles N of Blind Pass. Gasoline, water, ice, and some supplies are available at a marina at Captiva. The approach channel, marked by daybeacons and an unlighted 225° range, had a reported controlling depth of about 4 feet in May 1972.

At **Mile 13.7,** a privately dredged and marked channel leads W from the waterway to a marina near the N end of Captiva Island. In 1971, 4½ feet was reported available in the channel. The marina has berths with electricity, gasoline, diesel fuel, water, ice, marine supplies, and a launching ramp. Engine repairs are available.

**Redfish Pass,** W of **Mile 14.5,** separating Captiva Island and North Captiva Island is described in chapter 4. An unmarked channel reportedly skirting the N and E side of Captiva Island provides access to the marina near the N end of Captiva Island.

**Captiva Pass,** W of **Mile 18.0,** separating North Captiva Island and Cayo Costa is described in chapter 4. Fair anchorage is available for small boats in **Safety Harbor,** which is 0.5 mile S of Captiva Pass on the inner side of North Captiva Island. The depth inside the harbor is about 5 feet, but only small craft drawing less than 4 feet can enter. The holding ground is good, and the anchorage is well protected from all directions.

**Useppa Island,** near the N end of Pine Island Sound E of **Mile 21.5,** has a natural small-boat basin on its NW side. A privately marked channel leads to the basin; local knowledge is advised.

**Cayo Costa** is an island on the S side of the entrance to Charlotte Harbor. **Pelican Bay,** on the NE side of the island, affords well protected anchorage in depths of 4 to 7 feet. The entrance to Pelican Bay is through **Pelican Pass,** about 1 mile SSE from the N end of the island; the controlling depth is about 5 feet. A small circular basin at the N end of the bay affords excellent protection to small craft, but the entrance is reported almost filled in and is difficult to navigate.

At **Mile 22.6,** a channel marked by daybeacons and a light leads E from the waterway, N of Useppa Island, and thence NE to Charlotte Harbor in the vicinity of **Bokeelia Island.**

**Charts 11427 (856-SC), 11426 (1255).-Bokeelia** is a small settlement on **Bokeelia Island,** at the N end of Pine Island on the S side of Charlotte Harbor. Drafts up to about 5 feet can be taken to the wharf at Bokeelia. Several small marinas at Bokeelia, in **Back Bay,** can provide berths, gasoline, water, and ice. Launching ramps are available. On the W side of Bokeelia Island, a privately marked channel leads from Charlotte Harbor through **Jug Creek** to Back Bay. An overhead power and telephone cable with a reported clearance of 22 feet crosses the mouth of Jug Creek. A 14-foot fixed highway bridge with a clearance of 9 feet connects Bokeelia Island with Pine Island E of Back Bay.

At **Mile 25.6,** the waterway enters Charlotte Harbor.

**Boca Grande,** the entrance from the Gulf of Mexico to Charlotte Harbor, Port Boca Grande, and Charlotte Harbor and its tributaries, Peace and Myakka Rivers, are discussed in chapter 4.

**Chart 11425 (857-SC).-Anchorages.**-Small vessels can anchor almost anywhere in Charlotte Harbor. Good depths for small craft can be found close inshore between Port Boca Grande and Boca Grande. Small craft also can use the lagoon at Boca Grande.

At **Mile 26.6,** the waterway passes Port Boca Grande.

**Storm warning signals are displayed.** (See charts.)

**Boca Grande,** W of **Mile 28.6,** has marinas, boatyards, and a yacht basin. Berths with electricity, gasoline, diesel fuel, water, ice, marine supplies, and hull and engine repairs are available. The largest marine railway, in Boca Grande Bayou, can handle craft up to 43 feet.

**Boca Grande Bayou,** a landlocked lagoon that provides shelter for small craft, can be entered from the waterway opposite **Mile 28.3.** The channel is marked by daybeacons, lights, and a private lighted range. In 1972, the channel had a reported controlling depth of 6 feet. Boca Grande Bayou can also be entered at **Mile 29.4** by a privately dredged channel and a landcut. In 1965, 9 feet was reported available in the channel. The bayou is crossed by two fixed highway bridges with a least channel width of 28 feet and a least clearance of 13 feet. Entry to the bayou from N is possible through a partially, privately marked channel.

Harbor Drive Waterway leading W from Boca Grande Bayou near its S entrance is crossed at its mouth by a bridge with a reported 25-foot fixed span and a clearance of 12 feet.

At about **Mile 30.0,** the waterway enters **Gasparilla Sound** which extends N from Charlotte Harbor for about 5 miles between **Gasparilla Island** and the mainland.

At **Mile 34.0, Coral Creek** enters the head of Gasparilla Sound from N. A privately dredged channel leads NE from the waterway to the mouth of the creek. In 1968, the channel had a reported

controlling depth of 9 feet. State Route 771 highway bridge crossing the creek about 0.4 mile above the mouth has a 13-foot fixed span with a clearance of 8 feet. An overhead power cable just above the bridge has a clearance of 32 feet.

The Seaboard Coast Line Railroad trestle close NW has clearance for small skiffs only. **Placida** is a small village at the S end of the highway bridge. A marina with a boatyard is in the basin on the E side of the creek close S of the highway bridge. Berths with electricity, gasoline, water, ice, marine supplies, a launching ramp, and open and covered storage are available. In May 1972, there was reported to be 7 feet of water in the approaches and in the basin. A boatyard at the marina has a marine railway that can handle craft up to 65 feet for hull and engine repairs. The boatyard also builds steel and wooden vessels up to 85 feet.

At the head of Gasparilla Sound, close E of the N end of the railroad bridge, a channel with a reported controlling depth of 7 feet in 1972, and marked by private daybeacons, leads to a seafood processing and shipping plant. The 100-foot marginal fish wharf at the plant was reported to have from 7 to 12 feet alongside in May 1972, with the deepest water at the end of the wharf nearest the processing plant. Gasoline, diesel fuel, water, ice, and some marine supplies are available.

At **Mile 34.1**, a railroad bridge crosses Gasparilla Sound from Placida to the N end of Gasparilla Island; the NE opening over the waterway has a bascule span (normally left in the open position) with clearances of 55 feet, open, and 3 feet, closed; the middle span 0.6 mile SW has a 49-foot swing span with a clearance of 4 feet at the center; and the SW opening close to the Gasparilla shore has a fixed span which has a width of 10 feet and a clearance of 5 feet. (See 117.245 (a) through (e) and (i)(3-a), chapter 2, for drawbridge regulations.) A highway causeway, close NW of and parallel with the railroad bridge, has three openings; a swing span with a clearance of 9 feet over the waterway, the middle opening over the main channel from Gasparilla Pass has a 48-foot fixed span with a clearance of 15 feet, and the SW opening has a 48-foot fixed span with a clearance of 7 feet. On the NW side of the causeway at the middle span is an overhead power cable with a clearance of 35 feet.

Between the N side of the railroad bridge and the highway bridge is an outboard motor test facility. It is closed to the public.

**Gasparilla Pass** between Gasparilla Island and Little Gasparilla Island is discussed in chapter 4.

At **Mile 34.3**, the waterway enters **Placida Harbor**. Good small- boat anchorage is available inside the N point of Gasparilla Pass between Little Gasparilla Island and **Bird Key**.

At **Mile 36.6**, overhead power and telephone cables with minimum clearances of 81 feet cross the waterway.

At **Mile 37.4**, the waterway enters **The Cutoff**, a narrow shallow pass joining Placida Harbor with Lemon Bay. At **Mile 38.5**, overhead power and telephone cables with minimum clearances of 78 feet cross the waterway at the S end of Lemon Bay. A small-craft facility, at the NW end of the Cutoff E of the waterway at **Mile 38.7**, has berths, electricity, gasoline, diesel fuel, water, ice, a launching ramp, and marine supplies.

**Lemon Bay** is a shallow lagoon that extends 15 miles NW behind the barrier beach from the head of Placida Harbor to Alligator Creek. There are numerous marinas and service facilities along the E side of Lemon Bay between The Cutoff and Alligator Creek. Berths, gasoline, water, ice, launching ramps, and marine supplies are available at most of them.

**Stump Pass**, near the S end of Lemon Bay SW of **Mile 41.0**, is discussed in chapter 4.

On the E side of Lemon Bay opposite Stump Pass is a small marina which can be reached through a bush-staked, marked channel through which in May 1972, 5 feet reportedly could be carried into the basin. Berths with electricity, gasoline, water, ice, and a launching ramp are available.

**Ainger Creek**, known locally as **Rock Creek**, is about 2 miles N of Stump Pass on the E side of Lemon Bay NE of **Mile 42.8**. About 0.4 mile above the mouth, the creek is crossed by a highway bridge with clearance for skiffs only. A marina on the N side of the creek just below the bridge has berths, electricity, water, gasoline, a launching ramp, and a 1-ton lift. A privately marked channel with a reported controlling depth of 4 feet in 1972 leads to the facilities. Craft up to 22 feet can be handled on trailers for hull and engine repairs.

At **Mile 43.5**, about 15 miles NW from Boca Grande, State Route 776 highway bridge, with a bascule span with a clearance of 26 feet at the center, crosses the waterway from the mainland to **Manasota Key** and Englewood Beach.

**Englewood Beach** is on the W side of the bay just S of the bridge. Marinas at Englewood Beach have berths with electricity, gasoline, water, ice, a launching ramp, and some marine supplies.

**Redfish Cove** is on the E side of the bay at the N end of State Route 776 highway bridge.

**Englewood** is on the E side of the bay about 1.5 miles N of State Route 776 highway bridge. A boat basin and marina are here. In May 1972, it was reported that about 4 feet could be carried to the marina. Berths with electricity, gasoline, water, ice, marine supplies, and hull and engine repairs are available. A 20-ton mobile hoist and a 10-ton forklift that can handle craft up to 40 feet are available. A fish house is about 0.3 mile S of the marina.

At **Manasota, Mile 49.9**, a bascule highway bridge with a clearance of 26 feet at the center crosses the waterway. An overhead power cable at the bridge has a clearance of 88 feet.

At **Mile 52.0,** about 300 yards SE of the entrance to Alligator Creek, a small passenger ferry crosses Lemon Bay.

At **Mile 52.6,** the waterway enters a 5.1-mile landcut that leads into Roberts Bay at Venice.

At **Mile 53.7,** an overhead power cable with a clearance of 85 feet crosses the landcut.

At **Miles 54.9, 56.6,** and **56.9,** highway bascule bridges with center clearances of 25, 30, and 16 feet, respectively, cross the landcut of the waterway.

A marina, on the W side of the landcut just N of the highway bridge, at **Mile 54.9,** has berths, electricity, water, ice, gasoline, a 40-ton lift, and a marine railway that can handle craft up to 50 feet; hull, engine and electrical repairs can be made.

**Venice Inlet,** about 26 miles NW from Port Boca Grande, is described in chapter 4.

**Storm warning signals are displayed.** (See the charts.)

The city of **Venice** and the towns of **Nokomis** and **Laurel** are on the shores of the three small bays, **Roberts Bay,.Dona Bay,** and **Lyons Bay,** inside and to the E of Venice Inlet. A water tank and several large apartment buildings are prominent. In 1972, reported drafts of about 2 to 5 feet could be taken to the landings at these towns.

Several marinas are at Venice Inlet and on Roberts, Dona, and Lyons Bays. Berths with electricity, gasoline, diesel fuel, water, ice, launching ramps, and marine supplies are available.

There is a 50-ton marine lift at a marina on Venice Inlet, a 7½ ton mobile hoist on Hatchett Creek, a 25-ton marine lift at Nokomis, and 1- to 2½-ton hoists are available at several other marinas. Hull, engine, and electronic repairs can be made, and open and covered storage facilities are available.

The U.S. Public Health Service maintains a **contract physician's office** in Venice. (See appendix for address.)

The waterway continues N from Venice Inlet through **Blackburn Bay, Dryman Bay, Little Sarasota Bay, Roberts Bay,** and **Sarasota Pass** to the lower part of Tampa Bay. These connecting bodies of water are separated from the Gulf by a line of narrow keys.

**Currents,** Venice Inlet to Cortez.-In Venice Inlet the average velocity is about 1 knot. At the bridge at the S end of Blackburn Bay, the current floods to the N and ebbs to the S with an average velocity of about 0.8 knot. At Blackburn Point Bridge at the S end of Little Sarasota Bay, the current floods S with an average velocity of 1.4 knots and ebbs N with an average velocity of 0.7 knot. One day's observation off the bridge at the N end of Little Sarasota Bay showed very weak currents. In Sarasota Bay at the entrance to Roberts Bay, the currents average only 0.3 knot. At the bridge off Cedar Point the average velocity at strength is about 0.4 knot. In Sarasota Pass off Cortez, the flood currents set to the N and average about 0.6 knot; the ebb current is weak. (See the Tide Tables for predictions.)

A highway bridge crossing **Casey Thorofare,** at **Mile 59.3,** at the S end of Blackburn Bay has a bascule span with a clearance of 14 feet at the center.

At **Mile 63.0,** the **Blackburn Point** highway bridge crosses the waterway. The bridge has a swing span with a clearance of 9 feet. Near the E end of the bridge are a marina and a fish camp. A privately marked channel with a reported controlling depth of 5 feet in May 1972 leads to the facilities. Berths with electricity, gasoline, diesel fuel, water, ice, and marine supplies are available. The marina has a 30-ton marine lift that can handle craft up to 45 feet for hull, engine, and electronic repairs, or open dry or covered storage.

**Midnight Pass,** E of **Mile 65.0,** is described in chapter 4.

**Osprey** is a small settlement on the E side of Little Sarasota Bay. Some supplies can be obtained here, but no services are available along the waterfront. There are marinas and a boatyard near the S end of Siesta Key just N of Midnight Pass. Berths with electricity, gasoline, diesel fuel, water, ice, a launching ramp, and marine supplies are available. There is a 38-ton mobile hoist that can handle craft up to 55 feet for hull and minor engine repairs.

**Holiday Harbor,** E of **Mile 67.2,** is on the E side of Little Sarasota Bay. A marina is at the head of a long slip that, in May 1972, was reported to have a depth of 3 feet, with 6 feet at the berths. Berths with electricity, gasoline, water, ice, and marine supplies are available. Open and covered dry storage and hull and engine repairs are available.

At **Stickney Point, Mile 68.6,** at the N end of Little Sarasota Bay, a twin bascule highway bridge with a clearance of 18 feet crosses the waterway. Marinas are at both ends of the bridge. Berths with electricity, gasoline, water, ice, launching ramps, and marine supplies are available. Lifts up to 12 tons can handle vessels up to about 30 feet for hull, engine, and electronic repairs.

A boatyard on the E side of Siesta Key at Mile **69.4** W of **Phillippe Creek** has a 50-ton mobile hoist that can handle craft up to 65 feet for hull, engine, and electronic repairs, or open or covered dry storage. Berths with electricity, gasoline, diesel fuel, water, and ice are available. In May 1972, a reported depth of 6 feet could be carried to the boatyard.

At the N end of **Roberts Bay, Mile 71.8,** a bascule highway bridge with a clearance of 25 feet crosses the waterway from the mainland to the N end of Siesta Key. A boatyard on the E side of Roberts Bay, S of the bridge, has a marine lift that can handle craft up to 25 feet for hull and engine repairs. Berths, gasoline, and other services are available at the boatyard.

**Big Sarasota Pass,** an inlet from the Gulf of Mexico to the S end of Sarasota Bay between Siesta Key and Cerol Isles, is described in chapter 4.

The **Ringling Causeway, Mile 73.6,** crossing Sarasota Bay from Sarasota to **Lido Key** via **Bird Key, Coon Key,** and **St. Armands Key,** has a bascule span over the waterway with a clearance of 22 feet at the center. Over the channel between Bird Key and Coon Key there is a 46-foot fixed span with a clearance of 10 feet. The causeway continues W between Coon Key and St. Armands Key. Two fixed highway bridges connect St. Armands Key with the N and S ends of Lido Key. The N bridge has a 14-foot span with a clearance of 7 feet; overhead power and telephone cables on each side of the bridge have a clearance of 19 feet. The S bridge has an 18-foot span with a clearance of 5 feet. Overhead power cables on the E side of the bridge have a clearance of 25 feet. There are marinas at **City Island** at the NE end of Lido Key where berths, gasoline, water, ice, launching ramps, and other services are available.

**Sarasota,** on the E shore of Sarasota Bay at the S end, is a year-round community and winter resort. The Sarasota-Bradenton Airport is N of the city; rail, bus, and highways connect with points in Florida and other states. The town has several hospitals. A number of tall buildings, water tanks, and radio towers show prominently from offshore.

Sarasota has several marinas, boatyards, and yacht basins. The city-owned marina is in the bight just E of **Cedar Point. At Mile 73.3,** a dredged channel leads NE from the waterway to a turning basin at the municipal marina. In May 1972, 8 feet was reported available in the channel and turning basin. The small-craft facilities in Sarasota can provide berths with electricity, gasoline, diesel fuel, water, ice, storage, and marine supplies.

**Storm warning signals are displayed.** (See chart.)

The U.S. Public Health Service maintains a **contract physician's office** in Sarasota. (See appendix for address.)

**Hudson Bayou,** about 0.5 mile S of the municipal marina, provides excellent shelter for small craft. The channel into the bayou had a reported controlling depth of 3 feet in May 1972. The highway bridge over Hudson Bayou, 0.2 mile above the mouth, has a 30-foot bascule span with a clearance of 7 feet, but is maintained in the closed position. (See 117.245 (i)(3-b), chapter 2, for drawbridge regulations.) The overhead power cable at the bridge has a clearance of 65 feet. A highway bridge, 0.4 mile above the mouth, has a 39-foot fixed span with a clearance of 8 feet.

**New Pass,** an inlet from the Gulf of Mexico into Sarasota Bay, between Cerol Isles and Longboat Key is described in chapter 4.

At **Mile 74.4,** a dredged channel leads E from the waterway across Sarasota Bay to a turning basin at Payne Terminal. In May-June 1974, the controlling depth was 5½ feet to the Payne Terminal Basin, thence 8 feet in the basin except for shoaling to 4 feet in the E 50 feet. The basin at Payne Terminal has a Coast Guard berth and a marina at which gasoline, outboard motor repairs, and storage are available.

**Whitaker Bayou,** about 0.5 mile N of Payne Terminal, provides excellent shelter for small craft. The channel into the bayou had a reported controlling depth of about 5 feet in 1974. A highway bridge over the bayou has a 32-foot fixed span with a clearance of 7 feet. A marina and boatyard are near the head of Whitaker Bayou. Berths with electricity, gasoline, water, storage, and marine supplies are available. Craft up to 60 feet can be handled for hull and engine repairs.

**Bowlees Creek** empties into Sarasota Bay NE of **Mile 79.0.** A privately marked channel with a reported controlling depth of 3 feet leads to the Holiday Yacht Club and a marina inside the creek. Berths with electricity, gasoline, diesel fuel, water, and launching ramps are available.

About 0.4 mile NW of the entrance to Bowlees Creek, a privately dredged channel marked by private daybeacons and a lighted range leads to a basin of the Bayshore Gardens Yacht Club and Trailer Estates Yacht Club. In 1967, depths of 3 feet were reported in the channel and basin. Berths, gasoline, water, a launching ramp, and marine supplies are available in the basin. A fish haven, marked by private buoys, is 0.5 mile W of the channel entrance.

**Buttonwood Harbor,** on Longboat Key in Sarasota Bay, is SW of **Mile 79.9.** A privately dredged channel marked by private daybeacons leads to the harbor. A branch channel, also privately dredged and marked, leads NW to a marina about 0.4 mile NW of Buttonwood Harbor. In May 1972, a reported depth of 4 feet could be carried to Buttonwood Harbor and to the marina. Berths, gasoline, water, ice, and a launching ramp are available at the marina.

The town of **Longboat Key** is composed of the entire island of Longboat Key.

**Longbeach,** the N part of the town of Longboat Key on the S side of Longboat Pass, is a fishing and resort town. About 1.5 miles SE of the pass SW of **Mile 83.7,** a privately marked channel with a depth of about 4 feet leads to a boat basin where berths, gasoline, water, ice, and a launching ramp are available.

**Longboat Pass,** W of **Mile 85.4** between Longboat Key and Anna Maria Key, is described in chapter 4.

At **Mile 87.2,** a highway bridge crosses the waterway from **Bradenton Beach,** near the S end of Anna Maria Key, to Cortez on the mainland. The bridge has a bascule span with a clearance of 22 feet at the center. There are several fish wharves at the E end of the bridge at which party fishing boats moor; gasoline and diesel fuel are available. A basin with a large marina is on the E side of the waterway about 0.5 mile N of the bridge. In May 1972, a reported depth of 7 feet could be carried to the marina. Berths with electricity, gasoline, diesel fuel, water, ice, and marine supplies are available.

A 50-ton mobile hoist and several smaller lifts can handle craft up to 60 feet for hull and engine repairs or open or covered dry storage.

At **Mile 89.2,** a highway bridge crosses the waterway at the S end of Sarasota Pass from Anna Maria Key to Perico Island and then to the mainland. The bridge has a bascule span over the waterway with a clearance of 25 feet at the center. The highway continues E on a bridge over **Perico Bayou** and a causeway and bridge over the N end of **Palma Sola Bay** to the mainland. These two bridges have 46-foot fixed spans with clearances of 10 feet.

A marina on Perico Island at the E end of the bridge has berths with electricity, gasoline, diesel fuel, water, ice, and marine supplies. A forklift can handle craft up to 22 feet for hull and engine repairs or dry storage. In 1973, there was reported to be 5 feet in the privately marked channel to the marina.

**Anna Maria** is a small village at the N end of Anna Maria Key. A privately marked channel with about 3 feet of water leads to a yacht club W of **Mile 90.0,** where berths, gasoline, diesel fuel, water, ice, a launching ramp, and marine supplies are available. A 25-ton hoist is available for handling vessels for hull and engine repairs.

Several marinas and boatyards are at the village of Anna Maria. Gasoline, diesel fuel, water, ice, marine supplies, storage facilities, a 50-foot marine railway, a 20-ton mobile hoist, launching ramps, and smaller lifts are available. Hull, engine, and electronic repairs can be made.

**Charts 11425 (857-SC), 11414 (586).**-The waterway continues N through Sarasota Pass and enters Tampa Bay at **Mile 92.0.** Sarasota Pass is marked at its N end by **Sarasota Pass Light 1** (27°32.1'N., 82°42.8'W.), 15 feet above the water and shown from a square-shaped black daymark on a dolphin.

The waterway continues across lower Tampa Bay to the main ship channel at **Mile 97.8,** thence NE to **Mile 102.8,** thence N in the St. Petersburg Channel to **Mile 106.0,** thence W in the dredged channel, close S of Pinellas Peninsula and into Boca Ciega Bay at **Mile 110.8.**

Small craft can also use the dredged **Sunshine Skyway Channel** which extends parallel with and about 600 yards W of the Sunshine Skyway between Maximo Point and Mullet Key Shoal; this channel leads N from the waterway at **Mile 97.8** thence rejoins it at **Mile 110.8,** and saves about 7.5 statute miles. This channel is marked by lights and daybeacons. In 1963, the controlling depth was 9 feet.

**Charts 11414 (586), 11410 (858).-Boca Ciega Bay** extends 13 miles NW from the lower part of Tampa Bay. New channels have been dredged at several places in the bay. Several of the small keys have been filled in to form large islands, and bridges link many of the keys.

**Sunshine Skyway Park** is a State recreational area along the skyway E of the channel.

Tidal currents in Boca Ciega Bay seldom exceed 0.5 knot. (See Tidal Current Tables for daily predictions at several locations in these waters.)

At **Mile 110.5,** the twin bascule spans of the Sunshine Skyway Causeway cross the waterway; the spans have clearances of 21 feet at the center.

**Maximo Point,** opposite **Mile 110.5,** the SW extremity of Pinellas Peninsula, is at the N end of the Sunshine Skyway Causeway. A small- boat basin has covered berths with electricity for over 125 boats up to 23 feet in length. Gasoline, water, ice, a launching ramp, and some marine supplies are available. The controlling depth into the basin is about 3 feet. In May 1972, plans were being made to build an interstate highway at the site of the marina.

On Maximo Point, E of the skyway, there is a large prominent apartment hotel and motel which has a boat basin where gasoline, diesel fuel, water, and open berths with electricity are available.

**Cats Point Channel** extends NW from the waterway at **Mile 110.8,** thence NW along the landfill W of Cats Point, and thence across the upper part of Boca Ciega Bay, and rejoins the waterway at **Mile 115.7.** In 1963, the controlling depth in the dredged channel was 6 feet. The channel is marked by lights and daybeacons.

**Frenchman Creek** is on the E side of Boca Ciega Bay about 0.3 mile N of Maximo Point. There is a marina and boatyard at the head of the creek which has a 15-ton vertical lift that can handle craft up to 40 feet for hull and engine repairs and dry open and covered storage. Open and covered berths with electricity for over 200 boats, gasoline, diesel fuel, water, ice, and marine supplies are available. The twin 26-foot fixed spans of the Sunshine Skyway with clearances of 18 feet cross the creek. In May 1972, the reported controlling depth was about 8 feet in the privately marked channel leading from Cats Point Channel to the marina and boatyard.

**Cats Point** is on the E side of Boca Ciega Bay, 1.1 miles N of Maximo Point. A highway bridge of the Pinellas Bayway crossing Cats Point Channel at Cats Point has a 41-foot fixed span with a clearance of 18 feet. A large marina is in the lagoons close N of Cats Point. Gasoline, diesel fuel, water, ice, marine supplies, a launching ramp, and open and covered berths with electricity for more than 300 boats are available. A 50-ton mobile hoist can handle craft up to 60 feet for complete repairs. In 1972, the reported controlling depth in the lagoons was about 5 feet in the privately marked channel.

**Pinellas Bayway,** a complex system of highways and causeways crossing Boca Ciega Bay, links Pinellas Peninsula at Cats Point to St. Petersburg Beach and Tierra Verde, Cabbage Key, and other keys S of it, including Mullet Key. Clearances of the various bridges of the bayway are given with

the description of the various channels which they cross.

A highway bridge of the bayway crossing the channel between two sections of landfill W of Cats Point has a 38-foot fixed span with a clearance of 12 feet.

At **Mile 113.0,** a bridge of the Pinellas Bayway crosses the main channel of the waterway from Tierra Verde to the landfill N of it and has a bascule span with a clearance of 25 feet at the center.

Bunces Pass, Pass-a-Grille Channel, Tierra Verde, Vina del Mar, and St. Petersburg Beach are discussed in chapter 5.

At **Mile 114.0,** a bascule highway bridge of the Pinellas Bayway with a clearance of 25 feet crosses the waterway.

**Gulfport** is a city on the N shore of Boca Ciega Bay, opposite **Mile 116.0.** A draft of about 6 feet can be taken to the T-head Gulfport City Fishing Pier. A water tank in Gulfport and a cupola 1 mile to the NW are prominent.

**Clam Bayou,** is on the E side of the city. A privately marked **035°** lighted range and daybeacons mark a dredged cut leading into the bayou and the Gulfport City Marina in the basin close W of the bayou. In May 1972, there was a reported controlling depth of 5 feet in the channel and basin. A **harbormaster** who assigns berths is at the marina; he can be reached by telephone (813-347-0172). A **speed limit** of 5 m.p.h. is enforced. Gasoline, water, ice, marine supplies, a launching ramp, and open and covered berths with electricity are available. Two yacht clubs and a Coast Guard Auxiliary flotilla have facilities in the basin.

A boatyard, on the W side of the entrance to Clam Bayou, has a 7-ton mobile hoist that can handle craft up to 30 feet for hull and engine repairs or open or covered storage. Berths and marine supplies are available at the boatyard, and electronic repairs can be arranged for.

**South Pasadena** is a city on the E shore of Boga Ciega Bay about 2 miles NW of Gulfport.

A channel leaves the waterway at **Mile 116.5,** S of **Pasadena Isle,** passes around the S end of the island, then splits into two channels, one leading N to a marina on the W side of the entrance to **Bear Creek,** the other leading W to a marina 0.2 mile W of the creek entrance. The channels, privately marked, had reported controlling depths of 4½ feet in 1972. Gasoline, diesel fuel, water, ice, marine supplies, and open and covered berths with electricity are available for over 300 boats up to 48 feet at the two marinas. A 30-ton marine hoist at the marina at the creek entrance can handle craft up to 55 feet for hull, engine, and electronic repairs, or dry open or covered storage.

At **Mile 117.2, the St. Petersburg Beach Causeway** crosses Boca Ciega Bay from St. Petersburg Beach to the mainland at South Pasadena. The causeway bridge across the waterway has a bascule span with a clearance of 8 feet. An overhead power cable along the causeway is submerged where it crosses the waterway. Close N, another causeway connecting the same points crosses the bay. The bascule span over the waterway has a clearance of 23 feet at the center, and two fixed spans crossing minor channels to the NE have clearances of 6 feet. In 1974, a bascule highway bridge was under construction across the Intracoastal Waterway adjacent to the existing bascule span. When completed, it will have a clearance of 23 feet.

**Blind Pass,** a shallow pass from the Gulf to Boca Ciega Bay, is discussed in chapter 5.

The waterway continues N passing South Causeway Isles, Paradise Island, Isle of Palms, and Capri Isle which are land filled residential areas with numerous lagoons and private berths at waterfront homesites.

**Chart 11410 (858).-Treasure Island Causeway,** at **Mile 119.0,** crosses Boca Ciega Bay from Treasure Island via Paradise Island and South Causeway Isles to the mainland at St. Petersburg. The causeway has a bascule span over the waterway with a clearance of 8 feet. The E and W openings between Treasure and Paradise Islands and South Causeway Isles to the mainland have fixed spans with clearances of 4 and 5 feet, respectively.

At **Mile 121.5,** the channel from **Johns Pass,** discussed in chapter 5, junctions with the waterway.

**Long Bayou,** an arm of Boca Ciega Bay opposite Johns Pass, extends in a N direction for about 3 miles to a dam which forms **Lake Seminole.** Twin fixed highway bridges with clearances of 20 feet cross the bayou about 1 mile above the mouth. An overhead power cable at the bridge has a clearance of 34 feet. A railroad bridge close N of the highway bridges has a 24-foot fixed span with a clearance of 7 feet.

**Cross Bayou,** with a shoal area across its mouth, enters Long Bayou just above the railroad bridge. An overhead power cable with a clearance of 31 feet crosses the mouth of Cross Bayou and continues across Long Bayou. **Cross Bayou Canal,** principally a drainage ditch, connects Old Tampa Bay with Cross Bayou.

The waterway continues through the N part of Boca Ciega Bay between Sand Key and the mainland.

At **Mile 122.8,** the **Madeira Beach Causeway** crosses Boca Ciega Bay from Sand Key to the mainland. The causeway has a bascule span over the waterway which has a clearance of 25 feet at the center. The shallow cove just E of the mainland end of the causeway has been dredged to form a small boat basin adjacent to the Veterans Hospital. A depth of about 4 feet can be taken into the basin. Just N of the causeway a channel with a controlling depth of about 5½ feet leads to a large marina in a basin on Sand Key. Gasoline, diesel

fuel, ice, water, marine supplies, and covered and open berths with electricity for 120 boats up to 40 feet are available. A 23-ton mobile hoist can handle craft up to 40 feet for hull and engine repairs. Another basin at the NE end of the causeway on the mainland, with a reported depth of 4 feet, has a marina for the private use of residents of a nearby condominium apartment complex.

**The Narrows,** entered at **Mile 125.5,** connecting the NW end of Boca Ciega Bay with the S end of Clearwater Harbor, is about 4.5 miles long. On the W side of The Narrows near the S end are rocks that are covered at high water; to avoid them mariners should favor the E bank. A marina and boatel inside the bight on Sand Key, just S of The Narrows, has gasoline, diesel fuel, water, ice, open and covered berths with electricity, and some marine supplies.

Gasoline, diesel fuel, water, and berths are also available at several marinas on Sand Key along The Narrows.

At **Mile 129.3,** a highway bridge with a bascule span with a clearance of 25 feet at center crosses the waterway from the mainland to Indian Rocks Beach on Sand Key.

At **Mile 130.0,** the waterway enters Clearwater Harbor.

**Clearwater Harbor** extends about 7 miles N from the Narrows to St. Joseph Sound and has an average width of about a mile. The harbor is mostly shoal, except for the waterway and the natural channels varying in depth from 5 to 14 feet. The several channels in the harbor should be followed closely as some sections are quite crooked.

At **Mile 131.8,** the Belleair Beach Causeway crosses the harbor from Sand Key to the mainland. The causeway has a bascule span over the waterway with a clearance of 21 feet. **Belleair,** about 1 mile N of mainland end of the causeway, has a large hotel with a private yacht basin into which a draft of about 4 feet can be taken. The stack at the hotel is conspicuous. Gasoline and water can be obtained at **Belleair Beach,** on the W side of Clearwater Harbor.

In 1972, pilings of a former pier, exposed at near low water, were reported in the vicinity of **Mile 134.2** between the E edge of the waterway and Belleview Island; mariners are advised to exercise caution in this area.

At **Mile 135.5,** the dredged channel through Clearwater Pass, discussed in chapter 5, junctions with the waterway.

**Clearwater,** the county seat of Pinellas County on the E shore of Clearwater Harbor opposite Clearwater Pass, is principally a winter resort, but has considerable industry in electric and electronic manufacturing. There are many prominent features including a large white apartment hotel near the N end of Clearwater Beach Island, a tall water tank near the middle of the island, a large hotel on the island on the N side of the Garden Memorial Causeway, a prominent hotel in Clearwater, several tall radio towers, and several prominent buildings. The city has three hospitals. The city is served by passenger and freight rail service, and bus and truck lines. The St. Petersburg-Clearwater International Airport is about 7 miles SE of the city.

**Tides and currents.**-The mean range of tide at Clearwater is 1.8 feet. The tidal current at Clearwater in the vicinity of the Garden Memorial Causeway is about 0.4 knot.

At **Mile 135.9,** Causeway Channel, marked by daybeacons, leads W from the waterway to a junction with a dredged channel thence to a turning basin at the W end of Garden Memorial Causeway. The dredged channel with which it junctions is the branch channel leading N from the dredged channel through Clearwater Pass and is described in chapter 5.

The city of Clearwater operates the City Pier and Municipal Marina at the turning basin. The marina can provide berths, electricity, gasoline, diesel fuel, water, ice, and marine supplies. The **harbormaster** has his office at the marina and assigns the berths. He can be reached by telephone (813-442-5690) for marine information or berthing instructions. The Clearwater Police Boat is based at the Municipal Marina. The Clearwater Coast Guard Station is at Island Estates Marina on the N side of the causeway about 0.25 mile NE of the Municipal Marina.

The Clearwater Yacht Club is in a basin on the E side of Clearwater Beach Island about 0.4 mile N of the Clearwater Municipal Marina turning basin. It can be reached via **Mandalay Channel,** which leads N from the turning basin. Daybeacons mark the critical spots in the channel. The fixed bridge crossing the channel at the W end of Garden Memorial Causeway just N of the Clearwater Municipal Marina turning basin has a clearance of 14 feet at its center.

Other small-craft facilities in the Clearwater area are located at the part of Clearwater Beach Island, along the S side of the island N of Garden Memorial Parkway, and at Clearwater proper. Berths, electricity, gasoline, diesel fuel, water, ice, and marine supplies are available; hull, engine, and electronic repairs can be made. At Clearwater just E of **Mile 136.4,** a 50-ton mobile hoist can handle craft up to 70 feet.

Local guides can be hired as pilots.

At **Mile 136.0, the Garden Memorial Causeway,** crosses Clearwater Harbor from Clearwater Beach to Clearwater; the bascule span over the waterway has a clearance of 25 feet at the center. (See 117.466, chapter 2, for drawbridge regulations.)

At **Mile 136.4,** a channel marked by daybeacons leads NW to a junction with Mandalay Channel thence to Dunedin Pass. Dunedin Pass was closed due to shoaling in 1968.

The waterway through the harbor passes close alongshore off Clearwater and continues N into St. Joseph Sound.

**Dunedin,** E of **Mile 139.0,** is a resort town on the E shore of St. Joseph Sound, about 3 miles N of Clearwater. A large hotel, two tanks, and a stack are conspicuous. The town has a hospital and railway connections.

The mean range of **tide** at Dunedin is 1.9 feet.

The Dunedin Marina, E of **Mile 139.3,** is in a basin protected by two moles. It has a commercial fish pier and berths with electricity for about 200 boats. Gasoline, diesel fuel, water, ice, a launching ramp, and marine supplies are available. A motel is on the N mole, and a boat club on the S mole. In May 1972, depths of 5 feet were reported in the entrance channel and basin. The entrance to the basin is marked by pilings. A **harbormaster** is in attendance and assigns berths; he can be reached by telephone (813-773-1508).

A privately dredged channel leads into **Sevenmouth Creek,** to a basin on the NE side of Caladesi Island W of **Mile 141.1.** In 1972, the channel had a reported depth of 5 feet. It is marked by private daybeacons. The basin and island are part of the **Caladesi Island State Park.** Berths and campsites, but no water, are available at the basin. An observation platform near the basin is prominent.

**Curlew Creek,** on the E shore of St. Joseph Sound, E of **Mile 141.4,** has a marina in a basin on the creek. Gasoline, water, ice, open and covered, wet and dry berths, marine supplies, and a launching ramp are available. A 2½-ton forklift capable of handling boats up to 25 feet for hull and engine repairs is available. In May 1972, depths of 3 feet were reported in the creek channel and basin, but caution should be exercised due to rocks near the channel.

At **Mile 141.9,** the Honeymoon Island Causeway crosses St. Joseph Sound from the mainland to **Honeymoon Island.** A highway bridge in the causeway has a bascule span with a clearance of 24 feet over the waterway. A fixed bridge in the causeway near the W end has a 45-foot fixed span with a clearance of 11 feet.

**Hurricane Pass,** to the W of the causeway is discussed in chapter 5.

**Minnow Creek,** is on the E shore of St. Joseph Sound E of **Mile 142.3.** A privately dredged channel leads from the waterway to basins in **Smith Bayou** at the mouth of the creek. In 1972, the reported depth in the channel was about 5 feet. The channel is marked by private daybeacons. There are three boatyards and marinas in the basins, which in May 1972 had reported depths of 4 to 6 feet. There are forklifts and a 15-ton mobile hoist that can handle craft up to 40 feet for hull and engine repairs, or dry open or covered storage. The boatyards can build craft up to 45 feet. Gasoline, diesel fuel, water, ice, marine supplies, and open and covered berths with electricity are available. Several fish camps are on Smith Bayou.

At **Mile 143.4,** a dredged channel leads E from the waterway to the basin of a small marina at **Ozona.** In April 1972, the controlling depths were 3½ feet at midchannel in the channel and 3½ feet in the basin. The channel is marked by a light and daybeacons. Berths, gasoline and a launching ramp are available at the marina.

A small shrimp fleet base is in **Sutherland Bayou** about 0.5 mile N of Ozona. Water is available at the fish pier.

A **boiling spring** is close to shore just SE of **Crystal Beach,** E of **Mile 144.4.** The boiling water is visible above the surrounding waters in calm weather. Depths of 14 to 20 feet were found in the spring in 1924.

About 3.2 miles N of Ozona, a channel leads E to a marina in a basin at **Klosterman Point,** on the E shore of St. Joseph Sound E of **Mile 147.0.** In 1973, the channel had a reported controlling depth of 7 feet. It is privately marked. Gasoline, water, open and covered berths with electricity, and a launching ramp are available at the marina. A 2-ton forklift can handle craft up to 23 feet for hull and engine repairs or dry open or covered storage.

There is a paved launching ramp near the end of a municipally owned causeway about 1.3 miles N of Klosterman Point. Another causeway about 0.6 mile to the N is part of the Fred H. Howard County Park.

At **Mile 150.0,** the dredged channel of this first section of the Intracoastal Waterway ends.

From Anclote River N there is no inside route until the E terminus of the second section of the waterway is reached at Carrabelle, Fla., about 140 miles to the NNW. Boats sailing outside may find refuge during bad weather by entering the Withlacoochee River, about 75 miles N of Clearwater, Cedar Keys Harbor, about 95 miles N of Clearwater, the Steinhatchee River, the Crystal River, the Homosassa River, or Horseshoe Cove; all of which are described in chapter 5.

**Mileage.**-The second section of the waterway is zeroed at **Harvey Lock,** New Orleans, and measured **eastward (E)** or **westward (W)** along the waterway. Alternate Routes of the Intracoastal Waterway are zeroed to take off from the basic route and are given letter designations such as **A.A.** (Algiers Alternate Route), **L.R.** (Landside Route), **M.P.** (Morgan City-Port Allen Alternate Route), and **A.R.** (Atchafalaya River Route).

**Distances along the Intracoastal Waterway are in statute miles to facilitate reference to the small-craft charts; all other distances are in nautical miles. A mileage conversion table is on page T-20.**

**Channels.**-The Federal project for the Intracoastal Waterway Carrabelle, Fla., to Brownsville, Tex., provides for a channel 12 feet deep with a minimum width of 125 feet. Although effort is made to maintain the project depth, the channel may shoal several feet in places between maintenance dredging. (See Local Notice to Mariners for controlling depths.) Additional information can be obtained from the U.S. Army Dis-

trict Engineers offices. (See appendix for addresses.)

**Bridges.**-Minimum overhead clearances of fixed bridges in this section of the Intracoastal Waterway are 48 feet at **Mile 533.0W** and 50 feet at **Miles 361.4E, 295.4E, 284.6E, 223.1E** and **206.7E.** Minimum horizontal clearance of bridge openings (basic route) is 75 feet.

General drawbridge regulations and opening signals for bridges over this section of the Intracoastal Waterway are given in 117.240, chapter 2. Special drawbridge regulations for certain bridges that supplement the general regulations are referenced with the area description of the waterway.

**Overhead cables.**-Minimum clearance of overhead cables crossing this section of the Intracoastal Waterway is 60 feet at **Mile 58.9W** and 61 feet at **Mile 533.0W.** Several others have clearances of 71 to 76 feet.

**Locks.**-Minimum lock lengths are 415 feet at lock **Mile 0.0** (Harvey); 640 feet (626 feet usable) at lock **Mile 6.5E** (Inner Harbor Navigation); and 797 feet (760 feet usable) at lock **A.A. Mile 0.0**(Algiers). Minimum lock width is 56 feet at lock **Mile 162.7W** (Vermilion). Minimum depth over the sill is 11 feet at Vermilion Lock. The 425-foot Harvey Lock can be avoided by detouring through the 760-foot Algiers Lock in the Alternate Route. (See 207.180 and 207.187, chapter 2, for regulations governing use, administration, and navigation of locks and flood gates.)

**Ferries.**-Cable ferries still cross the Intracoastal Waterway at several places. The cables are suspended during crossings and are dropped to the bottom when the ferries moor. **Do not attempt to pass a moving cable ferry.**

**Aids to navigation.**-Intracoastal Waterway aids have characteristic yellow markings that 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.)

**Tides.**-Under ordinary conditions the mean tidal range in this section of the Intracoastal Waterway is from 1 to 2 feet. In most sections the net change in water level is largely dependent on the force and direction of the wind. Strong N winds that occur principally during winter depress the water surface as much as 3.5 feet below mean low water; S winds have the opposite effect. Severe hurricanes have raised the water surface 10 feet or more above low water in some localities.

**Weather.**-**Storm warning signals** are displayed at various places along the Intracoastal Waterway and connecting channels. Display locations are listed on NOS charts and shown on the Marine Weather Services Charts published by the National Weather Service.

**Chart 11404 (865-SC).**-The improved part of the waterway begins at 29°47.5'N., 84°40.4'W., in Carrabelle Ship Channel at **Mile 376.2E.** Waterway depths are available to Carrabelle, 3.7 miles to the N and to the open waters of the Gulf, 3.3 miles to the S. (See chapter 6.)

From Carrabelle channel, the well-marked waterway route is SW for 20.6 miles through St **George Sound** to 29°39.9'N., 84°58.1'W., in **Apalachicola Bay,** thence N by W for 4.2 miles to Apalachicola.

At **Mile 361.4E,** a highway causeway extends from **Cat Point** on the mainland to St. George Island. The fixed span over the waterway has a clearance of 50 feet. The fixed span over the auxiliary channel 0.8 mile S of Cat Point has a clearance of 26 feet. An overhead power cable close E of the causeway has a clearance of 40 feet over most of the 3.5 miles between the point and the island, but is submerged at the waterway.

**Chart 11402 (866-SC).**-**Apalachicola,** Mile **351.4E,** is on the W side of the entrance to **Apalachicola River.** The town has facilities for repair of small craft. Available supplies include gasoline, diesel fuel, water, and marine supplies. (See chapter 6 for more complete information.)

**John Gorrie Memorial Bridge** is a 4.2-mile E-W combination of highway bridges and causeways over the entrances to East Bay and Apalachicola River. The swing span over the river at Mile **351.4E** has a clearance of 28 feet; the overhead power cable 100 yards N of the bridge has a clearance of 84 feet.

The railroad bridge over Apalachicola River at **Mile 347.0E** has a swing span with a clearance of 11 feet. Extreme care is advised in the vicinity of the bridge. Two marinas are at the head of small bayous 0.8 and 0.6 mile SE of the railroad bridge. The southeasternmost facility is accessible through two channels with reported controlling depths of 3 feet, while the other is accessible through a channel with a reported controlling depth of 5 feet. Gasoline, water, ice, limited marine supplies, berths, and a launching ramp are available at each facility. A small pier at which gasoline and water are available is 0.5 mile W of the bridge.

The waterway leaves Apalachicola River at Mile **345.6E** and proceeds through Jackson River to **Lake Wimico,** which is entered at **Mile 340.7E.**

**Chart 11393 (867-SC).**-The waterway leaves Lake Wimico at **Mile 335.3E** through **Searcy Creek** and a long landcut. There is a submerged freshwater syphon at **Mile 329.5E.** An abandoned pontoon bridge at **Mile 330.6E** has a horizontal clearance of 80 feet.

The highway bridge over the waterway at **White City, Mile 329.3E,** has a lift span with clearances of 10 feet down and 80 feet up. A gasoline station on the highway at White City has some supplies, but there are no berthing facilities.

At **Mile 327.7E, Gulf County Canal** with a midchannel controlling depth of 9½ feet in May 1971, extends about 5 miles SW to **Port St. Joe,** where fuel and supplies can be obtained. (See chapter 6 for more complete information.) An overhead power cable, which crosses the canal about 3.5 miles SW of the junction with the waterway, has a clearance of 85 feet. A bascule highway bridge with a clearance of 10 feet crosses the canal at the entrance of St. Joseph Bay, an overhead power cable at the bridge has a clearance of 85 feet.

At **Mile 318.9E,** an overhead power cable with a clearance of 85 feet crosses the waterway.

At **Overstreet, Mile 315.4E,** a pontoon drawbridge crosses the waterway. Gasoline in cans and groceries are available at a store near the W end of the bridge.

N of Overstreet, the waterway follows a cut in **Wetappo Creek** for a short distance then enters **East Bay,** of St. Andrew Bay at **Mile 312.1E.** The channel through the bay is well marked with lights and buoys.

**Chart 11390 (868-SC).**-U.S. Route 98 highway bridge (Dupont Bridge) crossing East Bay at **Mile 295.4E** has a fixed span with a clearance of 50 feet over the waterway channel. The swing span, pivot piers, and the four spans of the old highway bridge about 200 yards E have been removed; the ends of the bridge remain and are used as fishing piers.

**Panama City,** at **Mile 292.3E,** is on the N side of St. Andrew Bay. Berthing and repair facilities, marine supplies, gasoline, and diesel fuel are available at the resort town. The municipal yacht basin is on the NW side of the entrance to Massalina Bayou at **Mile 290.4E.** (See chapter 6 for more complete information on Panama City.)

Opposite **Mile 285.3E,** a privately dredged channel leads from the waterway into **Alligator Bayou.** In 1965, the controlling depth was 22 feet. The channel is marked by a lighted range, lights, and daybeacons. The bayou is within a **restricted area.** (See 207.175d, chapter 2, for limits and regulations.)

The waterway continues through St. Andrew Bay and its NW arm, **West Bay. Hathaway Bridge,** at **Mile 284.6E,** has a fixed span clearance of 50 feet; part of the old highway bridge just S of the bridge remains. There are marinas near either end of the bridge at which gasoline and diesel fuel are available. A 12-ton fixed lift and berths are available at the marinas on the E side of the bridge.

**North Bay** extends in a NE direction from **Mile 282.4E.** The controlling depths are 12 feet to the bridge at **Lynn Haven,** 5 miles above the waterway, and thence 4½ feet to a dam, 2 miles above the bridge; oyster bars in the middle of the bay with 5 to 6 feet of water over them should be avoided. State Route 77 highway bridge over the bay at Lynn Haven has a fixed span with a clearance of 18 feet. An overhead power cable with a clearance of 34 feet crosses the bay about 200 yards S of the dam. Several bayous along North Bay afford anchorage for small craft.

A channel with a reported depth of about 13 feet leads from the bay into **Alligator Bayou** to the basin at the Gulf Electric Power Plant. Overhead power cables crossing North Bay about 0.5 mile E of Alligator Bayou have a clearance of 45 feet. The transmission towers in the bay are reported to be unlighted and present a hazard to small craft at night.

**Fanning Bayou,** about 0.7 mile NW of the bridge, leads to the town of **Southport** at the head of the bayou. A channel reported dredged to 13 feet in 1972 leads to an oil terminal wharf on the E bank of the bayou about 0.5 mile above the entrance. In June 1972, a depth of 3 feet was reported available to a shrimp dock at Southport.

A marina in the dredged basin on the W side of **Mill Point** at the N end of the bridge has gasoline, water, limited berths, and a launching ramp. In June 1972, a depth of 10 feet was reported in the stake-marked channel to the basin.

A State park is E of the S end of the bridge. Launching ramps are available in the park. Some berthage is available in a small bayou on the W side of the S end of the bridge. Gasoline in cans and limited marine supplies are available in Lynn Haven.

From West Bay the waterway enters **West Bay Creek,** at **Mile 273.0E.** An overhead power cable across the waterway at **Mile 272.9E** has a clearance of 70 feet. State Route 79 highway bridge over the waterway at **West Bay, Mile 272.1E,** has a lift span with clearances of 10 feet down and 80 feet up. A gasoline station is on the highway near the bridge, and there are limited transient berths available at a fish pier on the SE side of the bridge. Depths of about 4 feet were reported in the approach and 5 feet alongside the pier in June 1972.

**Chart 11385 (870-SC).**-From West Bay Creek, the waterway follows a long landcut and enters **Choctawhatchee Bay** at **Mile 253.5E.** An overhead power cable crossing the waterway at **Mile 269.2E** has a clearance of 100 feet; a cable ferry crosses at **Mile 254.8E.** An overhead power cable at the ferry crossing has a clearance of 70 feet.

The channel through the shallow E end of Choctawhatchee Bay is marked with lights and buoys, but the route through the remainder of the bay is in open water with depths greater than 12 feet and only occasional lights marking the shoal areas on the S side. The causeway crossing the bay at **Mile 250.4E** has a bascule span over the waterway channel with a clearance of 10 feet.

The entrance to Choctawhatchee Bay from the Gulf is at **Mile 228.0E.** The bay and its tributaries are described in chapter 6.

The waterway leaves Choctawhatchee Bay at **Mile 223.4E** and proceeds W for 33 miles through

**The Narrows** and **Santa Rosa Sound** to Pensacola Bay. The E part of the route is through a well-marked dredged channel; the W part is through open water with depths greater than 12 feet and marked by occasional lights and buoys. **Restricted areas** in The Narrows and Santa Rosa Sound extend from **Mile 218.9E** to **Mile 204.4E.** (See 204.134 and 204.136, chapter 2, for limits and regulations.)

U.S. Route 98 highway bridge over The Narrows at **Mile 223.1E** has a fixed span with a clearance of 50 feet. A fuel pier is on the N side of The Narrows about 0.9 mile W of the bridge; depths of about 10 feet are reported to be alongside the pier. Gasoline and diesel fuel are available at the fuel pier, and gasoline is also available at several marinas W of the bridge.

**Fort Walton Beach** on the N side of The Narrows at **Mile 222.2E** has limited repair facilities; fuel and marine supplies can be obtained. A mobile hoist is available at Shalimar. (See chapter 6 for more complete information on the facility at Shalimar.)

An overhead power cable crossing The Narrows at **Mile 216.8E** has a clearance of 76 feet. A ferry crosses the waterway just W of the cable crossing. State Route 399 highway **Navarre Causeway,** over Santa Rosa Sound at **Mile 206.7E** has a fixed channel span clearance of 50 feet over the waterway.

**Chart 11378 (872-SC).**-State Route 399 highway bridge over the W end of Santa Rosa Sound, at **Mile 189.1E**, has a bascule span with a clearance of 20 feet. (See 117.240 and 117.480, chapter 2, for drawbridge regulations and opening signals.) The nearby overhead power cable has a clearance of 70 feet. In 1972, dual fixed highway bridges with design clearances of 65 feet were under construction immediately W of the bascule bridge; when complete, the center span of the bascule bridge will be removed and the remainder will be used as fishing piers. Gasoline, diesel fuel, water, ice, launching ramps, and berths are available at marinas on Little Sabine Bay at Pensacola Beach at the S end of the bridge. In June 1972, a reported controlling depth of 5 feet was available in a privately marked channel leading from the waterway to the marinas.

At **Mile 182.9E,** a 4.1-mile route leads about NNE through deep water in **Pensacola Bay** to **Pensacola.** The city has complete supply and repair facilities. (See chapter 6 for more complete information.)

From Pensacola Bay, the waterway passes through a landcut at **Mile 179.OE** into **Big Lagoon.** Several marinas are on the N shore W of **Trout Point, Mile 177.0E.** Gasoline, diesel fuel, water, ice, launching ramps, and open and covered berths with electricity are available.

State Route 292 highway bridge over the W end of the lagoon at **Mile 171.8E** has a fixed span with a clearance of 73 feet.

**Gulf Beach** is a summer resort S of the bridge. A marina is on a basin on the S bank of the waterway about 0.7 mile W of the bridge. Gasoline, water, ice, marine supplies, launching ramps, and open and covered berths with electricity are available at a marina in the basin. A 20-ton mobile hoist can handle craft up to 40 feet long for general repairs or storage.

From **Mile 166.8E,** the well-marked waterway extends through the lower part of **Perdido Bay,** thence through **Arnica Bay,Bay La Launch,** and **Wolf Bay.** The Florida-Alabama boundary follows the waterway between **Miles 167.4E** and **169.9E.** (Perdido Bay and its tributaries are described in chapter 6.)

In 1967, it was reported that the stranded wreck charted in 30°19′03″N., 87°31′00″W., at **Mile 165.9E,** was no longer visible; caution is advised.

A marina is at a small-boat basin on the S side of the waterway in Arnica Bay at **Mile 165.1E.** Gasoline, diesel fuel, water, ice, and marine supplies are available. A marina in **Roberts Bayou,** on the N side of Arnica Bay, has gasoline, diesel fuel, water, and berths. Marine railways and other repair facilities are available at Terry Cove. (See chapter 6 for more complete information.)

From the W end of Wolf Bay at **Mile 160.0E,** the waterway extends through a long landcut to and through **Oyster Bay** and enters **Bon Secour Bay** at **Mile 151.0E.**

The fixed span of the State Route 59 highway bridge crosses the cut at **Mile 154.9E** and has a clearance of 73 feet. The overhead power cables in the vicinity of **Mile 154.6E** have clearances of 93 feet. Gasoline, diesel fuel, water, ice, marine supplies, berths, and a launching ramp are available at marinas near the bridge.

The village of **Gulf Shores** is 0.7 mile S of the bridge. The Dixie Graves Highway extends W from Gulf Shores to Fort Morgan on Mobile Point.

**Storm warning signals are displayed.** (See chart.)

The 22.5-mile route of the waterway across the lower part of Bon Secour Bay and **Mobile Bay** is through a well-marked dredged channel, except inside the entrance to Mobile Bay from the Gulf where general depths are greater than 12 feet.

**Mobile Bay Channel** crosses the waterway at **Mile 133.6E; Mobile** is 25.2 miles N. Chapter 7 describes Mobile Bay and its tributaries.

From Mobile Bay, the waterway goes through **Pass aux Herons** to the open water of Mississippi Sound. Dauphin Island Causeway (State Route 163) highway bridge over Pass aux Herons, at **Mile 127.8E,** has a lift span with clearance of 19 feet down and 79 feet up. An overhead power cable on the W side of the bridge has a clearance of 91 feet. In 1967, a vessel reported striking a submerged object in the channel at **Mile 127.3E,** about 0.4 mile W of the bridge. The current velocity is 1.3 knots through Pass aux Herons. Berthing and repair facilities, supplies, and fuel are available at Dauphin Island, 2 miles S of the bridge lift span. (See

chapter 7.) A highway bridge in the causeway just S of Cedar Point has a 32-foot fixed span with a clearance of 14 feet. An overhead power cable at the bridge has a clearance of 38 feet.

**Charts 11374 (874-SC), 11372 (876-SC), 11373 (1267).**-The waterway leaves Pass aux Herons Channel at **Mile 119.1E** and enters the open water of Mississippi Sound, which has general depths greater than 12 feet until up to Marianne Channel, **Mile 58.1E** at the W end of the sound.

If bound for **Bayou La Batre,** depart the waterway at the light marking the W end of Pass aux Herons Channel, **Mile 119.1E**, and proceed on a NNW course for about 4.3 miles to Bayou La Batre Light 1, marking the entrance to the dredged channel, thence through the marked channel for about 6 miles to the town. Supply and repair facilities are available. (See chapter 7 for more complete information.)

The entrance to Mississippi Sound from the Gulf through **Petit Bois Pass** is 2 miles S of **Mile 115.4E**. The Alabama-Mississippi boundary crosses the waterway at **Mile 112.0E.**

At **Mile 104.2E,** the waterway crosses the deep ship channel in Mississippi Sound between Horn Island Pass and **Pascagoula.** The channel to Pascagoula extends N for 1.9 miles, thence NW for 5.8 miles to the turning basin. Berthing and repair facilities, supplies, gasoline, and diesel fuel are available. (See chapter 7 for more complete information.)

A light at **Mile 98.6E** and lighted buoys at **Mile 98.1E** and **95.9E** mark turning points in the waterway route. At **Mile 89.3E,** a lighted buoy, 3.4 miles S of low and rounded **Bellefontaine Point** , marks the waterway route.

At **Mile 87.5E**, a dredged channel leads N and NW for 9.4 miles to **Biloxi.** (See chapter 7.)

**Chart 11372 (876-SC).**-At **Mile 81.0E,** a lighted buoy, 2.6 miles N of Ship Island, marks the waterway through Mississippi Sound. From the buoy a N by W course in depths of 15 to 10 feet for 4.7 miles leads to a marked channel which continues N and E for 3.2 miles to Biloxi. A NW course from the buoy for 6.4 miles leads to a large yacht basin at **Beauvoir.** Berthing and repair facilities, marine supplies, gasoline, and diesel fuel are available. (See chapter 7 for more complete information.)

At **Mile 72.8E,** the waterway crosses the deep **Gulfport Channel** between Ship Island Pass and Gulfport. The channel to Gulfport extends NW for 6.0 miles to the ship basin. Small-boat basins are on both sides of the ship basin. Berthing and repair facilities, marine supplies, gasoline, and diesel fuel are available. (See chapter 7 for more complete information.)

At **Mile 65.3E,** the waterway rounds a lighted buoy in Mississippi Sound and turns sharply to the SW. If bound for **Pass Christian Harbor** , depart the lighted buoy on a WNW course and proceed 5.4 miles through depths of 13 to 7 feet to the entrance to the municipal boat basin at the town of **Pass Christian.** (See chapter 7 for more complete information.)

From **Mile 65.3E,** the SW reach proceeds through natural depths and through dredged **Marianne Channel** to **Mile 53.9E;** thence the route is W through dredged **Grand Island Channel,** to natural depths exceeding 12 feet at **Mile 47.9E** in the E approach to Grand Island Pass.

**Chart 11367 (878-SC).**-The Mississippi-Louisiana boundary follows the waterway W through **St. Joe (Grand Island) Pass** to **Mile 40.6E,** then turns sharply from the waterway and follows the channel to **Pearl River.**

From **Mile 40.6E**, the waterway continues W through dredged cuts and crosses the **Lake Borgne** end of Rigolets at **Mile 35.0E. Rigolets** (see chapter 7) is a comparatively deep passage that connects Lake Borgne with **Lake Pontchartrain,** several miles to the W.

From Rigolets, the waterway route is SW through nearly 23 miles of **Rigolets-New Orleans Cut.** Pilots should be on the alert for cross currents at waterway crossings of passes and bayous. **Chef Menteur Pass** (see chapter 7), which is crossed at **Mile 22.9E**, is specially noted for such currents; the pass is another deep link between Lake Borgne and Lake Pontchartrain.

At **Mile 15.0E,** privately owned **Michoud Canal,** with a controlling depth of 14 feet in November 1974, extends N from the waterway for 1.5 miles to the town of **Michoud**, which has rail connections.

The basin at the National Aeronautics and Space Administration Missile Center, on the N side of the waterway at **Mile 13.5E**, had a centerline controlling depth of 14 feet in November 1974. An overhead power cable with a clearance of 170 feet crosses the waterway close W of the basin. This is the approximate turning point from the E-W reach to SE reach of the deep **Mississippi River-Gulf Outlet Canal.** (See chapter 8.) The waterway continues W through the canal to **Mile 13.0E** where it is crossed by a fixed highway bridge with a clearance of 135 feet.

The Port of New Orleans Bulk Materials Handling Plant is on the N bank of the waterway at **Mile 9.7E.**

The overhead power cable over the waterway at **Mile 8.2E** has a clearance of 170 feet. The waterway enters the deep **Inner Harbor Navigation Canal** of New Orleans at **Mile 7.5E** and proceeds S through the canal to Mississippi River. (See chapter 8 for more complete information.)

The combination Southern Pacific Railroad and Florida Avenue highway bridge over Inner Harbor Navigation Canal at **Mile 7.5E** has a bascule span with a clearance of zero feet; the overhead power cable on the N side of the bridge has a clearance of 166 feet.

The marine service station on the E side of the canal at **Mile 7.0E** has a 440-foot wharf with reported depths of 14 feet alongside in 1972. Gasoline, diesel fuel, water, ice, and marine supplies are available. The station has a 100-foot marine railway, a 100-ton fixed lift, and a machine shop.

The highway bridge over the canal at **Mile 6.7E** has a lift span with a clearance of 40 feet down and 156 feet up.

**Inner Harbor Navigation Lock,** at **Mile 6.5E**, is 640 feet long (626 feet usable), 75 feet wide (74 feet usable), with 31½ feet over the sills, and handles lifts up to 17 feet.

The highway bridge over the canal at **Mile 6.2E** at the end of the lock has a bascule span with a clearance of zero feet.

The Intracoastal Waterway leaves Inner Harbor Navigation Canal and enters **Mississippi River,** at **Mile 5.8E.** The basic route follows the **New Orleans** waterfront upriver to **Canal Street, Mile 3.6E,** which is 83 miles above the river's Head of Passes. (See chapter 8 for description of New Orleans.) Most of the city's small-craft facilities are behind canal locks or at West End Park on Lake Pontchartrain. (See chapter 7 for more complete information on these facilities.)

From Canal Street, the waterway continues up Mississippi River and passes under the high fixed bridges at **Mile 2.7E.** At **Harvey,** on the S side of Mississippi River, 3.6 miles above Canal Street, the route leaves the river and proceeds S through **Harvey Canal No. 1.**

**Harvey Lock,** at **Mile 0.0**, is 415 feet long, 75 feet wide, 12 feet over the sills, and handles lifts up to 20 feet. The railroad bridge over the canal at **Mile 0.1W** has a bascule span with a clearance of 9 feet. (See 117.536, chapter 2, for drawbridge regulations.) The overhead power cable on the N side of the bridge has a clearance of 90 feet. The highway bridge at **Mile 0.1W** has a bascule span with a clearance of 7 feet.

Supplies and services available at Harvey include gasoline, diesel fuel, water, ice, and marine supplies. Harvey shipyards can handle vessels up to 300 feet, and the machine shops can repair gasoline and diesel engines.

The overhead power cable over Harvey Canal No. 1, at **Mile 1.8W**, has a clearance of 135 feet. At **Mile 2.7W,** a highway bascule bridge with a clearance of 45 feet crosses the canal. The overhead power cable at **Mile 4.1W** has a clearance of 124 feet. The waterway continues S and enters Bayou Barataria at **Mile 6.5W.**

**The Algiers Alternate Route (A.A.)** is zeroed at **Algiers Lock (A.A. Mile 0.0)** where the basic Intracoastal Waterway route enters the Mississippi. The alternate route swings downriver, departs the river about 6 miles below Canal Street, and continues SW through a landcut with the same project dimensions as the basic route.

**Algiers Lock,** at **Mile 0.0,** is 797 feet long (760 feet usable), 75 feet wide, 13 feet over the sills, and handles lifts up to 18 feet. The overhead power cable crossing the lock has a clearance of 126 feet. The highway bridge over the route at **A.A. Mile 1.0** has a lift span with clearance of 4 feet down and 100 feet up; the overhead power cable on the SW side of the bridge has a clearance of 112 feet.

The Missouri Pacific Railroad bridge at **A.A. Mile 3.7** has a lift span with clearance of 2 feet down and 100 feet up; the overhead power cables on the SW side and 300 yards NE of the bridge have clearances of 120 feet. A highway lift bridge is adjacent to the SW side of the railroad bridge; clearances are 40 feet down and 100 feet up.

The overhead power cable over the waterway at **A.A. Mile 8.4** has a clearance of 110 feet. The alternate route enters Bayou Barataria and rejoins the basic route at **A.A. Mile 8.9,** which coincides with **Mile 6.5W.**

From **Mile 6.5W**, the waterway continues S and W for several miles through **Bayou Barataria.** At **Mile 10.1W**, an overhead power cable with a clearance of 99 feet crosses the waterway. At **Mile 10.6W** is the town of **Crown Point.** At **Mile 11.9W**, in 1973, a fixed highway bridge with a design clearance of 73 feet was under construction across the waterway. The highway bridge over the waterway at **Mile 12.4W** has a swing span with a clearance of 9 feet; use the S opening.

The waterway departs Bayou Barataria at **Mile 14.6W** and crosses **Bayou Villars** at **Mile 15.1W.** A shipyard is at **Jones Point** just N of the crossing. The yard has a 500-ton floating drydock that can handle vessels with drafts up to 7 feet. From the crossing, Bayou Villars extends 1.0 mile W to **Lake Salvador,** which has depths of 5 to 7 feet, and 0.4 mile E to a junction with Bayou Barataria at the town of Lafitte. An overhead power cable crossing Bayou Villars close W of the waterway has a clearance of 185 feet. A 20-mile chain of bayous and canals winds SE from Lafitte to **Barataria Bay.** (See chapter 9 for bridges, overhead cables, and controlling depths.) **Lafitte** has several shipyards that can handle vessels up to 80 feet; gasoline, diesel fuel, water, ice, and marine supplies are available.

At **Mile 20.0W**, the waterway crosses **Bayou Perot** which is another passage from the lakes on the SE to Lake Salvador on the W. An overhead power cable crossing the mouth of the bayou has a clearance of 60 feet. An overhead power cable at **Mile 23.0W** has a clearance of 191 feet.

**Chart 11355 (879-SC).**-The waterway enters **Harvey Canal No. 2** at **Mile 29.3W,** which is 1.2 miles from the canal's Lake Salvador terminus, and proceeds SW in the canal to Larose.

The overhead power cables over the waterway at **Miles 34.6W** and **34.8W** have minimum clearances of 90 feet. The piers of a former pon-

toon bridge are at **Mile 35.2W**; clearance between piers is 91 feet. At this site, a fixed highway bridge with a design clearance of 73 feet was under construction in 1974.

At **Mile 35.4W**, the waterway crosses **Bayou Lafourche** which is described in chapter 9. On the NE side of the crossing is **Larose.** Boatyards in the vicinity have a 1,000-ton floating drydock and other facilities for handling craft up to 70 feet; gasoline, diesel fuel, water, ice, and marine supplies are available. A pontoon drawbridge crosses Bayou Lafourche at Larose.

The waterway W from Larose is through the **Larose-Bourg Cutoff** . State Route 1 highway bridge over the cutoff at **Mile 35.6W** has a lift span with clearance of 35 feet down and 73 feet up; the overhead power cable 0.1 mile S of the bridge has a clearance of 90 feet.

At **Mile 40.4W**, an overhead power cable with a clearance of 100 feet crosses the waterway.

At **Mile 48.8W**, the cutoff crosses **Company Canal** which connects **Bourg** on Bayou Terrebonne, with Lockport on Bayou Lafourche. (See chapter 9.) At **Mile 49.8W**, a pontoon highway bridge crosses the waterway; the overhead power cable on the W side of the bridge has a clearance of 90 feet.

The overhead power cables over the waterway at **Miles 53.9W, 54.7W,** and **55.7W** have a minimum clearance of 90 feet. The route swings sharply S and crosses an E-W reach of **Bayou Terrebonne** at **Mile 57.5W**; the bayou is described in chapter 9. The highway bridge on the N side of the crossing has a lift span with clearances of 8 feet down and 73 feet up; the overhead power and telephone cables N of the bridge have a clearance of 88 feet. The highway bridge on the S side of the crossing has a bascule span with a clearance of 4 feet; the overhead power cable S of the bridge has a clearance of 106 feet.

In the SW angle of the Terrebonne-Intracoastal Waterway crossing is the town of **Houma (Mile 57.6W)** which is the seat of Terrebonne Parish. Houma is an industrial and agricultural town which is also a petroleum center and a base for commercial fishing. The town has good rail freight and highway connections, a sugar mill, seafood processing, and cold-storage facilities. Gasoline, diesel fuel, water, ice, and marine supplies are available. The Houma shipyard can handle craft up to 225 feet and boatyards can handle craft up to 60 feet, and there are facilities for engine repairs. A **vessel documentation office** of the Coast Guard is in the town. (See appendix for address.)

The Southern Pacific Railroad bridge over the waterway at **Mile 58.9W** has a swing span with a clearance of 3 feet. An overhead power cable at the bridge has a clearance of 60 feet. Immediately S of the bridge **Bayou Black** branches W from the waterway and follows a winding 24-mile course through several towns and under numerous bridges and overhead cables to another junction with the waterway at **Mile 83.7W**. Dams have been constructed across the bayou at 0.5 and 4.3 miles W of the E junction of the bayou with the Intracoastal Waterway; this section of the bayou has been declared nonnavigable waters. The bayou has a depth of about 4 feet from the W dam to Gibson; thence about 8 feet to the W junction of the bayou with the Intracoastal Waterway. The minimum channel width of the swing bridges crossing the bayou is about 36 feet and the minimum clearance about 1 foot. U.S. Route 90 highway bridge crossing the bayou at Gibson has a lift span with clearances of 2 feet down and 56 feet up. (See 117.245 (a) through (e) and (j)(5), chapter 2, for drawbridge regulations.) The numerous overhead power cables crossing the bayou have a minimum clearance of 40 feet. Black Bayou has very little traffic and navigation can be difficult at times because of the many vessels that are moored in the bayou.

U.S. Route 90 runs along the E bank of the bayou and crosses over the W bank at **Gibson,** then continues on to Morgan City. A large shipyard on a basin off the bayou about 3 miles S of Gibson builds barges, crew boats, and offshore oil well structures.

The highway bridge over the waterway at **Mile 59.7W** has a swing span with a clearance of 5 feet; the overhead power cable on the SW side of the bridge has a clearance of 108 feet.

The waterway continues W through landcuts to **Mile 73.7W,** where it crosses the SE part of **Lake Hackberry;** the remains of hyacinth booms are on both sides of the lake crossing.

The waterway enters narrow **Lake Cocodrie** at **Mile 76.9W** and departs the lake at **Mile 80.4W**; the channel through the lake is well marked. The next link is **Bayou Cocodrie** ; winding Bayou Black, previously described, comes down from the N to join Bayou Cocodrie at **Mile 83.7W**.

Bayou Cocodrie joins the N loop of **Bayou Chene,** which in turn joins **Bayou Boeuf** at Mile 87.2W; this is also **L.R. Mile 0.0** of the **Landside Route,** a lesser channel that winds N through Bayou Boeuf and other waterways for 43 miles to a junction with the latter-described Morgan City-Port Allen Alternate Route.

In 1972, the Landside Route was no longer being maintained. (See Local Notice to Mariners for controlling depths.) U.S. Route 90 highway bridge over Bayou Boeuf at **L.R. Mile 1.3** has a fixed span with a clearance of 73 feet. The Southern Pacific Railroad bridge over the bayou at **L.R. Mile 1.9** has a swing span with a clearance of 6 feet; the overhead power cable 0.5 mile N of the bridge has a clearance of 120 feet. Bayou Boeuf has several oil company marine terminals and shipyards that build supply vessels, barges, and offshore oil well structures.

**Chart 11354 (880-SC).**-The Landside Route proceeds N through landcuts and through **Bayou Milhomme** to **L. R. Mile 12.0** where the waterway is crossed by a pontoon bridge. Continuing N, the route is through **Bayou Long** and **Belle River** to **L.R. Mile 23.8** where another pontoon bridge crosses the waterway.

The next passages are **Big Goddel Bayou, Little Goddel Bayou, Bay Natchez,** and **Chopin Chute.** A pontoon bridge crosses Chopin Chute at **L.R. Mile 41.3.** The Landside Route then follows a section of **Lower Grand River** and merges with the basic Morgan City-Port Allen Alternate Route at **L.R. Mile 49.2 (M.P. Mile 36.9).**

**Chart 11355 (879-SC).**-Returning to the main Intracoastal Waterway, the route W and NW from **Mile 87.2W** is through the W reach of Bayou Boeuf. The overhead power cable over Bayou Boeuf at **Mile 90.8W** has a clearance of 130 feet.

**That part of the Intracoastal Waterway from Mile 93.0W to Mile 100.0W is within the area of the Berwick Bay Vessel Traffic System (VTS). (See chapter 9 for a discussion of the Berwick Bay Vessel Traffic System and other additional information.)**

**Bayou Boeuf Lock,** at **Mile 93.0W**, is 1,156 feet long (1,148 feet usable), 75 feet wide, 13 feet over the sills, and handles lifts up to 11 feet.

A cable ferry crosses Bayou Boeuf at **Mile 94.3W.** Deep **Bayou Shaffer** branches S from **Mile 94.5W.** (See chapter 9 for more complete information.)

At **Mile 95.5W** the westernmost reach of Bayou Boeuf joins **Lower Atchafalaya River,** which is an important outlet to the Gulf. (See chapter 9.) Narrow **Berwick Bay,** a link in the Atchafalaya River System, extends N from the junction for about 2 miles. On the NE side of the junction is the port of **Morgan City (Mile 95.5W).** (See chapter 9 for port facilities, service, supplies, and repairs.)

**Chart 11354 (880-SC).-Mile 95.7W is M.P. Mile 0.0 of the Morgan City- Port Allen Alternate Route and A.R. Mile 113.3 of the Atchafalaya River Route,** both of which wind N to outlets on the Mississippi River near and above Baton Rouge. Both of the alternate routes have the same project dimensions as the basic Intracoastal Waterway. (See Local Notice to Mariners for controlling depths.)

**That part of the Morgan City-Port Allen Alternate Route from M.P. Mile 0.0 to M.P. Mile 7.0 is within the area of the Berwick Bay Vessel Traffic System (VTS). (See chapter 9 for a discussion of the Berwick Bay Vessel Traffic System and other additional information.)**

At **M.P. Mile 0.3**, the Southern Pacific vertical lift railroad bridge crosses the bay; clearances are 4 feet down and 73 feet up. U.S. Route 90 Long Allen highway bridge that crosses from Morgan City to Berwick at **M.P. Mile 0.6** has a fixed span with a clearance of 50 feet. In 1972, a fixed highway bridge with a design clearance of 73 feet was under construction about 0.2 mile above the railroad bridge.

In order to advise mariners on southbound vessels that special navigation orders are in effect, Berwick Bay Bridges Warning Light has been established at the water's edge in 29°43′02″N., 91°12′56″W. The light on a skeleton tower on piles shows two quick flashing white lights 5 feet apart with two 24-inch red fluorescent balls 5 feet apart. The light will operate 24 hours a day when special navigation orders are in effect.

The bridgetender of the Southern Pacific Railroad bridge is available on VHF-FM channels 13 (156.65 MHz) and 16 (156.80 MHz) for information regarding the lift span and marine traffic in the vicinity of the bridge.

At **M.P. Mile 1.9,** the Lower Atchafalaya River branches W and joins **Bayou Teche** (Chart 11350 (881-SC)) 8 miles from Berwick Bay. (See chapter 9 for depths, locks, bridges, overhead cables, and facilities.)

At **M.P. Mile 2.4 (A.R. Mile 115.7),** the two alternate routes separate. The Morgan City-Port Allen Alternate Route turns sharply to the E, then follows winding courses N through landcuts and bayous.

**Bayou Sorrel Lock,** at **M.P. Mile 36.4,** is 800 feet long (790 feet usable), 56 feet wide, 14 feet over sills, and handles lifts up to 21 feet.

The Landside Route, described previously, comes in from the SE and merges with the Morgan City-Port Allen Route at **M.P. Mile 36.9 (L.R. Mile 49.2)** in Lower Grand River. At **M.P. Mile 37.6,** a pontoon bridge crosses the bayou.

The M.P. route continues N through landcuts and bayous. Jack Miller Store is on the E side of the waterway at **M.P. Mile 43.6,** and **Indian Village** is on the same side at **M.P. 46.0.** An overhead power cable with a clearance of 99 feet crosses the route at **M.P. Mile 44.8.**

**Bayou Plaquemine** branches E from **M.P. Mile 46.5** and leads for 6.6 miles to **Plaquemine,** which is on the W bank of the Mississippi River 98 miles above Canal Street, New Orleans. A swing bridge with a clearance of 2 feet crosses the bayou about 0.6 mile E of its junction with Morgan City-Port Allen Alternate Route. The bayou had a reported controlling depth of about 5 feet in August 1972. **Plaquemine Lock,** formerly the N terminus of the Morgan City-Port Allen Alternate Route, is permanently closed, and two fixed bridges 0.2 mile W of the lock have clearances of 14 feet; the overhead power cables over the bayou have least clearances of 52 feet. It is advised that prior to navigating the bayou information concerning depths and local conditions be obtained from local authorities.

From **M.P. Mile 46.5,** the Morgan City-Port Allen Alternate Route continues N through parts of Bayou Grosse Tete and through the landcuts of

the **Port Allen Canal.** State Route 77 highway bridge over the waterway at **M.P. Mile 47.1** has a swing span with a clearance of 2 feet. An overhead power cable with a clearance of 117 feet crosses the waterway at **M.P. Mile 48.3.**

The Texas and Pacific Railroad bridge over Port Allen Canal at **M.P. Mile 56.0** has a lift span with clearances of 7 feet down and 73 feet up. A shipyard on the E side of the canal just below the railroad bridge has a 2,500-ton floating drydock capable of handling vessels for general repairs.

Port Allen Canal turns NE at **M.P. Mile 56.9.** An overhead power cable at **M.P. Mile 57.5** has a clearance of 92 feet. The canal turns again at **M.P. Mile 62.5** and heads SE to Port Allen Lock. The overhead power cable over the canal at **M.P. Mile 63.0** has a clearance of 90 feet. The Texas and Pacific Railroad bridge over the canal at **M.P. Mile 64.0** has a lift span with clearances of 14 feet down and 73 feet up; State Route 1 highway bridge on the SE side of the railroad bridge has a fixed span with a clearance of 65 feet.

**Port Allen Lock** at **M.P. Mile 64.2** is 1,198 feet long (1,188 feet usable), 84 feet wide, 14 feet over the sills, and handles lifts up to 47 feet. The lock is the Mississippi gateway of the Morgan City-Port Allen Alternate Route and is on the W side of the river 115 miles above Canal Street, New Orleans.

**Charts 11354 (880-SC), 11352 (1050).**-Getting back to Berwick Bay, the **Atchafalaya River Route** turns sharply to the NW at **A.R. Mile 115.7 (M.P. Mile 2.4)** and follows improved channels through **Stouts Pass** and **Sixmile Lake,** then winds N to **A.R. Mile 0.0,** which is at **Barbre Landing** 0.5 mile E of the confluence of **Atchafalaya River, Red River,** and Old River.

From **A.R. Mile 0.0,** the route leads for 5.2 miles E in Old River Canal and Old River Lock to a junction with Mississippi River which is 181 miles up the Mississippi from Canal Street, New Orleans, and 64 miles above Baton Rouge.

Old River is a 6-mile-long stream which formerly connected the Mississippi River with the Red and Atchafalaya Rivers. A dam about 1.0 mile from its E entrance prevents the Mississippi from flowing uncontrolled into the Atchafalaya Basin. An outflow channel with a control structure on the W bank of the Mississippi about 9.2 miles upriver regulates and controls the flow into the Red River.

**Old River Navigation Canal and Lock** was built to bypass the dam and permit navigation between the Mississippi, Red, and Atchafalaya Rivers. The Federal project provides for a dredged channel 12 feet deep and about 2 miles long from the Mississippi to Old River about 1.4 miles W of the dam, thence 12 feet to the junction at **Barbre Landing** with the Red and Atchafalaya Rivers at **A.R. Mile 0.0.** The lock is 1,200 feet long (1,190 feet usable), 75 feet wide, with 11 feet over the sill. A highway bridge over the lock has a lift span with a clearance of 53 feet up and zero feet down.

**Atchafalaya River** flows S into the Gulf of Mexico from its confluence with Red and Old Rivers at **A.R. Mile 0.5.** The 117-mile section, the confluence to Morgan City, has a Federal project depth of 12 feet. The controlling depths are published periodically in Navigation Bulletins issued by the New Orleans District Corps of Engineers, New Orleans, La.

**That part of the Atchafalaya River Route from A.R. Mile 113.0 to A.R. Mile 122.0 is within the area of the Berwick Bay Vessel Traffic System (VTS). (See chapter 9 for a discussion of the Berwick Bay Vessel Traffic System and other additional information.)** In 1972, the deepest draft carried on the river was 11 feet with average drafts between 5 and 6 feet. Commerce on the river is in shell, logs, petroleum products, liquid sulfur, alcohol, industrial chemicals, fertilizer, sugar, and molasses.

The minimum clearance of the overhead power cables and pipelines is 51 feet and of a fixed highway bridge 40 feet at high water stage.

A combination highway and railroad bridge crossing the river at **Simmesport** at **A.R. Mile 4.9** has a swing span with a clearance of 5 feet. A fixed highway bridge at **A.R. Mile 5.3** has a clearance of 50 feet.

Two aerial gas pipelines crossing at **A.R. Mile 28.2** have a clearance of 52 feet.

The Texas and Pacific Railroad bridge at **Melville** on the W bank at **A.R. Mile 29.5** has a vertical lift span with clearances of 3 feet down and 53 feet up.

U.S. Route 190 highway bridges at **Krotz Springs** on the W bank at **A.R. Mile 40.5** have fixed spans with a least clearance of 40 feet. An overhead telephone cable at the bridges has a clearance of 51 feet. An overhead pipeline with a clearance of 60 feet at the center crosses the river just N of the highway bridges.

The Missouri Pacific Railroad bridge at **A.R. Mile 41.5** has a swing span with a clearance of 6 feet. An overhead power cable crosses on the bridge.

At **A.R. Mile 58.0,** an overhead power cable with a clearance of 70 feet crosses the waterway. At **A.R. Mile 58.1,** a fixed highway bridge with a clearance of 52 feet crosses the waterway. At **A.R. Mile 104.5,** an overhead power cable with a clearance of 75 feet crosses the waterway.

At Morgan City, U.S. Route 90 highway bridge at **A.R. Mile 117.4 (M.P. Mile 0.6)** has a fixed span with a clearance of 50 feet. In 1972, a fixed highway bridge with a design clearance of 73 feet was under construction close S. The Southern Pacific Railroad bridge 0.3 mile S of the highway bridge has a vertical lift with a clearance of 4 feet down and 73 feet up.

**Chart 11355 (879-SC).**-Returning to Morgan City and the basic route, the Intracoastal Waterway continues SW in Lower Atchafalaya River. The overhead power cable over the river at **Mile 96.5W** has a clearance of 130 feet.

The waterway departs Lower Atchafalaya River at **Mile 98.2W** and proceeds W in **Little Wax Bayou.** The river entrance to the bayou is marked by a light. The route leaves Little Wax Bayou at **Mile 102.0W** and continues W through a landcut that crosses several other bayous. The bayou sides of most crossings may have remains of hyacinth booms.

**Chart 11350 (881-SC).**-At **Mile 107.7W,** the waterway crosses **Wax Lake** which is a deep drainage ditch. The alternate **North Channel** and **South Channel** at the crossing are no longer maintained.

The settlement of **North Bend** is at **Mile 113.0W** on the N side of the waterway. State Route 317 highway bridge over the waterway at North Bend has a lift span with clearances of 5 feet down and 80 feet up; the overhead power cables on the E side of the bridge have a clearance of 94 feet. Another overhead power cable over the waterway at **Mile 113.1W** has a clearance of 90 feet.

The waterway continues in a cut to **Bayou Bartholomew,** where a cutoff at **Mile 120.8W** leads N through Franklin Canal to Bayou Teche. (See chapter 9 for more complete information.)

At **Miles 121.4W** and **122.6W,** the remains of hyacinth booms block the entrances to **Mud Lake.**

At **Mile 122.9W,** the waterway is crossed by a cut which leads SW through The Jaws to West Cote Blanche Bay (see chapter 9) and NE for 5.5 miles through Charenton Canal to Bayou Teche, 0.5 mile below **Baldwin.**

**Charenton Canal** (see also chart 11345 (1051)) had a controlling depth of 9 feet in June 1974, to Bayou Teche. The canal is crossed at the upper end by a railroad bridge with a swing span clearance of 5 feet and a highway bridge with a fixed span clearance of 50 feet; cables over the canal have clearances greater than 50 feet.

At **Mile 129.7W,** the waterway is crossed by a ferry.

A highway bridge over the waterway at **Cypremort, Mile 134.0W,** has a swing span with a clearance of 4 feet. The overhead power cable about 0.1 mile E of the bridge has a clearance of 90 feet.

**Weeks,** on the E side of the waterway at **Mile 137.2W,** is the site of the largest salt mine in Louisiana. Just N of the village, at **Mile 138.6W, Vermilion Bay** is entered through Weeks Bayou; the route N to Port of New Iberia is at **Mile 140.4W** through a cut to **Bayou Jack Canal.** (See chapter 9 for more complete information.)

At **Mile 145.8W,** the waterway is crossed by **Bayou Petite Anse** leading N through connecting canals to Avery Island and Delcambre; Avery Canal connects with the bayou S of the waterway to provide a passage to Vermilion Bay. (See chapter 9 for more complete information.)

Between **Miles 159.0W** and **160.2W,** the waterway passes through a cut in Vermilion River. At **Mile 159.0W,** Vermilion River Cutoff leads SE to Vermilion Bay. Tows using the waterway should use extreme caution because of strong currents in Vermilion River. During flood stages, loaded westbound tows should not attempt to cross the river without assistance. Eastbound tows should hold close to the N bank well before entering the river until past the junction.

Repair facilities are available at **Perry** and **Abbeville,** 19 to 21 miles N of the waterway on Vermilion River. Gasoline and marine supplies are also available at Abbeville. (See chapter 9 for more complete information.)

**Intracoastal City,** on the N side of the waterway at **Mile 160.0W,** is a base for oil-field exploration and development with boatyards and marinas with several boat slips having depths of 7 feet. Available supplies include gasoline, diesel fuel, water, ice, and some marine supplies. Repair facilities include a 1,250-ton floating drydock. (See chapter 9 for more complete information.) State Route 333 highway leads to the settlement.

**At Mile 161.0W, Schooner Bayou Cutoff** leads SW from the waterway through connecting canals to White Lake or to the Gulf through Freshwater Bayou Canal. (See chapter 9 for more complete information.)

**Vermilion Lock,** at **Mile 162.5W,** is 1,182 feet long, 56 feet wide, 11 feet over the sills, and handles lifts up to 5 feet. The lock prevents saltwater from entering rice fields to the W. Small boats may anchor or tie up alongside the banks in a small dredged slip at each end of the lock.

**Chart 11348 (883-SC).**-A pontoon drawbridge crosses the waterway at **Forked Island,** Mile **169.8W.** An oil company slip and wharves are just NW of the bridge, at **Mile 169.9W.** In 1973, a fixed highway bridge with a design clearance of 73 feet was under construction across the waterway at **Mile 170.3W.** An overhead power cable with a clearance of 97 feet crosses at **Mile 170.6W.** A cable ferry crosses at **Mile 172.1W.**

A cable ferry crosses the waterway at Mile **178.4W.** An overhead power cable over the waterway at **Mile 184.6W,** W of Florence Canal, has a clearance of 90 feet.

A marine fuel and supply facility, at **Mile 193.2W,** monitors VHF-FM channel 16 (156.80 MHz) continuously. Gasoline, diesel fuel, and groceries are available at the facility's pier, which had a reported depth of 12 feet alongside in August 1972. Welding equipment is available for above-the-waterline repairs. Diesel fuel by barge in midstream and a 300 hp tug are also available.

The waterway crosses **Mermentau River** between **Miles 201.6W** and **202.5W** and continues W in a landcut. The Mermentau River is navigable for more than 32 miles N of the crossing. S of the waterway, the river leads through Grand Lake to

the Gulf. (See chapter 9 for more complete information.)

**Bayou Lacassine** (see also chart 11345 (1051)) crosses the waterway at **Mile 205.1W**. N of the crossing, the bayou had a centerline controlling depth of 6 feet in February 1972, for about 15 miles to Hayes. Many of the bends have been cut through to provide a shorter route. A highway bridge over Bayou Lacassine, about 3 miles S of Hayes, has a swing span with a clearance of 5 feet. The Southern Pacific Railroad bridge over the bayou near Hayes has a swing span with a clearance of 3 feet. (See 117.245 (a) through (e) and (j)(19) and (20), chapter 2, for drawbridge regulations.) S of the waterway, Bayou Lacassine flows through **Mud Lake** into Grand Lake.

At **Miles 211.5W** and **212.7W**, a canal on the S side of the waterway leads to **Little Lake Misere**, thence E through **The Narrows** to **Lake Misere** and **Bayou Misere** to Mud Lake. The waterway arcs to the N in this section. **Bell City Drainage Canal** crosses the waterway at **Mile 212.3W**.

A pontoon drawbridge crosses the waterway at **Gibbstown, Mile 219.8W**. An overhead power cable on the E side of the bridge has a clearance of 120 feet. In 1974, a fixed highway bridge with a design clearance of 73 feet was under construction just W of the pontoon bridge.

At **Mile 221.9W**, an overhead power cable with a clearance of 219 feet crosses the waterway.

The loading docks and tanks of an oil company are on the N side of the waterway at **Mile 223.3W**; a cut here leads to **Sweet Lake**.

A pontoon bridge crosses the waterway at **Grand Lake Ridge, Mile 231.5W**; the overhead power cable on the S side of the crossing has a clearance of 90 feet. A loading dock is near the crossing.

A cable ferry crosses the waterway at **Mile 237.7W**.

**Calcasieu Lock, Mile 238.2W**, is 1,206 feet long (1,194 feet usable), 75 feet wide, 13 feet over the sills, and handles lifts up to 4 feet. The lock prevents saltwater from entering rice fields to the E.

The waterway enters **Calcasieu River** at **Mile 239.2W** and continues N around a bend in the river across deep Calcasieu Channel to Choupique Cutoff. Vessels and tows are advised to use caution at the junctions. A fuel dock, at which diesel fuel is available by barge, and a shipyard which has a 2,000-ton floating drydock are at Calcasieu Landing on the W side of the Calcasieu River just N of its junction with Choupique Cutoff. The fuel dock monitors VHF-FM channel 16 (156.80 MHz) continuously. (See chapter 9 for more complete information on Calcasieu River.)

**Lake Charles** (chart 11347 (651-SC)), 9.8 miles up Calcasieu River from the waterway junction at **Mile 241.2W**, has numerous boat landings along the shore of Lake Charles. Good anchorage in depths of 8 to 10 feet is available in the lake. Berthing and repair facilities, marine supplies, gasoline, and diesel fuel are available. (See chapter 9 for more complete information.)

**Chart 11331 (885-SC).**-From **Mile 241.2W**, the waterway passes through Choupique Cutoff and the long landcut **Lake Charles Deepwater Channel** for 24 miles to the Sabine River at Orange.

**Bayou Choupique** (see also chart 11348 (883-SC)) is part of the waterway between **Miles 241.8W** and **242.4W**. The 12-foot deep exit leads to Calcasieu Channel while the W exit passes through marshland for many miles. The controlling depth in the W branch is about 8 feet to the highway bridge 2.5 miles above the junction; the bridge has a swing span with a width of 45 feet and a clearance of 1 foot in the S draw. (See 117.245 (a) through (e) and (j)(18), chapter 2, for drawbridge regulations.) An overhead power cable on the W side of the bridge has a clearance of 62 feet.

At **Mile 243.3W, Old Canal** leads E to the Calcasieu Channel. In 1965, the controlling depth was 9 feet.

At **Mile 243.8W**, a highway lift bridge with a clearance of 75 feet down and 135 feet up crosses the waterway. An overhead power cable NW of the bridge has a clearance of 139 feet.

A cable ferry crosses the waterway at **Gum Cove Ridge, Mile 254.1W**.

**Vinton Canal**, crossing the waterway at **Mile 258.4W**, had a controlling depth of 4 feet in February 1974, to the highway bridge about 6.8 miles N of the junction. The canal connects with **Black Bayou** S of the waterway. An overhead power cable with a clearance of 151 feet crosses the waterway at **Mile 260.1W**.

At **Mile 264.8W**, the waterway enters **Sabine River** and continues around the S bend of the river to the deep ship channel.

**Orange**, 0.9 mile up the Sabine River Ship Channel from the waterway junction at **Mile 266.0W**, has repair facilities, marine supplies, and gasoline. (See chapter 10 for more complete information.)

From **Mile 266.0W**, the waterway continues for 22 miles down the Sabine River Ship Channel and the Sabine-Neches Canal to a junction with Port Arthur Canal at Port Arthur.

**Adams Bayou**, at **Mile 266.8W**, and **Cow Bayou**, at **Mile 269.5W**, both on the N side of the waterway, are described in chapter 10. An overhead power cable with a clearance of 172 feet crosses the waterway at **Mile 267.8W**.

At **Mile 276.5W**, a 15.9-mile channel leads up the **Neches River** to the port facilities at **Beaumont**. (See chapter 10 for more complete information.)

**Port Arthur**, between **Miles 279.8W** and **288.5W** (junction with Port Arthur Canal), has complete repair facilities, marine supplies, gasoline, and diesel fuel at places along the Sabine-Neches Canal and in Taylor Bayou. (See chapter 10 for more complete information.)

A fixed highway bridge across the waterway at **Mile 286.3W** has a clearance of 136 feet.

The waterway leaves the Sabine-Neches Canal at **Mile 288.6W** and continues for about 61 miles through a landcut to Galveston Bay.

State Route 87 highway bridge across the waterway at **Mile 288.8W** has a fixed span with a clearance of 73 feet. The overhead power cable W of the bridge has a clearance of 125 feet.

A small-boat basin on the S side of the waterway at **Mile 288.9W** has berthing facilities for craft drawing up to 5 feet. Berths, electricity, water, and a 15-ton portable lift are available; hull repairs can be made.

A spillway at **Mile 292.4W** contains **Shell Lake** and other lakes S of the waterway. Floodgates on the S side of the waterway at **Mile 305.4W** contain **Star Lake.**

At **Mile 314.1W**, dirt ramps of a cattle crossing are on either side of the waterway.

A highway bridge over the waterway at **Mile 319.3W** has a swing span with a clearance of 10 feet. Overhead power cables E and W of the highway bridge have clearances of 83 and 110 feet, respectively.

An oil loading terminal is in a slip on the N side of the waterway just E of the highway bridge. **High Island,** on the highway 1.5 miles S of the waterway, is an oil-producing center with numerous oil wells, but has no facilities for passing craft. A landing for shallow-draft boats is at **Mile 321.3W.** At **Mile 322.3W,** an overhead power cable has a clearance of 93 feet.

The waterway passes through two marked cuts in the SE part of shallow **East Bay** between **Miles 325.7W** and **329.7W.** Berthing facilities for shallow-draft boats are in slips on each side of the waterway.

An oil-loading terminal is at **Mile 333.2W** on the SE side of the waterway. The waterway continues SW to Port Bolivar and Galveston Bay. Basins along this part of the waterway have several marinas where berths, gasoline, diesel fuel, water, ice, launching ramps, and marine supplies can be obtained. A marina at **Mile 342.9W,** on the SE side of the waterway can accommodate craft drawing up to 5 feet, and has facilities for handling craft up to 55 feet for hull and engine repairs. A channel leading from Galveston Bay through **Sievers Cove** to the waterway, about **Mile 343.2W,** is marked on both sides by piles. In 1970, 4½ feet was reported available in the channel.

**Charts 11326 (152-SC), 11324 (518), 11325 (518-SC), 11331 (885-SC), 11322 (887-SC).-Port Bolivar** is at **Mile 348.3W** on the SE side of the waterway and is near the SW end of **Bolivar Peninsula.** Gasoline, diesel fuel, and water are available at some of the town landings.

The waterway leaves the Bolivar cut and enters **Galveston Bay** at **Mile 349.3W.** The direct route bypasses Galveston and proceeds SW through the lower part of the bay. **Houston Ship Channel** is crossed at **Mile 350.2W;** the port of **Houston** is 43 miles to the NW. (See chapter 10.) The channel to Texas City is crossed at **Mile 350.8W;** the port is 5 miles to the WNW. (See chapter 10 for more complete information.)

There is a dry storage marina on the end of the Texas City Dike, about 0.6 mile NW of the junction with Texas City Channel. Gasoline, diesel fuel, water, ice, and marine supplies are available. A depth of 6 feet was reported alongside the fuel dock and in the approach channel in September 1972.

The basic route of the waterway continues SW through dredged cuts to the bridges that separate Galveston Bay from West Bay.

An alternate route of the waterway at **Mile 349.3W** swings S in **Bolivar Roads** then SW in Galveston Channel. The port of Galveston at **Mile 353.5A** is on the S side of **Galveston Channel.** (See chapter 10 for port facilities, services, supplies, and repairs.) The **Pelican Island** railroad-highway bridge over Galveston Channel at **Mile 356.0A** has a bascule span with a clearance of 12 feet. **Caution:** The open bascule span overhangs the channel above a vertical clearance of 75 feet. (See 117.553, chapter 2, for drawbridge regulations.) An overhead power cable close E of the bridge has a clearance of 85 feet. The alternate route leaves the port's deep water at the bridge and proceeds W in dredged cuts to rejoin the waterway at **Mile 356.4W.**

The rail-highway bridge over the waterway at **Mile 357.2W** has a bascule span with a clearance of 7 feet. Mariners may contact the bridgetender on VHF-FM channel 14 (156.70 MHz) or channel 16 (156.80 MHz) for information regarding the operation of the span. The overhead power cable on the SW side of the bridge has a clearance of 99 feet. The two fixed bridges at **Mile 357.3W** have a clearance of 73 feet.

W of the bridges, a marked channel leads SE from **Mile 357.7W** to **Offatts Bayou** which is one of the principal bases for Galveston pleasure and fishing craft. (See chapter 10 for channel depths, services, supplies, and repairs.)

**Chart 11322 (887-SC).**-The waterway continues W through dredged cuts between **North Deer Island** and **Tiki Island** in the NE part of West Bay. A marina is on Tiki Island. (See chapter 10 for channel depths, services, supplies, and repairs.) At **Mile 362.8W,** the waterway enters a 12-mile cut which is never more than 0.2 mile behind the NW shore of West Bay.

At **Mile 374.7W,** the waterway leaves the landcut and crosses the NW end of West Bay through a buoyed channel with range lights at each end. Marked channels to **Chocolate Bay** lead N from the waterway at **Miles 375.7W** and **376.3W.** Gasoline, water, berths, supplies, and repair facilities are

available at marinas on Chocolate Bayou. (See chapter 10 for more complete information.)

San Luis Pass and tributaries to the W part of West Bay are described in chapter 10.

From **Mile 377.9W**, the waterway enters a landcut which passes through and across shallow bays, bayous, and rivers for 33 miles to **Mile 411.3W** at the NW end of Cedar Lakes.

**Oyster Creek**, emptying into the waterway at **Mile 392.2W**, about 2.5 miles NE of Brazosport, is a tortuous stream of no importance used as a storm refuge by small craft. Overhead power cables with clearances of 50 feet and 45 feet cross the creek about 0.3 mile and 3.2 miles, respectively, above the mouth. State Route 523 highway bridge crosses the creek about 2.5 miles above its mouth. The bridge has an 18-foot span with a clearance of 12 feet. A reported depth of about 2 feet could be carried to this bridge in September 1972. Marinas on either side of the creek can provide gasoline, diesel fuel, water, ice, marine supplies, open and covered berths with electricity, and a surfaced launching ramp. A 10-ton mobile lift can handle craft up to 30 feet for general repairs or storage.

The highway bridge across the waterway at **Mile 393.8W** has a fixed span with a clearance of 73 feet. The overhead power cable on the W side of the bridge has a clearance of 97 feet.

There are numerous marinas and boatyards along the waterway between the entrance to Oyster Creek and the Freeport Entrance Channel. Gasoline, diesel fuel, berths, marine supplies, and complete repair facilities are available. Reported depths of from 5 to 12 feet are alongside these facilities. Marine railways and lifts can handle craft up to 65 feet for general repairs.

An overhead telephone cable with a clearance of 74 feet crosses the waterway at **Mile 394.8W**.

At **Mile 394.8W**, the private canal on the N side of the waterway is closed to the public by a gate across the entrance.

**Freeport**, 2 miles up Old Brazos River from the waterway junction at **Mile 395.1W**, has berthing and repair facilities, gasoline, diesel fuel, and marine supplies. (See chapter 11 for more complete information.)

An overhead power cable with a clearance of 108 feet crosses the waterway at **Mile 395.6W**. A pontoon drawbridge crosses at **Mile 397.6W**.

The waterway crosses the **Brazos River** at **Mile 400.8W**. The 75-foot-wide floodgates on both sides of the river control waterway traffic when crossing conditions are hazardous because of strong current velocities. (See 207.180 and 207.187, chapter 2, for regulations governing the use, administration, and navigation of the floodgates; local information is issued by the Galveston District Engineer, Corps of Engineers.)

The lockmasters monitor VHF-FM channels 13 (156.65 MHz) and 16 (156.80 MHz) continuously and may be reached by telephone (East Gate, 713-233-1251; West Gate, 713-233-5161). Mooring piles are on both sides of the waterway on the canal sides of the floodgates for the mooring of vessels when the floodgates are closed or when tows are limited. (Brazos River is described in chapter 11.)

The waterway crosses **San Bernard River** at **Mile 405.0W**. Operators of small craft are advised to be on the lookout for logs and floating debris in the waterway between Brazos River and San Bernard River. A fuel pier on the W side of the river's junction with the waterway had a reported depth of 5 feet alongside in September 1972. Gasoline, diesel fuel, and water are available. (San Bernard River is described in chapter 11.)

**Chart 11319 (889-SC).**-The waterway continues in a landcut from the N side of Cedar Lakes to **Mile 420.5W** where it follows a cut along the N shores of shallow East Matagorda Bay and Matagorda Bay for 35 miles, thence across the open waters of Matagorda Bay to Port O'Connor. Prolonged E winds will create a difference in water level between East Matagorda Bay and Matagorda Bay, thus causing strong W currents in the waterway.

The overhead power cable over the waterway at **Mile 417.9W** has a clearance of 73 feet. A pontoon drawbridge crosses at **Mile 418.0W**. Another power cable on the W side of the bridge has a clearance of 94 feet. Gasoline, ice, and limited berths are available from a small marina just W of the bridge. Depths of about 4 feet were reported alongside the facility in September 1972.

The entrance to **Caney Creek** at **Mile 419.9W** was reported closed in 1969. The creek can be entered through **Caney Creek Cutoff**. The cutoff crosses the waterway through a 0.5-mile canal leading to **East Matagorda Bay** at Mile **420.4W**. In 1969, shoaling was reported at the junction of Caney Creek and Caney Creek Cutoff. Above the junction, a depth of 3 to 4 feet can be taken up the creek to a bridge 25 miles above the waterway. The fixed highway bridge 9 miles above the waterway and 2 miles below **Sargent**, has a 28-foot fixed span with a clearance of 10 feet. Several fish camps along the creek have gasoline and launching ramps.

**Live Oak Bayou** crosses the waterway at **Mile 427.8W** and empties into East Matagorda Bay. There is a fish camp on the bayou about 1.0 mile above the crossing at which gasoline, water, ice, and a launching ramp are available. It is accessible by small outboards only.

There is an abandoned boat basin and bulkhead at **Old Gulf** on the N side of the waterway at **Mile 435.7W**. A channel opposite Old Gulf leads S from the waterway into East Matagorda Bay. This channel had a reported controlling depth of about 7 feet in September 1972, with shoaler depths in the bay.

An oil-loading terminal is on the N side of the waterway at **Mile 438.6W**.

The overhead power cable over the waterway at **Mile 440.7W** has a clearance of 71 feet. A pontoon drawbridge crosses at **Mile 440.7W**.

**Matagorda,** a small fishing and oystering fleet base, is on the N side of the waterway at **Mile 440.7W**. Gasoline, diesel fuel, water, ice, marine supplies, and a launching ramp are available. A depth of 3 feet is reported available alongside. A small boatyard at Matagorda can handle craft up to 40 feet.

**Colorado River Locks,** at **Miles 441.1W** and **441.8W**, are 1,200 feet long, 75 feet wide, with 15 feet over the sills. The locks control the waterway traffic when crossing conditions are hazardous because of strong current velocities. (See 207.180 and 207.187, chapter 2, for regulations governing use, administration, and navigation of floodgates and locks; local information is issued by the Galveston District Engineer, Corps of Engineers.)

The lockmaster may be contacted by telephone (713-863-7842) or radiotelephone. The lockmaster monitors VHF-FM channels 13 (156.65 MHz) and 16 (156.80 MHz) continuously. Mooring piles are on both sides of the waterway on the canal sides of the locks for mooring vessels when the locks are closed or when tows are limited.

**Colorado River** crosses the waterway at **Mile 441.5W** and enters the Gulf through a 5.8-mile flood discharge channel in the isthmus separating East Matagorda Bay and Matagorda Bay. The channel was formerly used by the Matagorda fishing fleet. In 1972, the entrance from the Gulf was reported closed because of heavy silting and sandbars. The E side of the river has fish camps where gasoline, water, ice, launching ramps, and berths are available.

A dredged channel leads N from the Intracoastal Waterway for 13.5 miles to a turning basin at the Matagorda Navigation District No. 2 Bay City Barge Terminal. In September-October 1974, the midchannel controlling depth was 7 feet from the Intracoastal Waterway to the turning basin with 9 feet in the basin. The head of navigation in the river is just above the turning basin. The channel is marked by daybeacons as far as the turning basin.

Overhead power cables crossing the Colorado River just above its junction with the waterway and about 6 miles above the junction with the waterway have clearances of 92 and 74 feet, respectively. A cable ferry also crosses the river about 6 miles above the junction with the waterway. On the E side of the river, a small-craft facility, just N of the cable ferry, has gasoline, diesel fuel by truck, water, berths with electricity, and a launching ramp. Piling from a former bridge are reported about 1 mile N of the cable ferry. A highway bascule bridge about 8 miles above the waterway has a clearance of 28 feet. An overhead power cable immediately N of the bridge has a clearance of 76 feet. Boat operators should be on the lookout for logs and floating debris in the river and discharge channel.

**Bay City Barge Terminal Wharf** is 200 feet long with a concrete apron and a transit shed with 32,000 square feet of storage space. The wharf has a barge loading ramp and oil handling pipe connection on a lower level below the main wharf apron. In October 1972, a private petroleum wharf was under construction. In October 1972, depths of 9 feet were reported alongside the facilities. The Matagorda County Navigation District's Port Director is in charge of operations.

**Bay City,** the county seat of Matagorda County, is about 7 miles N of the terminal. It is a center for cattle, cotton, petroleum, natural gas, sulfur, and petrochemicals. The Missouri Pacific, Southern Pacific, and Santa Fe Railroads, and an interstate busline serve the city. Two main State highways pass through the city. Bay City has an inflatable dam in the river which is inflated during the growing season to impound water for irrigation purposes.

At **Mile 455.6W**, the waterway enters the open waters of **Matagorda Bay** through a well-marked channel and continues across the bay for 19 miles to Port O'Connor. Openings are provided through the spoil banks on the N side of the waterway for passage in depths of 4 to 10 feet through the open waters of the bay to Tres Palacios Bay and Lavaca Bay; however, marked channels lead to Tres Palacios Bay and Lavaca Bay at **Miles 466.1W** and **470.9W**, respectively. (See chapter 11 for more complete information.)

Emergency moorings have been established on the S side of the landcut S of Oyster Lake to enable vessels and tows to tie up when it becomes unsafe to proceed through the open waters of Matagorda Bay. These facilities are for temporary use only, and at all other times the fairway must be kept open.

At **Mile 470.9W**, the waterway crosses the Matagorda Ship Channel. Small craft should not anchor in the area between the waterway and the entrance to the landcut through Matagorda Peninsula due to the turbulence reported in the waters in the area.

**Charts 11319 (889-SC), 11315 (891-SC).**-The entrance channel to Port O'Connor is between jetties with lights off their outer ends at the SW end of Matagorda Bay. Berthing facilities, gasoline, diesel fuel, and marine supplies are available. (See chapter 11.) An overhead power cable with a clearance of 88 feet crosses the waterway at **Mile 473.3W**.

**Storm warning signals are displayed.** (See chart.)

From Port O'Connor, the waterway passes through a cut along the N shore of Espiritu Santo Bay for about 18 miles to San Antonio Bay.

At **Mile 478.5W**, a marked channel across Espiritu Santo Bay leads to a military base on Matagorda Island. (See chapter 11 for more complete information.)

Gasoline and a launching ramp are available at a small-boat basin on the N side of the waterway at **Mile 485.2W**. In October 1972, a depth of 2½ feet was reported alongside the fuel dock.

**Chart 11315 (891-SC).**-At **Mile 491.8W**, the waterway enters the open waters of shallow **San Antonio Bay** through a well-marked channel. Marked channels lead N from **Miles 491.8W** and **492.5W** to **Seadrift** and other places in the bay. (See chapter 11 for more complete information.)

At **Mile 500.0W**, the waterway leaves San Antonio Bay and passes through landcuts and buoyed channels in shallow bays for about 11 miles to Aransas Bay. The **Aransas Migratory National Waterfowl Refuge** is on the N side of the waterway at the E end of the landcut. With a prevailing S wind, vessels may be set into the shallow depths of the bays through this section of the waterway. Mariners are advised to keep in the channel and favor the aids on the S side.

**Chart 11314 (892-SC).**-At **Mile 511.1W**, the waterway enters the open waters of **Aransas Bay** and continues across the bay in a well-marked channel. Marked openings in the spoil banks on the NW side of the waterway provide passage in depths of 3 to 12 feet to Rockport and other places in Aransas Bay. (See chapter 11 for more complete information.)

At **Mile 522.7W**, an alternate route of the waterway continues SW and S through Lydia Ann Channel to Aransas Pass. The main route of the waterway swings W and follows a cut along the NW shore of Redfish Bay to Corpus Christi Bay.

**Rockport**, 1.5 miles NW of **Mile 524.0W**, has berthing and repair facilities, gasoline, diesel fuel, and marine supplies. (See chapter 11 for more complete information.)

**Storm warning signals are displayed.** (See chart.)

Boat operators are advised to stay in the waterway channel throughout the cut in Redfish Bay to avoid rock formations that may project from the channel slopes.

**Cove Harbor, Mile 525.6W**, is a commercial basin off the waterway about 2.5 miles S of Rockport Harbor. There are two slips in the basin and berthage along the bulkhead of the basin and in the slip. In October 1972, there was about 12 feet reported in the entrance and 10 to 11 feet reported in the basin. There are several offshore oil supply facilities around the basin. Gasoline, diesel fuel, water, ice, covered berths, and launching ramps are available.

**Palm Harbor, Mile 527.5W**, is a yacht basin in a dredged slip 0.3 mile long off the waterway about 1.5 miles SSW of Cove Harbor. A depth of 6 feet was reported in the basin and entrance channel in October 1972. Gasoline, water, ice, open and covered berths, marine supplies, and a launching ramp are available at the basin.

At **Mile 532.9W**, the waterway crosses Aransas Channel which leads W to the town of **Aransas Pass** and E to the Gulf through Aransas Pass. Repair facilities, gasoline, diesel fuel, and marine supplies are available at the town. (See chapter 11 for more complete information.)

**Storm warning signals are displayed.** (See chart.)

The fixed highway bridge across the waterway at **Mile 533.1W** has a clearance of 48 feet. Overhead power cables just SSW of the bridge have a clearance of 61 feet.

At **Mile 534.0W**, the waterway is crossed by a dredged channel; NW of the waterway, the channel leads to a small-boat basin at the town of Aransas Pass. The channel S leads through Redfish Bay to Corpus Christi Bay.

**Chart 11308 (893-SC).**-At **Mile 539.5W**, the waterway joins Corpus Christi Channel and follows it for a short distance before turning SE in Corpus Christi Bay at **Mile 543.5W** to Laguna Madre. At **Miles 539.6W** and **540.7W**, dredged channels lead from the waterway to a barge assembly basin off the S side of Corpus Christi Channel. In March 1970, depths of 14 feet were available in the basin.

**La Quinta** (chart 11309 (523)), 4.7 miles NNW of **Mile 541.0W**, is reached through deep La Quinta Channel.

**Corpus Christi** (charts 11309 (523), 11311 (524)), 9.5 miles W of **Mile 541.6W**, has complete berthing and repair facilities, gasoline, diesel fuel, and marine supplies. Corpus Christi and other places in Corpus Christi Bay are described in chapter 11.

From the Corpus Christi junction, the waterway continues S in an arced channel marked by lights and buoys to **Mile 543.5W** where it crosses the open water of Corpus Christi Bay in a SE direction in depths of 12 feet to Laguna Madre.

At **Mile 549.7W**, the waterway enters a well-marked channel that extends for 120 miles through shallow **Laguna Madre** to Port Isabel.

At **Mile 551.0W**, an overhead power cable crossing from the mainland to Mustang Island is submerged at the channels into Laguna Madre. An overhead power cable crossing the waterway at **Mile 552.9W** has a clearance of 93 feet.

John F. Kennedy Causeway, extending across Laguna Madre, has a fixed bridge over the waterway with a clearance of 73 feet at **Mile 554.7W**. Another opening in the causeway, 1.8 miles to the W, has a fixed span with a clearance of 11 feet. An overhead power cable crossing the waterway on the N side of the causeway at **Mile 554.7W** has a clearance of 91 feet.

Between **Miles 554.1W** and **562.9W** on both sides of the waterway are numerous marked and unmarked private channels which lead through an area obstructed by oil wells and pipelines to private petroleum facilities.

**Charts 11308 (893-SC), 11306 (895-SC).-Baffin Bay**, extending W from **Mile 581.7W**, is a commercial and sport fishing area, and the site of oil exploration and drilling. A marked private natural channel with reported depths of 3 feet in October 1972 extends W up Baffin Bay for about 14 miles to a small-craft facility at Riviera Beach on the N side of the entrance to Laguna Salada. Minor services and a launching ramp are available at the facility. Strangers are advised to keep in the marked channel because of the many sunken rocks and other obstructions in the bay. A privately marked natural channel with reported depths of 6 feet in October 1972 extends 4 miles farther up Laguna Salada to a boat basin and boatyard. The boatyard that builds boats can handle craft up to 50 feet or 20 tons using a large trailer for hull and engine repairs. Gasoline, diesel fuel, water, ice, electricity, and a launching ramp are available during daylight.

At **Mile 586.8W**, a privately marked channel extends E from the waterway to an oil company facility on Padre Island. In May 1968, the channel had a controlling depth of 4 feet. The oil storage tanks and a 135-foot tower at the facility are prominent.

**Yarborough Pass** to the E of the oil facility, and at one time connecting the Gulf with the Intracoastal Waterway across Padre Island, has filled in at the E end and is no longer discernible.

Between **Miles 590.0W** and **614.0W**, the waterway passes through a long cut in the sand and mud of Laguna Madre. In this stretch, private short oil company side channels extend on either side of the waterway.

**Charts 11305 (896-SC), 11303 (897-SC).-Port Mansfield**, 1 mile W of **Mile 631.7W**, has berthing and repair facilities, gasoline, diesel fuel, and limited marine supplies. (See chapter 11 for more complete information.)

**Storm warning signals are displayed.** (See chart.)

At **Miles 645.9W** and **646.5W**, **Arroyo Colorado Cutoff** leads W from the waterway and joins Arroyo Colorado to form a route to **Rio Hondo** and **Port Harlingen.** (See chapter 11 for more complete information.)

**Chart 11302 (898-SC).**-At **Mile 667.4W** the fixed span of the causeway crossing the waterway has a clearance of 73 feet.

At the S end of Laguna Madre at **Mile 667.8W**, the waterway enters a reverse curve cut between Port Isabel and **Long Island**, and joins deep Brownsville Ship Channel at **Mile 670.4W.**

The pontoon drawbridge across the waterway at **Mile 667.9W** connects Port Isabel with Padre Island by a causeway over the S end of Laguna Madre. A fixed 38-foot span opening at the E end of the causeway has a clearance of 18 feet. A launching ramp is on the E end of the causeway.

**Port Isabel, Mile 668.5W**, has berthing and repair facilities, gasoline, diesel fuel, and marine supplies. (See chapter 11 for a discussion of Port Isabel.)

From **Mile 670.4W**, the waterway follows the Brownsville Ship Channel for 13 miles to Port Brownsville.

**Port Brownsville**, at **Mile 683.8W**, the W terminus of the Intracoastal Waterway, and the city of **Brownsville**, 5 miles WSW of the port, are described in chapter 11.

# 13. PUERTO RICO

This chapter describes the islands of the Commonwealth of Puerto Rico, which includes Puerto Rico, Mona, Vieques, Culebra, and a few smaller islands. Port information is provided for San Juan, Fajardo, Radas Roosevelt (Roosevelt Roads), Yabucoa, Laguna de Las Mareas, Bahia de Jobos, Ponce, Guayanilla, Guanica, Mayaguez, Arecibo, Isabel Segunda, Ensenada Honda, and other smaller ports.

**Nine hundred miles** ESE of Key West, Fla., is the island of **Puerto Rico,** which was ceded to the United States in 1898. Puerto Rico is the smallest and easternmost of the **West Indies** group known as the **Greater Antilles;** the larger islands are Cuba, Jamaica, and Hispaniola. To the N of Puerto Rico is the Atlantic Ocean, and on the S is the **Caribbean Sea.**

Puerto Rico formerly was administered under the Jones Act of March 2, 1917, which extended United States citizenship to all Puerto Ricans. On July 25, 1952, the island was formally proclaimed a free Commonwealth, voluntarily associated with the United States. Under the Constitution of Puerto Rico, the people of the Commonwealth elect a governor and a legislature for 4-year terms. The Legislature has an upper house, or senate, and a house of representatives. The people also elect a Resident Commissioner who speaks in the U.S. House of Representatives but does not vote.

Puerto Rico, the big island, is about 96 miles long, W to E, and about 35 miles wide. The interior of Puerto Rico is mountainous and very rugged. The highest mountains are nearer the S and E coasts and have elevations up to 4,400 feet. There are many fertile valleys, and along the coasts are more or less narrow strips of lowland from which the higher land rises abruptly.

The sea bottom is similar to the land. Close to the island are narrow banks from which the bottom pitches off rapidly to great depths. Under favorable conditions, the shoals frequently are marked by a difference in the color of the water.

**Caution.**-Mariners are advised that local fishermen commonly mark the position of their fish nets and fishtraps with plastic bleach bottles. Care should be taken to avoid destroying this fishing gear.

Puerto Rico has several hundred streams, some of good size, but none are navigable for anything but small boats. The mouths of the streams generally are closed by bars except during short periods of heavy rainfall. From the location of the mountain divides, the streams on the S and E sides of the island are short and fall rapidly to the sea, whereas those on the N and W sides are longer and slope more gently.

**Boundary lines of inland waters.**-At all buoyed entrances from seaward to bays, sounds, rivers, or other estuaries of Puerto Rico for which specific lines are not described, **Inland Rules** apply shoreward of the outermost buoy or other aid to navigation of any system of aids; **International Rules** apply outside the aids. Specific lines are described in **Part 82,** chapter 2.

**Control over movement of vessels.**-(See **Part 124,** chapter 2, for regulations requiring advance notice of vessel's time of arrival to Captain of the Port.)

**Anchorages.**-Under ordinary conditions, the first requirement for anchorage is shelter from the E trade winds. Anchorages are numerous except along the N coast. Strong N winds and heavy seas may occur from November to April. During the hurricane season gales may strike from any direction. The best hurricane harbors are Bahias San Juan, Guanica, Guayanilla, and Jobos, and Ensenada Honda (on Isla de Culebra).

**Tides.**-The periodic range of tide around Puerto Rico is only about 1 foot. The actual fluctuations in the water level consequently depend largely upon the winds and other meteorological conditions. The tide is chiefly semidiurnal along the N and W coasts of Puerto Rico, whereas it is more or less diurnal along the Caribbean coast.

**Currents.**-Along the Atlantic and Caribbean coasts of Puerto Rico, the currents are greatly influenced by the trade winds. In general, there is a W drift caused by prevailing E trade winds; the velocity averages about 0.2 knot and is said to be strongest near the island. A decided W set has been noted near the 100-fathom curve along the Caribbean coast from Isla Caja de Muertos to Cabo Rojo. Offshore of Bahia de Tallaboa a current of 0.5 knot has been observed setting NE across and against the E wind. With variable winds or light trade winds it is probable that tidal currents are felt at times along the Atlantic and Caribbean coasts of Puerto Rico. Currents are weak in the passage N of Isla Caja de Muertos and Cayo Berberia.

Predictions of the tidal current in Canal Guanajibo and at three locations off the E coast of Puerto Rico may be obtained from the Tidal Current Tables. The times of slack water and of maximums of flood and ebb in the middle of Canal de la Mona are 2 to 3 hours later than in Canal Guanajibo. The times of S and N currents in the passages E of Puerto Rico, as far as Isla Culebrita, are believed to be about the same as the times of W and E currents, respectively, in Pasaje de Vieques.

In Canal de la Mona, on the NW end of the bank about 13 miles W of Punta Guanajibo, there is a

current velocity of about 1 knot; slacks and strengths occur about 15 minutes later than in Canal Guanajibo.

In Sonda de Vieques, there are strong tidal currents over the shoals in the W part and around Isla Cabeza de Perro. In Pasaje de San Juan and Pasaje de Cucaracha, estimated velocities of about 2 knots have been reported. In the wider passages between Cayo Icacos and Cayo de Luis Pena, it is estimated that the current velocity is less than 1 knot. From Isla de Culebra the S current sets toward Punta Este, Isla de Vieques, around which tidal currents are strong.

In Canal de Luis Pena, the SE current is deflected N of Bahia Tarja and thence sets toward the S end of Cayo de Luis Pena; the current is weak off the entrance to Bahia de Sardinas. The NW current sets directly through the channel. The current velocity is about 2 knots.

**Weather.**-The following description of general weather conditions in Puerto Rico was prepared by the National Weather Service. (See page T-7 for **San Juan and Santa Isabel climatological tables.**)

**Climate.**-Puerto Rico is a tropical, hilly island which lies directly in the path of the E trade winds throughout the year. Because of island characteristics, daily temperature ranges are relatively small, at least near the coast where there is a tempering effect from the nearby waters. The hilly terrain of the island causes rather sizable variations in temperature over relatively short distances with precipitation largely mountain-related in nature. The rugged terrain also causes wide local variations in wind speed and direction due to sheltering and channeling effects.

**Winds.**-The prevailing winds over Puerto Rico are the E trades, which generally blow fresh during the day. The center of the Bermuda High shifts a little N in summer and S in winter changing the direction of the winds over that island from NNE in winter to E in summer.

Factors which interrupt the trade wind flow are frontal and E wave passages. As the cold front approaches, the wind shifts to a more S direction, and then as the front passes there is a gradual shift through the SW and NW quadrants back to NE. The E wave passage normally does not bring a W wind but is usually characterized by an ENE wind ahead of the wave and a change to ESE following the passage.

Over most of the ocean area near Puerto Rico the strength of the winds increases in midsummer, with lighter winds in the spring and autumn seasons. There are also somewhat higher average winds in the NW part of the area in the late autumn and winter. Mean wind speeds over the Atlantic in this area range from 9 to 10 knots during the autumn to a high of 12 to 15 knots in midsummer.*

Since the island lies in the path of tropical storms and hurricanes, occasional winds of extreme force are experienced. At San Juan, during the passage of the hurricane known locally as "San Felipe" in September 1928, the National Weather Service's anemometer blew away after recording an extreme wind speed of 160 m.p.h. This is the highest value recorded in Puerto Rico to date.

**Precipitation.**-The greatest part of Puerto Rico's rainfall is mountain-related and showery in nature. Duration of rain is usually brief and amounts vary greatly from place to place. The distribution of rainfall over the year shows only a relatively dry season and a relatively wet season. The length of the dry season varies somewhat with the location on the island. In the S portion of Puerto Rico the dry season normally lasts from about December to April, while in the N portion it runs from about February to April. In both the N and S the wet season commences in May. The geographical distribution of the rainfall over the island shows that the heaviest is centered over El Yunque in the Luquillo Mountains in the NE section. The annual rainfall there is approximately 150 inches greater than at San Juan, about 23 miles distant.

**Temperature.**-Temperatures are normally steady over the tropical island of Puerto Rico. For the San Juan-Isla Verde Airport area, the highest temperature of record is 96°F. and lowest, 60°F. at the airport. These conditions are in significant contrast to those prevailing in the mountain and valley regions of the interior, where much greater daily and annual ranges of temperature occur. The highest temperature that has been reported in Puerto Rico is 103°F. at San Lorenzo, and the lowest is 40°F. at Aibonite.

Tropical cyclones of the North Atlantic are usually called West Indian Hurricanes, but many of these storms form, move, and die hundreds of miles from the West Indies. The hurricane season generally begins in June and closes with November. (See chapter 3 for more detailed discussion of hurricanes.)

**Storm warning display** locations are listed on the NOS charts and shown on the Marine Weather Services Charts published by the National Weather Service.

**Routes.**-Vessels bound from Straits of Florida (24°25'N., 83°00'W.) to San Juan can proceed by rhumb lines through the following positions: 23°34'N., 80°26'W.; 22°34'N., 78°00'W.; 22°07'N., 77°24'W.; 20°50'N., 73°43'W.; 19°45'N., 69°50'W.; 18°29'N., 66°08'W.

From the E coast of the United States, the route to San Juan is direct by great circle.

Distances from San Juan are 1,017 miles to Straits of Florida, 1,252 miles to Norfolk, 1,399 miles to New York, and 1,486 miles to Boston.

**Pilotage** is compulsory for all foreign vessels and U.S. vessels under register when entering or leaving the harbors of Puerto Rico. Coastwise vessels, vessels owned or controlled by the United States or foreign governments, and all pleasure yachts are exempt from pilotage unless a pilot is actually en-

gaged. The pilot service at each port is under the supervision and direction of a Commonwealth Captain of the Port; ships' agents should notify his local office in advance so a pilot will be available at the expected time of arrival of a vessel. Pilots provide 24-hour service and board vessels from motorboats. Detailed information on pilotage procedures is given in the text for the ports concerned.

**Towage.**-Large tugs are available at San Juan, Puerto Yabucoa, and Bahia de Guayanilla; smaller tugs are available at some of the other ports. Arrangements for tugs should be made in advance by ships' agents. (See the text for the ports concerned as to the availability of tugs.)

**Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

**Customs.**-Puerto Rico collects no customs duties on merchandise entering the island from the continental United States or its dependencies. Merchandise entering from foreign countries is subject to the duties of the United States, which are collected at the ports of Puerto Rico by the U.S. Customs Service. Ports of entry are listed in the appendix. At least 24-hours' advance notice of arrival at a port should be given to the local customs officer.

**Agricultural quarantine laws** are enforced by officials at Ramey Air Force Base, San Juan, Fajardo, Roosevelt Roads Naval Air Station, Ponce, and Mayaguez.

**Immigration.**-The United States immigration laws apply to Puerto Rico. Passports and visas are required.

**Ports Authority.**-The control of all the ports of Puerto Rico is vested in the Commonwealth Government whose authority is exercised through the Puerto Rico Ports Authority. Appointed Commonwealth Captains of the Port have administrative charge of the harbors; they collect the port fees and assign vessels to anchorage or to berths alongside wharves.

At ports where commonwealth and federal officials are not stationed, inspectors usually come from the nearest represented port or from San Juan as required.

**Wharves.**-The ports of San Juan, Yabucoa, Laguna de Las Mareas, Central Aguirre (Bahia de Jobos), Ponce, Bahia de Tallaboa, Bahia de Guayanilla, Ensenada (Bahia de Guanica), and Mayaguez all have wharves where large vessels can go alongside to load and unload cargo. At the other ports, the wharves are only used by small vessels.

**Supplies.**-All kinds of supplies are available at San Juan, Ponce, and Mayaguez. Gasoline, water, and marine supplies are available at most of the smaller ports. If necessary, supplies can be trucked from San Juan in a few hours.

**Repairs.**-San Juan is the only port where major repairs to large ocean-going vessels can be made. Available are a 691-foot graving dock and two marine railways for medium-sized vessels. Ordinary repairs to machinery can be made at Ponce and Mayaguez. Small vessels, motorboats, and yachts can be repaired at some of the marinas around the island.

**Communications.**-There are good highways to all the principal cities, and roads connect the smaller towns. Regular air service is maintained between San Juan, Ponce, and Mayaguez. Air service is also available from San Juan to the Virgin Islands, the United States, and some foreign countries.

Many steamship lines operate from San Juan, Ponce, and Mayaguez to the United States and foreign ports. Small inter-island vessels operate from most of the ports of Puerto Rico to the Virgin Islands and other West Indies ports.

Telephone and telegraph communications are available through all the ports of Puerto Rico. Radio communication to all points, including ships at sea, is available through commercial systems. The Commonwealth Government maintains radio telegraphic service between San Juan and the islands of Culebra and Vieques.

**Currency.**-The monetary unit is the United States dollar.

**Standard time.**-Puerto Rico uses Atlantic standard time, which is 4 hours slow of Greenwich mean time.

**Language.**-Spanish is the official language of Puerto Rico, although many of the native people are bilingual; most of the island's geographic features have Spanish names. English is a required subject in the schools and is preferred for business purposes by a large part of the commercial community.

**Spanish-English Geographic Glossary:**

Agua-water
Amarillo-yellow
Anclaje, Ancladero-anchorage
Arena-sand
Arrecife-reef
Arroyo-small stream
Bahia-bay
Bajo-shoal
Banco-bank
Barra-bar
Blanco-white
Boca-mouth, entrance
Boqueron-wide mouth
Cabeza-shoal head
Cabezo-summit of hill
Cabo-cape
Caleta-cove
Canal-channel
Cano-creek, channel
Castillo-castle
Cayo-key
Cerro-hill
Cienaga-marsh
Isleta-islet
Istmo-isthmus
Lago-lake
Laguna-lagoon
Laja-flat rock
Largo-long
Mar-sea
Medio-middle
Meridional-southern
Monte, Montana-mountain
Morro-headland, bluff
Negro-black
Norte-north
Nuevo-new
Occidental-western
Oeste-west
Oriental-eastern
Pantano-marsh
Pasaje-passage
Peninsula-peninsula
Pico-peak
Piedra-stone, rock
Playa-beach

| | |
|---|---|
| Cordillera-mountain chain | Pueblo-town |
| Costa-coast | Puerto-port, harbor |
| Desembarcadero-landing | Punta-point |
| Embarcadero-wharf, quay | Rada-roadstead |
| Ensenada-bay, cove | Rincon-inside corner |
| Escollo-shelf, reef | Rio-river |
| Este-east | Roca-rock |
| Estero-creek, inlet | Rojo-red |
| Estrecho-strait | Septentrional-northern |
| Exterior-exterior | Sierra-mountain range |
| Farallon-rocky islet | Sonda-sound |
| Golfo-gulf | Sud-south |
| Gran, Grande-great | Tierra-land |
| Interior-interior | Verde-green |
| Isla-island | Viejo-old |

**Chart 25640 (920).-Canal de la Mona (Mona Passage),** 61 miles wide between the W end of Puerto Rico and the E end of Hispaniola, is one of the principal entrances to the Caribbean Sea. Three small islands are located in the passage: Isla de Mona and Isla Monito about midway in the S part, and Isla Desecheo about 12 miles W of the extremity of Puerto Rico in the N part.

On the W side of Canal de la Mona, a bank extends from Cabo Engano, the E extremity of Hispaniola, for 23 miles, with a least depth of 26 fathoms. Depths of 5 to 20 fathoms have been reported on the bank about 7 miles SSE of Cabo Engano (chart *25008). Strong tide rips and heavy swells, caused by the meeting of contrary currents, are visible for many miles and mark the position of this bank. On the E side of the passage, an extensive bank makes off from the W coast of Puerto Rico extending up to 15 miles offshore. The W coast of Puerto Rico is described later in this chapter.

Tidal currents set generally S and N through Canal de la Mona. Varying nontidal flows, depending to a great extent upon the velocity and direction of the wind, combine with the tidal current. An average nontidal current of about 0.2 knot setting approximately NNW is generally experienced during all seasons. In summer, when the trade wind has slackened and blows more from the E and ESE, a strong countercurrent sets E off the S coast of Hispaniola. This countercurrent occasionally induces a N set in the passage.

A 3.5-knot current, setting approximately WSW, has been reported in the passage N of Isla de Mona. Observations made on the NW edge of the bank about 13 miles W of Punta Guanajibo, Puerto Rico, gave a velocity of about 1 knot for both S and N strengths.

The tidal currents also set with considerable velocity, especially near the shore S of Cabo Engano, where they have been reported to set with a velocity of 3.5 knots during the month of May, with ebb currents setting NE for 3 hours and flood currents setting SW for 9 hours. The duration of these currents has also been reported to be the reverse, and at other times to be of the usual duration of 6 hours.

The passage presents little difficulty in navigation, except that caution must be used in the vicinity of Isla Saona off the SE coast of Hispaniola, which is low and foul. This island should be given a berth of at least 6 miles. Heavy squalls may be expected in the passage, particularly in the summertime.

**Chart 25671 (901).-Isla de Mona** (18°05'N., 67°54'W.), 6 miles long E and W and 4 miles wide, lies in the middle of the S part of Canal de la Mona. Temporary anchorage and landing can be made in places on the S and W sides of the island during good weather, but on many days anchorage and landings are impracticable. The attendants for the Puerto Rico Department of Agriculture experimental station on Punta Arenas are the only inhabitants of the island, which is a commonwealth forest preserve.

The island is composed of limestone and from E appears perfectly flat on top, breaking off abruptly at the water in a vertical whitish cliff about 175 feet high. On the NW and NE coasts are extensive caves that run in every direction but are so obstructed by stalactites and stalagmites in places that it is almost impossible to pass. They were used as hideouts by pirates for nearly three centuries. The W, S, and SE sides of the island are fringed with detached coral reefs through which boat passages lead.

The 100-fathom curve lies about 1 mile offshore, except on the SE side, where it is about 1.7 miles off, and on the SW side, where it is only about 0.3 mile off. With a strong wind from any direction, the sea draws around the island and generally into all the anchorages. **Anclaje Sardinera,** on the W coast, is the best anchorage during SE winds, and **Anclaje Isabela,** just S of Punta Arenas, is good during NE winds. Boat landings can be made at Anclaje Sardinera and Playa de Pajaros.

**Currents.**-In Anclaje Sardinera the tidal currents set N and S with a velocity of about 0.5 knot. A northerly current with a velocity of 0.5 knot has been experienced off Playa de Pajaros.

**Isla de Mona Light** (18°05.3'N., 67°50.8'W.), 231 feet above the water, is shown from a 59-foot black hexagonal pyramidal skeleton tower connected to a white dwelling on **Cabo Este,** the E extremity of the island.

Vertical cliffs with deep water close to shore extend from Cabo Este N and W to **Cabo Barrionuevo,** the NW cape of the island. Here a mass of rock, shaped like two saw teeth on top, projects from the base of the cliff. This feature can be observed from N and SW.

**Playa de Pajaros,** about 1.5 miles S of Isla de Mona Light, has a boat harbor with 3 to 8 feet of water inside the reefs. The S and main entrance has reported depths of 7 to 12 feet. The landing place, formerly used by Coast Guard vessels, has 7 to 8 feet alongside, but with S winds a swell sets into the landing.

The southernmost point of the island is surmounted by a large balanced rock. **Punta Arenas (Oeste)**, the westernmost point, is a low, narrow ridge, covered with brush, which projects nearly a mile W of the cliffs; a reef extends 0.3 mile W of the point.

**Isla Monito**, 3 miles NNE of Isla de Mona, is a 213-foot high bare rock 0.2 mile in diameter. The passage between the two islands is deep and clear.

**Isla Desecheo**, 27 miles NE of Isla de Mona and 12 miles W of Punta Higuero, is a 715-foot high wooded island a mile in diameter. The island is visible for more than 30 miles in clear weather and is one of the best landmarks for Canal de la Mona and the W coast of Puerto Rico. Isla Desecheo is a forest reserve and a native-bird reserve; it is uninhabited and has no anchorages along its shores. A depth of 5 fathoms is reported about 9 miles SW of Isla Desecheo, in 18°15.8'N., 67°34.5'W.

The U.S. Navy has advised that a survey (1974) of Isla Desecheo and adjacent waters revealed the presence of unexploded ordnance. Mariners are urged to use extreme caution when in this area.

**Punta Higuero**, the most W point of the mainland of Puerto Rico, is projecting and prominent with the land bank of it rising abruptly to rolling hills which ascend gradually to **Pico Atalaya**, 6 miles inland to the SE. A light is shown from a 69-foot gray cylindrical tower at the end of the point.

Steep-to reefs with less than 12 feet of water over them extend up to 0.4 mile offshore from Punta Higuero to beyond Punta Borinquen to the NE.

**Bahia de Aguadilla**, 7 miles NE of Punta Higuero, is exposed N and W, but with ordinary E trade winds anchorage is smooth. There are frequent rough spells during the winter when the wind is from N.

**Aguadilla** is on the E shore of the bay. Radio towers S of the town, and the city hall clock tower and twin gray towers of the cathedral at the plaza are prominent. The 1,208-foot high naval communication tower (18°24.0'N., 67°10.6'W.) is the most prominent feature from offshore. The small white shaft of the Columbus Monument is about a mile S of city hall. **Storm warning signals are displayed.** (See chart.)

Large vessels load raw sugar and molasses at the conveyor pier with mooring buoys and dolphins 1.1 miles N of Aguadilla; depths of 40 feet or more are at the outer end of the pier.

An Air Force fuel pier, with pipelines for handling aviation fuels, is 1.8 miles N of Aguadilla. In 1972, depths of 30 feet were reported alongside the platforms at the outer end of the pier. Depths of 6 feet and less were reported alongside the emergency crash boat basin finger piers that extend off the SE end of the fuel pier.

**Pilotage.**-Pilots for Bahia de Aguadilla are available at Mayaguez. (See Pilotage for harbors of Puerto Rico at the beginning of this chapter.)

**Quarantine.**-A representative of the U.S. Public Health Service quarantine office at San Juan enforces the national quarantine laws. (See Public Health Service, chapter 1.)

Aguadilla is a **customs port of entry.**

Customs, **immigration**, and **agricultural quarantine** services are handled by officials stationed at Ramey Air Force Base.

**Charts 25671 (901), 25668 (903).**- The N coast of Puerto Rico from Canal de la Mona to San Juan extends in an almost E direction for 60 miles. From Punta Borinquen for 27 miles to Arecibo, there are numerous rocky cliffs with sand beaches and dunes between them. The prominent features are the high hills in the interior and high cliffs along the coast. The hills that terminate a mile W of Arecibo are mostly smooth grassy slopes backed by conical wooded hills up to 800 feet high.

Between Arecibo and San Juan, the coast is indented by several coves and bights, although none of them afford sheltered anchorage. The first 17 miles to nearly Punta Puerto Nuevo consists of sandy beaches and dunes with occasional rocky bluffs, then there are numerous hummocks and rocky bluffs with short beaches between them in the 16-mile stretch to San Juan. A line of breakers enclosing numerous rocks lies as close as 0.5 mile offshore. A range of conical hills is W of San Juan.

In addition to the marine and aerolights near Punta Borinquen, the marine lights at Arecibo and San Juan, several stacks, radio towers, and towns are prominent from offshore along the N coast. All dangers will be avoided by staying a mile or more offshore.

**Chart 25671 (901).-Punta Borinquen**, at the NW end of Puerto Rico, is steep-to with deep water within 0.5 mile of shore, but vessels should stay several miles offshore because of a small arms firing area in the vicinity of the light. The extreme W part of the point is low, but it is backed by steep wooded slopes 0.5 mile inland.

**Punta Borinquen Light** (18°30.1'N., 67°08.7'W.), 292 feet above the water, is shown from a 60-foot gray cylindrical tower. **Storm warning signals are displayed.** (See chart.) A 200-foot rock bluff begins 0.8 mile SW of the light and extends NE and E along the N coast of Puerto Rico.

A boat landing may be made in calm weather in the sandy cove on the W side of **Punta Sardina**, 7.3 miles E of Punta Borinquen Light.

**Chart 25668 (903).-Punta Penon**, 16 miles E of Punta Borinquen Light, is a slight projection with lower land between it and the foothills. A rocky islet lies W of the point and a chain of bare rocks and a small islet extend 0.8 mile E of it.

**Puerto Arecibo**, 26 miles E of Punta Borinquen Light and 33 miles W of San Juan, is an open bight somewhat protected by the headland of **Punta Morrillos** on the E side with a 1,200-foot break-

water extending from it to **Roca Cocinera.** Only fishing vessels, pleasure craft, and a chemical supply barge use the port. **Arecibo** is along the SW shore of the bight.

**Arecibo Light** (18°29.0'N., 66°41.9'W.), 120 feet above the water, is shown from a 46-foot white hexagonal tower attached to a dwelling on the hill close to the shore near the W end of Punta Morrillos. Radio towers and stacks are prominent around Arecibo.

**Boundary lines of inland waters.**-The lines established for Puerto Arecibo are described in 82.205, chapter 2.

A dredged channel, marked by buoys, leads from the Atlantic Ocean to a bulkhead wharf on the S side of the breakwater of Puerto Arecibo. In October 1971, the controlling depth was 18 feet. Care should be taken to avoid the offshore rocks when approaching the port from W and E.

A pipeline on the bulkhead wharf is used by barges to supply liquid chemicals to storage tanks of a chemical company. Gasoline can be obtained at the wharf in an emergency. Fishing vessels and small craft anchor S of the wharf.

**Danger zones** for artillery and small-arms ranges extend up to 10 miles offshore in the vicinity of **Punta Puerto Nuevo,** 42 miles E of Punta Borinquen Light. (See 204.228, chapter 2, for limits and regulations.)

A boat landing can be made in calm weather inside the rock islets that extend a mile W of Punta Puerto Nuevo. An aero radiobeacon (18°28.2'N., 66°24.8'W.), marked by a flashing red light, is prominent SW of Punta Puerto Nuevo.

Several large dome-shaped structures are prominent on **Punta Salinas,** a narrow projecting point 3 miles W of San Juan. A large blue water tank, 1.9 miles inshore of the point, shows up well from offshore.

**Chart 25670 (908).-Bahia de San Juan,** the most important commercial harbor in Puerto Rico, is about 60 miles E of Punta Borinquen and 30 miles W of Cabo San Juan. It is the only harbor on the N coast which affords protection in all weather. It is protected on the N by the relatively high land of Isla San Juan, and on the S, E, and W by the adjacent low mangrove swamps of the Puerto Rico mainland.

The bay is about 3 miles long in a SE direction and varies in width from 0.6 to 1.6 miles, but the entire SW side is shoal. The SW shore is divided into two large bights by **Punta Catano,** the point which extends about 0.6 mile NE into the harbor.

Metropolitan **San Juan,** the capital and principal port of Puerto Rico, includes Isla San Juan on the N side of Bahia de San Juan and the communities surrounding the bay. The principal commercial facilities are on the S side of Isla San Juan (Old San Juan). Container cargo terminals are on the N side of **Isla Grande** and at **Puerto Nuevo** in the SE part of the bay.

The principal imports into the harbor include foodstuffs, textiles, building materials, machinery, fertilizers, and petroleum products. Exports include sugar, molasses, fruit, tobacco, coffee, petrochemicals, pharmaceuticals, and alcoholic products. Over half the commerce of Puerto Rico passes through San Juan. Most commercial and government activities are located here.

**Boundary lines of inland waters.**-The lines established for Bahia de San Juan are described in 82.200, chapter 2.

**Prohibited dumping grounds** are located at the entrance to and within Bahia de San Juan. (See 205.80 (a) and (c)(12), chapter 2, for limits and regulations.)

**Prominent features.-Isla de Cabras,** on the W side of the entrance to Bahia de San Juan, is low with cliffs 32 to 36 feet high at its N end and is marked by a light on its NW end. **Las Cabritas** are three small islands and rocks 0.1 mile NE of the island. The island is connected to the mainland by a causeway at **Punta Palo Seco.** A small stone structure of **El Canuelo** is on the S extremity of Isla de Cabras.

**Isla San Juan,** on the E side of the entrance to the harbor, is generally bold and rocky, with a ridge 100 feet high extending along its N side. At each end of the island are large stone forts connected by a continuous high wall. **Fort San Cristobal** is on the summit of the ridge in the E part, and **Castillo del Morro** is on the extreme W point of the island at the entrance to the harbor. The city wall extends from the castle along the channel side of the island to the Governor's Palace.

**Puerto San Juan Light** (18°28.4'N., 66°07.4'W.), 181 feet above the water, is shown from a 51-foot buff tower on the summit of Castillo del Morro. A radiobeacon is 0.4 mile ESE of the light.

The white marble dome of the capitol building, a mile E of the light, and a white church 0.4 mile farther E are prominent landmarks.

Several tanks and towers are prominent on Isla Grande; an aerolight is shown from a small air traffic control tower about 750 yards SE of its NW end. Many radio towers, stacks, and tanks surround Bahia de San Juan.

**Channels.**-Bar Channel, the entrance channel to Bahia de San Juan, leads to the deep-draft anchorage SW of Isla Grande, via Anegado Channel; Federal project depths in Bar and Anegado Channels, and the deep-draft anchorage are 45, 36, and 36 feet, respectively. San Antonio Channel, project depth 35 feet, leads from Anegado Channel between Isla San Juan and Isla Grande, to the commercial piers and the Navy berthing facilities on the S side of Isla San Juan, and to the Isla Grande marginal wharf and the Seatrain Lines container terminal on the N side of Isla Grande. The Army Terminal Channel leads S from Anegado Channel to the Army Terminal and turning basin, Puerto Nuevo Terminal bulkhead wharves, and to

the oil piers at the S end of the harbor; project depths in the Army Terminal Channel and turning basin are 36 feet. Graving Dock Channel and turning basin, S of Isla Grande, leads from Anegado Channel; project depths in Graving Dock Channel and turning basin are 30 feet. Puerto Nuevo Channel, project depth 32 feet, in the SE part of the harbor, connects Army Terminal Channel with Graving Dock Channel. (See Notice to Mariners and latest editions of charts for controlling depths.)

The entrance channel and the channels inside the harbor are marked by lighted ranges, lights, and lighted and unlighted buoys.

**Caution.**-When approaching the entrance channel (Bar Channel), with quartering and following seas which are especially predominant in winter, speeds of not less than 10 knots are recommended. This requirement for speed permits sufficient time to commence turning into Anegado Channel while maintaining ship control. An additional cause of confusion and groundings is that the N side Anegado Channel markers are not visible, virtually, until the turn into it should already have been commenced. Positive identification of channel marks is imperative.

Vessels should proceed with caution when dredging is in progress in the channels. (See 207.810, chapter 2, for navigation regulations.)

A channel, partially marked by buoys, leads to a landing pier at the NE end of the causeway between Isla de Cabras and Punta Palo Seco; depths of about 4 feet can be carried. The channel and pier are used by craft handling dangerous or explosive cargoes.

**Cano de Martin Pena,** at the SE end of Bahia de San Juan, is a narrow slough that connects with lakes and lagoons which extend E for 7 miles. A channel with a reported depth of 3 feet extends 1.5 miles above the entrance. A fixed bridge at the entrance to the slough has a clearance of 21 feet. The bridges 1.5 miles above the entrance, the head of navigation, have a least width of 44 feet and a clearance of 7 feet.

**Anchorages.**-Limits and regulations of the anchorage areas in Bahia de San Juan are given in 110.240, chapter 2. In 1965, a controlling depth of 26 feet was in Anchorage F, on the SW side of Anegado Channel with shoaling to 24 feet in the S 100 yards of the anchorage.

**Dangers.-Bajo Colnas,** on the W side of the entrance to Bahia de San Juan, has depths of 18 feet and less extending 700 yards from Isla de Cabras. The shoal area is usually defined by breakers.

**Bajo Sta Elena,** on the E side of the entrance, has depths of 7 to 18 feet extending 200 yards from shore.

Inside the harbor, the areas outside the channel limits marked by buoys are shallow with depths varying from 4 to 18 feet with many shoals having less than 1 foot over them.

A **restricted area** for seaplane operations is in the S part of the bay. (See 207.812, chapter 2, for limits and regulations.)

**Tides.**-The mean range of tide is 1.1 feet; the wind causes considerable variations in the depth. Daily predictions for Bahia de San Juan are given in the Tide Tables.

**Currents.**-The currents along the N shore of Puerto Rico are greatly influenced by the direction and strength of the winds. The prevailing E trade winds generally cause a W drift. In Bahia de San Juan a slight W flow prevails. When N seas set into the harbor entrance, an undertow and surge may be felt as far as San Antonio Channel.

**Weather.**-San Juan is located on the NE coast of the island of Puerto Rico in 18°28'N., 66°07'W. It is surrounded by the waters of the Atlantic Ocean and Bahia de San Juan. Santurce, directly to the E of Bahia de San Juan, is the urbanized section of San Juan. The surrounding terrain is level with a gradual upslope inland. Mountain ranges, with peak elevations of 4,000 feet, extend E and W through the central portion of Puerto Rico, and are located 15 to 20 miles E and S of the capital city. This mountain range has a decided influence on the rainfall in the San Juan area, especially summertime thunderstorms.

The climate is tropical marine, slightly modified by insular influences when land breezes blow. Radiational cooling frequently causes land winds at night, consequently, somewhat lower nightime temperatures occur than would normally be experienced with sea breezes. This air drainage from the higher altitudes in the interior of the island to the coastal areas gives delightfully invigorating night temperatures, especially during December to March, inclusive. Minimum temperatures during this period are frequently 2° to 3° higher within the city than at Isla Verde Airport, which is located 6.5 miles E and slightly inland. By the same token, maximum temperatures are 1° to 2° lower in the city.

San Juan has a small annual temperature range, which is a characteristic of all tropical marine climates. The difference between the average temperatures of the warmest and coolest months is about 5.7°F. in San Juan, 6.5°F. at Isla Verde Airport, and is representative of most of the coastal localities in the island. This is also true concerning the absolute range of temperature. For the San Juan-Isla Verde Airport area, the highest temperature of record is 96°F. and lowest, 60°F. at the airport.

San Juan's average annual rainfall is near 60 inches, with fairly even distribution throughout the year. At Isla Verde Airport, about 12 miles W of this mountain range, the annual rainfall is about 64 inches. The heavier monthly amounts normally occur during the period from May to December, inclusive. Rainfall is generally of the showery type except for the continuous rains which occur in connection with the passage of tropical storms, or when the trailing edge of a cold front which has swept across the continental United States penetrates far enough S to have a definite effect

upon Puerto Rico rainfall. This infrequently occurs from November to April. Sunshine is plentiful, with only an average of 5 days a year entirely without sunshine, although there is an average of 209 days a year with measurable precipitation. The average duration of the showers is not more than 10 to 15 minutes, although on many occasions, especially in the summer a series of intermittent showers will extend over a period of an hour or two. Being marine, the climate is naturally humid. Relative humidity averages about 85 percent in the nighttime and 65 percent near midday. Dense fogs never occur in the San Juan area.

The E trade winds, aided by the daily recurrence of the land and sea breezes constitute the most characteristic feature of the climate for San Juan throughout the year. The wind is almost constantly from the ocean during daylight. Usually, after sunset the wind shifts to the S or SE, off the land. This daily variation in the circulation pattern of surface winds is a contributing factor to the delightful climate of the island. The seawater temperature about San Juan ranges from a minimum of 78°F. in March to a maximum of about 83°F. in September.

Heavy N winds pile up heavy seas and breakers in the harbor entrance.

Puerto Rico is in the tropical hurricane region of the E Caribbean where the season for these storms begins June 1 and ends November 30. Several hurricanes affect this area every season, but weather records show that only six of these storms have caused winds of hurricane intensity in the San Juan area during the past 60 years. In 1928, the National Weather Service's anemometer blew away after recording an extreme wind speed of 160 m.p.h., the highest value in Puerto Rico to date. The last hurricane that caused considerable loss of life and great property damage in San Juan occurred in September 26, 1932; however, on August 12, 1956, Hurricane Betsy passed over Puerto Rico. Hurricane winds were felt at San Juan, but there was no loss of life reported, and property damage was not great.

Mild temperatures, refreshing sea breezes in the daytime, plenty of sunshine, and adequate rainfall make the climate of San Juan enjoyable and exceptionally favorable for tourists and visitors.

The National Weather Service maintains an office at Isla Verde International Airport; **barometers** may be compared there.

(See page T-7 for **San Juan climatological table**.)

**Storm warning display** locations are listed on NOS charts and shown on the Marine Weather Services Charts published by the National Weather Service.

**Routes.**-Owing to the swells and currents on the coast of Puerto Rico, especially during the winter northerlies, inbound vessels should steer for a point about 4 miles N of **Punta del Morro**, the NW point of Isla San Juan, before lining up on the entrance to Bahia de San Juan. This precaution permits early adjustments to course and speed while still having sea room to do so. A **188°** lighted range and lighted buoys mark the entrance channel into the harbor.

From W, Punta Salinas (chart 25668 (903)) will appear as an island when first sighted and must not be mistaken for Isla de Cabras.

The harbor is easy of access in ordinary weather, but it should not be entered at night without local knowledge. During winter northers, dangerous conditions may prevent entering the harbor. The bend inside the entrance can be difficult when the NE trades are blowing strongly, as they may force a vessel almost broadside to swells. Vessels outbound should avoid getting too close to Bajo Colnas; this is particularly so with long vessels in a strong N breeze.

**Signal Station.**-It is advised by the Puerto Rico Ports Authority that the signalling station at Fort San Cristobal (18°28.2'N., 66°06.7'W.) is manned around the clock. All vessels equipped with radiotelephone approaching to enter Bahia de San Juan shall, at a safe distance not less than 3 miles N of the sea buoy, use the call and reply VHF-FM channel 16 (156.80 MHz) and the working channel 14 (156.70 MHz) to call the signal station and obtain clearance to proceed inside the harbor.

Vessels about ready to leave their berths and proceed out to sea shall, prior to departure, call the signal station on the regular call and reply channel, then switch over to the working channel to obtain clearance to depart.

All vessels, particularly tugs with a tow, are cautioned to closely follow the procedure herein above indicated to avoid close quarters and risk of collision situations in the Bar and Anegado Channels.

The Commonwealth Captain of the Port also maintains a visual signal station at Fort San Cristobal; communication is by International Code signals.

**Traffic signals.**-The alphabet flag N, when displayed from either yardarm of the signal mast at Fort San Cristobal, will govern entry and departure of vessels at Bahia de San Juan:

(a) When flag N is displayed from the NW yardarm, all incoming vessels must remain a safe distance outside the entrance.

(b) When flag N is displayed from the SE yardarm, all outgoing vessels must remain at a safe distance inside the harbor entrance or at the anchorages or berths.

**Pilotage.**-(See Pilotage for harbors of Puerto Rico at the beginning of this chapter.) Pilot services are generally arranged for at least 24 hours in advance through the ships' agents. If advance arrangements have not been made a minimum of 2 hours' notice is required.

Pilots board vessels 3 miles off the harbor entrance from motorboats which are painted black with white tops and have the word PILOT or the letter "P" in white on both sides of the bow; 24-hour service is available.

Vessels requiring pilot services are advised to navigate with caution and maintain a safe distance, never closer than 3 miles in a generally N direction from the harbor entrance, and hold that distance until boarded by the pilot. When small-craft warning signals are displayed, with heavy seas breaking outside, the harbor is difficult and dangerous to negotiate and the arrival of the pilot on board may be considerably delayed. Pilot boats communicate over the same frequencies as the signal station at Fort San Cristobal via individual walkie-talkie sets; i.e., call and reply frequency Channel 16 (156.80 MHz) and working frequency Channel 14 (156.70 MHz).

**Towage.**-Tugs up to 2,200 hp are available for docking, undocking, and long-distance towing and salvage.

Quarantine, customs, **immigration, and agricultural quarantine** officials are stationed in San Juan. (See appendix for addresses.) Vessels subject to such inspections generally make arrangements through ships' agents; officials usually board vessels at their berths.

**Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) The U.S. Public Health Service maintains an **outpatient clinic** in San Juan. (See appendix for address.) San Juan has several hospitals.

San Juan is a **customs port of entry**.

**Coast Guard.**-The **Captain of the Port** maintains an office in San Juan. A **Marine Inspection Office** and a **vessel documentation office** are in San Juan. (See appendix for addresses.)

**Harbor regulations.**-The Commonwealth Captain of the Port enforces the local rules and regulations for Bahia de San Juan. His office is located on Isla Grande.

**Wharves.**-The port of San Juan has numerous wharves and piers of all types, most of which are owned by the Puerto Rico Ports Authority. Only the major deepwater facilities are described, and these are located on the S side of Isla San Juan, the N and S sides of Isla Grande, along the S side of Puerto Nuevo Channel, and alongside the Army Terminal Turning Basin at the S end of the harbor. The port has over 700,000 square feet of transit sheds, 1 million square feet of open storage, and 73 acres of marshalling yards. All the piers have freshwater connections, access to highways, and most have electrical shore power connections. Cargo is generally handled by ships' 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; for information on the latest depths, contact the operator.

**S side of Isla San Juan:**

Pier 1 (26°27′50″N., 66°06′50″W.): W side 950 feet long; 35 feet alongside; berthing for cruise ships; operated by Puerto Rico Ports Authority.

Pier 3: 200 yards E of Pier 1; 905 feet long; 35 feet along E and W sides; berthing for cruise ships; operated by Puerto Rico Ports Authority.

Bulkhead Wharf: immediately E of Pier 3; marginal wharf, 695 feet long; 15 feet alongside; general and bulk cargoes from interisland vessels; operated by Puerto Rico Ports Authority.

Wharf 6: 300 yards E of Pier 3; marginal wharf, 955 feet long; 30 feet alongside; 43,600 square feet of covered storage; general and bulk cargoes; operated by Puerto Rico Ports Authority.

Pier 7: N of Wharf 6; 472 feet long; 21-25 feet alongside; general cargo; operated by San Juan Dock Corp.

Pier 8: 100 yards E of Pier 7; 400-foot face, E and W sides 590 feet long; 28 feet along W side, 11 to 17 feet alongside face and E side; 175,000 square feet of covered storage, 40,000 square feet of open storage; conveyors; general and bulk cargoes, containers; operated by Puerto Rico Ports Authority.

Pier 9: 100 yards E of Pier 8; face 350 feet, E and W sides 600 feet long; 27 feet alongside W side, 11 to 22 feet alongside face and E side; 133,000 square feet covered storage, 40,000 square feet open storage; general cargo and containers; operated by Puerto Rico Ports Authority.

Pier 10: 50 yards E of Pier 9; E side 480 feet long; 33 to 26 feet alongside; bulk cargo, molasses pipeline; operated by Porto Rico Lighterage Co.

Wharf 11: 150 yards E of Pier 10; marginal wharf, 580 feet long; 28 feet alongside; 100,000 square feet covered storage; general and bulk cargoes, containers; operated by Gulf-Puerto Rico Steamship Co.

Wharf 12: joining Wharf 11 to the E; marginal wharf, 550 feet long; 27 to 30 feet alongside; 15,000 square feet covered storage, 37,000 square feet open storage; general cargo; operated by Puerto Rico Ports Authority.

Wharf 13: joining Wharf 12 to the E; marginal wharf, 500 feet long; 27 feet alongside; 28,000 square feet covered storage, 55,000 square feet open storage; general cargo; operated by Puerto Rico Ports Authority.

Wharf 14: joining Wharf 13 to the E; marginal wharf, 480 feet long; 27 feet alongside; 40,000 square feet covered storage; general cargo; operated by Puerto Rico Ports Authority.

Fernandez Juncos Federal Quay: 300 yards E of Wharf 14; marginal wharf, 888 feet long; 27 to 29 feet alongside; berthing of naval vessels; owned and operated by U.S. Navy.

**N side of Isla Grande:**

Isla Grande Terminal Seatrain Section (18°27′41″N., 66°06′12″W.): 1,232-foot marginal wharf; depths alongside 32 to 27 feet W to E; trailer marshalling yard; two 45-ton cranes; container and trailer cargo; operated by Puerto Rico Ports Authority.

Isla Grande Terminal Berths E, D, and C: immediately E of Seatrain Section; 1,500-foot mar-

ginal wharf; depths alongside 29 to 15 feet W to E; 32,000 square feet covered storage, 240,000 square feet open storage; general, bulk, and container cargo; operated by Puerto Rico Ports Authority.

**S side of Isla Grande:**

U.S. Navy Tender Pier (18°26'58"N., 66°05'28"W.): E side 950 feet long, 26 to 30 feet alongside; W side 450 feet long, 17 to 22 feet alongside; owned and operated by U.S. Navy.

Pier 15: 150 yards E of Navy Tender Pier; 1,000 feet long; 30 feet alongside; 25-ton mobile crane, floating drydock, graving dock, machine and electrical shops, foundry; ship repair facility; U.S. Navy installation under lease to Puerto Rico Drydock and Marine Terminals, Inc.

Bulkhead Wharf (18°27'01"N., 66°05'15"W.): marginal wharf, 600 feet long; 28 feet alongside; open and covered storage; general and bulk cargoes, containers; operated by Gulf-Puerto Rico Steamship Co.

**S side of Puerto Nuevo Channel:**

Puerto Nuevo Docks and Trailership Terminal:

Berths A and B (18°25'50"N., 66°06'22"W.): 1,000 feet long; 30 feet alongside; 102,000 square feet covered storage; general cargo; operated by Puerto Rico Ports Authority.

Berths C, D, E, F, G, and H; joining Berths A and B to the E; 3,600 feet long; 30 feet alongside; trailership terminal, marshalling yards, five 27½-ton cranes; operated by Puerto Rico Ports Authority.

Catano Navy Fuel Pier: immediately W of Berth A; E and W sides 490 feet long; 28 feet alongside; receipt of petroleum products, bunkering vessels, loading barges for bunkering vessels; operated by various oil companies.

Army Terminal Pier: 150 yards W of Catano Fuel Pier; face 200 feet long, E and W sides 600 feet long; 28 feet alongside; 50,000 square feet covered storage, 75-ton fixed crane, 20-ton mobile crane; general cargo; operated by Puerto Rico Ports Authority.

Caribbean Refining Co. Oil Pier: 200 yards W of Army Pier; 400 feet long; 34 feet alongside; receipt of petroleum products; operated by Borinquen Refinery.

Puerto Rico Mills Wharf: 375 yards N of Caribbean Refining Co. Pier; offshore wharf, 600 feet with dolphins; 30 feet alongside; pneumatic unloaders and conveyor; receipt of grain; operated by Puerto Rico Mills, Inc.

Master Mix Mills Wharf: 100 yards N of Puerto Rico Mills Wharf; offshore wharf, 400 feet with dolphins; 30 feet alongside; pneumatic unloaders and conveyor; receipt of grain; operated by Master Mix Mills, Inc.

Caribe Feed Mills Wharf: 200 yards N of Puerto Rico Mills Wharf; offshore wharf, 200 feet with dolphins; 30 feet alongside; pneumatic unloaders and conveyors; receipt of grain; operated by Caribe Feed Mills, Inc.

California Rice Growers Assn., Wharf: 300 yards N of Puerto Rico Mills Wharf; offshore wharf, 600 feet with dolphins; 30 feet alongside; pneumatic unloader and conveyor; receipt of grain; operated by California Rice Growers Assn., Inc.

**Supplies.**-All types of marine supplies are available at San Juan. Water can be obtained at all piers and at anchorage from barges. Bunker fuel oil is available at the Catano Navy Fuel Pier and at anchorage from barges. Gasoline and diesel fuels are available by tank truck.

**Repairs.**-San Juan is equipped to make major repairs to ocean-going vessels. A graving dock on Isla Grande is 691 feet long overall, with a docking space of 632 feet, with a width of 83 feet at the bottom and 96 feet at the top, and has a depth over the sill of 25 feet. The largest floating drydock, near the graving dock, has a capacity of 2,000 tons. The largest marine railway, at Punta Catano, can haul out vessels up to 1,400 tons, 225 feet in length, with a draft of 18 feet. Machine and electrical shops and a foundry are available.

**Small-craft facilities.**-The Club Nautico de San Juan, at the SE end of Isla de San Juan, has limited nonmember berths, a 20-ton lift, gasoline, and diesel fuel.

About 200 yards S of the club is a marina which has berths, gasoline, diesel fuel, and some marine supplies. Minor engine repairs can be made.

Small craft usually anchor NW of La Puntilla inside the harbor entrance and E of San Antonio Channel.

**Charts 25668 (903), 25650 (904).**- The N coast of Puerto Rico from San Juan to Cabo San Juan trends in an E by S direction for 30 miles. The shore is low and sandy except for occasional bluffs. The low land extends 2 to 4 miles inland and then the mountains rise to three prominent peaks toward the E part of the island. The coast is indented by many coves with reefs and rocky islets extending 0.5 to a mile offshore; breakers show at many of the reefs. All dangers will be avoided by staying 2 miles or more offshore.

**Chart 25668 (903).**- The 7.3-mile stretch of coast from San Juan to **Punta Cangrejos** is bold and rugged with outlying rocks and reefs. A shallow inlet with least depths of 2 to 4 feet is W of the reef off Punta Cangrejos. The entrance to the inlet is marked by a lighted buoy and a private 146°30' lighted range. The entrance to **Laguna La Torrecilla**, in the NE part of the inlet, is crossed by a fixed bridge with a clearance of 15 feet. A private yacht club is on the S side of the entrance to the lagoon and a public marina on the N side. Berths, electricity, gasoline, diesel fuel, water, ice, a launching ramp, and minor hull and engine repairs are available.

**Storm warning signals are displayed.** (See chart.)

**Chart 25650 (904).-Punta Vacia Talega,** 12 miles E of San Juan, is a 60-foot-high brush covered ridge with low bluffs at the water's edge. **Rio Grande de Loiza,** 14 miles E of San Juan, shows as a wide gap in the trees. It is the largest river in Puerto Rico but cannot be entered because of the sandbar across the entrance.

A rocky patch with a least depth of 2½ fathoms is 1.5 miles N of **Punta Picua,** 21 miles E of San Juan. The patch breaks in a moderate swell and is marked by a lighted buoy.

Three tall apartment buildings are prominent at **Luquillo** just E of Punta Embarcaderos, 24 miles E of San Juan.

**Sierra de Luquillo,** the mountains in the NE part of Puerto Rico, are prominent features in clear weather for this part of the coast. **Roca El Yunque,** the westernmost of the three closely connected peaks 5 miles inland and 10 miles from the E end of the island, is the highest and most prominent.

**Chart 25667 (921).-Cabo San Juan,** the NE point of Puerto Rico, is a bluff hill 200 feet high. **Cabezas de San Juan,** two 100-foot clifflike heads, are at the N end of the cape. **Cabo San Juan Light** (18°23.0'N., 65°37.1'W.) 260 feet above the water, is shown from a 45-foot cylindrical tower on the front of a white rectangular dwelling on the highest part of the cape.

**Storm warning signals are displayed.** (See chart.)

**Charts 25667 (921), 25663 (917), 25650 (904).**-Beginning 1.5 miles N of Cabo San Juan, a chain of islands, islet, rocks, and reefs extends SE for 20 miles to Isla de Culebra. The chain is nearly steep-to on the N and S sides; the dangers will be avoided by giving both sides a berth of 0.5 mile. Several passages are between the groups of rocks and reefs, but they should be used only with extreme caution because many reefs with little water over them are near the limits of the channels.

**Las Cucarachas,** a group of rocks up to 15 feet high, a mile N of Cabo San Juan, lie at the NW end of the chain. A light is shown from a white cylindrical tower on one of the rocks. A shoal with depths of 21 to 30 feet is 0.9 mile NW of the light and a rock awash is 0.2 mile from the light in the same direction.

**Pasaje de San Juan,** between Cabo San Juan and Las Cucarachas, is 0.7 mile wide and has depths of 32 to 65 feet. The passage is one of the principal channels leading into Sonda de Vieques.

**Boundary lines of inland waters.** The lines established for Sonda de Vieques are described in 82.245, chapter 2.

**Los Farallones,** a group of rugged bare rocks 30 feet high, are 0.8 mile E of Las Cucarachas. Deep water is close to the N and W sides of the rocks, but a shoal with several bare rocks extends to Cayo Icacos. A reef on which the sea breaks is 0.2 mile S of Los Farallones and continues about 0.4 mile W from the NW end of Cayo Icacos. The W end of the reef should be given a berth of 300 yards or more.

**Pasaje Cucaracha,** between Las Cucarachas and Los Farallones, is 0.3 mile wide. A 23-foot spot is 500 yards SE of the light on Las Cucarachas, and another 23-foot spot is 200 yards W of Los Farallones. A **218°** course for Cabo San Juan Light will lead through the passage over a least depth of 38 feet. It is the best passage for sailing vessels entering the NW end of Sonda de Vieques with the usual E trade winds.

**Cayo Icacos,** 1.3 miles E of Cabo San Juan and the second largest of the chain, is a 40-foot hummocky island covered with a scrubby growth. A small wharf and buildings of a former limestone quarry are near the SW point of the island. A prominent tower is in about the center of the island.

**Cayo Ratones,** 250 yards E of Cayo Icacos, is 60 feet high; the E summit is a large bare ledge. A number of bare rocks are off its N side, and a reef awash is between the island and Cayo Icacos.

**Cayo Lobos,** 0.5 mile ESE of Cayo Ratones, is 25 feet high with several bare rocks and islets up to 75 feet high off the N side. A chain of bare rocks and islets up to 30 feet high continues SE for 2.2 miles to Cayo Diablo. A 300-yard-wide channel with depths of 17 to 40 feet is between Cayo Ratones and the bare rocks NW of Cayo Lobos. A tourist resort and private landing field occupy Cayo Lobos. A concrete pier is on the W side of the island with a lighted gasoline sign located on the pier. A 7-foot-deep unmarked channel leads to the pier from about 0.25 mile W with shoal coral areas to the N and S of the channel.

**Cayo Diablo,** 5 miles SE of Cabo San Juan, is low with a 40-foot grassy hummock at its E end. White beaches are on the N and S sides.

Between Cayo Diablo and Cayo Lobito, 8 miles ESE, are two groups of rocks 2 to 15 feet high known as **Arrecife Hermanos,** and **Arrecife Barriles,** with numerous reefs either awash or with little water over them in the chain. **Pasaje de Hermanos,** a 2-mile-wide passage 3.3 miles ESE of Cayo Diablo, has shoals of 15 to 30 feet and is not recommended for strangers. **Pasaje de Barriles,** a 1.5 mile-wide passage 6.7 miles ESE of Cayo Diablo and 1.3 miles W of Cayo Lobito, has depths of 36 to 48 feet and may be used by large vessels. A buoy marks the center of the passage, but the deepest water is E of it. A 28-foot shoal is 0.6 mile W of the buoy.

**Chart 25653 (914).-Cayo Lobito,** 13 miles E of Cabo San Juan, is the westernmost of the chain of islands extending for over 3 miles NW of Isla de Culebra. **Cayo Tuna** and a bare ledge are close to the NW end of the island. **Roca Columna** is a detached 75-foot bare pinnacle rock on the S end of the island.

**Cayo Lobo,** a mile SE of Cayo Lobito, is a triangular-shaped island covered with scrub grass, the

highest part being at the W end. The three points of the island are high with rocky bluffs.

**La Pasa de los Cayos Lobos,** the 0.5-mile-wide passage between Cayo Lobito and Cayo Lobo, has depths of 60 feet or more.

**Cayo Lobito Light** (18°20.1'N., 65°23.5'W.), 110 feet above the water, is shown from a black square daymark on a white skeleton tower on Cayo Lobito.

**El Mono,** 0.5 mile SE of Cayo Lobo, is a small irregular 15-foot ledge with several heads. The 0.4-mile-wide passage between Cayo Lobo and El Mono has depths of 36 feet or more.

**Las Hermanas,** 1.3 miles off the W coast of Isla de Culebra, consist of three islets. **Cayo Yerba,** the northernmost, 66 feet high, has a smooth grassy slope on the E side, and rocky bluffs on the W side. **Cayo Raton,** the southwesternmost and smallest, 46 feet high, is grassy on top and rocky on the sides; a low rock is close to its SE side. **Cayo del Agua,** the southeasternmost, is low in the middle and 39 feet high at its E part. The islet is rocky with many large boulders scattered over and near it. A shoal with 5 feet at its end extends nearly 0.1 mile W. The passage between Cayo Raton and Cayo del Agua should be avoided.

**Cayo de Luis Pena,** off the W side of Isla de Culebra and the largest island of the chain, rises to a peak in about the center with the S and N ends joined to the island by low necks. **Punta Cruz,** the SW point of the island, has a prominent whitewashed cliff. The 0.3-mile passage between Cayo del Agua and Cayo de Luis Pena has depths of 30 feet or more.

**Isla de Culebra,** 16 miles E of Puerto Rico, is about 6 miles long E and W. The island is fairly high, with broken and ragged terrain. **Monte Resaca,** a mountain about in the center, rises to 650 feet, and **Cerro Balcon,** about 1.5 miles ESE of it, is 551 feet high. The island is barren and brown in appearance. The N shore is steep-to, with the 20-fathom curve extending about 1.5 miles off and nearly parallel to it.

The island is a **Naval Defensive Sea Area and Airspace Reservation.**

The **Culebra Island Naval Defensive Sea Area** is defined as the territorial waters between the extreme high-water mark and the 3-mile marine boundary adjacent to that portion of the island of Culebra which is described as follows:

All that area lying NW of line (1) described as beginning at a point on the W coast of the island of Culebra (18°18'57"N., 65°19'02"W.), about 0.25 mile N of Punta Tamarindo Chico, and extending through a point at the N tip of Cayo Matojo (18°20'24"N., 65°17'26"W.); and W of line (2) described as beginning at the point on the W coast of Culebra above referred to (18°18'57"N., 65°19'02"W.), and extending due S to a point (18°16'40"N., 65°19'02"W.), from which Punta del Soldado Light bears 085°; thence extending SW at a bearing of 220° to the 3-mile boundary.

**Procedures regarding Danger Area 204.230 and the Culebra Naval Defensive Sea Area are as follows:**

All craft are advised that hazards exist within Danger Area 204.230 due to scheduled offshore gunnery, aircraft bombing practice, and unexploded ordnance around the islands and cays located in the danger area. Targets are located on the NW peninsula of Culebra (Pta. Noroeste/Peninsula Flamenco), Alcarraza (Fungy Bowl), Los Gemelos (Twin Rocks), and Cayo Lobo (Cross Cay).

Craft desiring to enter or transit Danger Area 204.230 must obtain clearance prior to entering the danger area by contacting **"Culebra Control"** by radio on 2182 kHz, or by telephoning the Atlantic Fleet Weapons Range Duty Officer at 863-2000, Extension 4222. Craft will be cleared into Danger Area 204.230 at any time that operations are not scheduled. Schedules of all operations by the Navy in the vicinity of Culebra (and Vieques) are promulgated weekly by the Atlantic Fleet Weapons Range, and are distributed to local authorities in Culebra, Vieques, and Fajardo.

When night operations are conducted within Danger Area 204.230, a red flashing light is displayed from the Navy Observation Post on Punta Flamenco. This light serves as a general warning, but it does not indicate exactly where the operations are being conducted.

Special procedures are no longer required for craft to enter or transit that portion of the Culebra Naval Defensive Sea Area which lies outside of Danger Area 204.230. Unrestricted passage is permitted at all times through that portion of the Defensive Sea Area E of a line extending 180° from Punta Melones Light at 18°18'11"N., 65°18'24"W. and S of a line extending 046° from Punta Resaca at 18°20'12"N., 65°17'29"W. The foregoing paragraphs should be consulted for information on the hazards and special procedures concerning Danger Area 204.230.

Craft are advised that hazards exist around Cayo Botella, Cayo Tiburon, Cayo Geniqui, and Cabo del Pasaje and the Northwestern Peninsula on Isla Culebrita owing to unexploded ordnance remaining from target practice which was conducted in those areas in the past.

The principal industry of the island is raising cattle. Vegetables and some tropical fruits are grown in quantities sufficient only for local consumption. The rainy season lasts from June to October, but the rainfall is much lighter than in Puerto Rico. There are no freshwater streams, and rain water stored in cisterns forms the principal water supply. No freshwater is available for vessels. The principal harbor is Ensenada Honda, one of the most secure in the Leeward Islands.

**Punta Noroeste,** the NW point of Isla de Culebra, is at the end of a prominent projecting ridge. A reef extends 200 yards NW from the high bare rock close to the point.

A shoal area with several rocks extends 2.2 miles NW from Punta Noroeste. **Cayo Botijuela,** 2 feet high, and **Roca Lavador,** awash, are the northwesternmost rocks of the group.

**Alcarraza,** 1.6 miles NW of Punta Noroeste, is a 144-foot bare round rock with perpendicular sides and a whitish appearance. **Pasaje Lavador,** between Roca Lavador and Alcarraza, is a 0.5-mile-wide passage with depths of 45 feet or more.

**Los Gemelos,** 1.1 miles NW of Punta Noroeste, consists of a 20-foot rock 50 yards in diameter with a low rock close to its SW side and another small rock 100 yards NW. **La Pasa de la Alcarraza,** between Alcarraza and Los Gemelos, is a 0.3-mile-wide passage with depths of 38 feet or more.

**El Ancon,** 0.9 mile NW of Punta Noroeste, is a rock with 7 feet over it that breaks when there is considerable sea; a buoy is 150 yards E of the rock.

**Piedra Stevens,** 0.6 mile NNW of Punta Noroeste, is a 30-foot rock 100 yards in diameter with a 27-foot shoal extending 100 yards S of it. A lighted buoy is 100 yards NW of the rock.

**La Pasa de Los Gemelos,** between Los Gemelos and El Ancon on the W and Piedra Stevens on the E is a 0.5-mile-wide passage with depths of 45 feet or more; it is the safest passage NW of Punta Noroeste.

**Canal Piedra Stevens,** between Punta Noroeste and Piedra Stevens, is a 0.3-mile-wide passage with depths of 35 feet or more.

The N **coast** of Isla de Culebra has sandy beaches between rocky bluffs for 2 miles, then the shoreline becomes generally bold and rocky, with sand beaches in the coves and occasional coral reefs fringing the shore. A 23-foot shoal is 1.0 mile E by N of Punta Noroeste and a 17-foot spot is the same distance E of the point; otherwise depths of 30 feet or more are 0.4 mile off the N coast.

A **danger area** for aerial gunnery and bombing extends 6.5 miles off the coast; limits and regulations are given in 204.230, chapter 2.

**Bahia Flamenco,** 1.8 miles SW of Punta Noroeste, is constricted by reefs. Buoys mark the entrance into the bay.

**Cayo Matojo,** 3.2 miles E by S of Punta Noroeste, is a 20-foot-high island off **Punta Resaca,** a projecting point separating Bahia de Marejada and Bahia de Oleaje.

**Roca Speck,** 100 yards off **Punta Manchita,** 4.8 miles SE of Punta Noroeste, is low and bare. **Punta Garay** is a projecting point 0.8 mile SE of the rock.

**Cabeza de Perro,** the E point of Isla de Culebra, is a pointed rocky bluff. A break in the reef 0.3 mile N of the point leads to a boat landing. **Pela,** 0.5 mile SW of the point, is a 30-foot-high cay that presents a prominent bluff facing SE.

**Cayo Norte,** 0.5 mile off the NE shore of Isla de Culebra, is somewhat oval in shape and covered with a thick scrubby growth. The highest peak, 338 feet high, is in the W part of the island. **Cayo Sombrerito,** a 59-foot rocky islet, extends about 300 yards N of the E end of the island.

Several rocky islets and islands extend up to 1.0 mile NE from Cayo Norte. **Cayo Ballena** and **Cayo Tiburon,** the northwesternmost group, are 10 to 20 feet high with foul ground between. **Cayos Geniqui,** the southeasternmost group, are two connected islands; the 79-foot W island is flat and grass covered on top, the 82-foot E island is pointed on top.

**Isla Culebrita,** 0.6 mile off the E coast of Isla de Culebra, is irregular in shape and about a mile in length. The island is formed by three hills with low land between them, and is covered with a scrubby forest growth. **Isla Culebrita Light** (18°18.9'N., 65°13.7'W.), 305 feet high, is shown from a 43-foot cylindrical tower and building on the summit of the island. A Coast Guard boat landing is on the W side of the island. The E end of the island is a bare high cliff. **Cayo Botella** is a grass-covered 30-foot island on an extensive coral reef that extends 0.5 mile NW of Isla Culebrita.

The islands, islets, and reefs on the E and S sides of Isla de Culebra form a protected passage and several well-protected anchorages.

**Canal de Cayo Norte,** between Cayo Norte and the Isla de Culebra, is a 0.5-mile-wide passage with depths of 28 feet or more through the middle.

**Canal Tiempo,** between Cayo Norte and the reefs NW of Isla Culebrita, is a 180-yard-wide passage with depths of 30 feet or more. The narrow passage should not be attempted by strangers because of the 7- to 12-foot shoals on either side. The approach to Canal Tiempo can be made between Cayo Norte and Cayo Tiburon, or between Cayo Tiburon and Cayos Geniqui. The passages are at least 0.3 mile wide with depths of 30 feet or more.

**Tierra a Medio,** between Isla de Culebra and Isla Culebrita, is a shoal area with depths of 13 to 29 feet that obstructs the S end of Canal de Cayo Norte. A buoy marks the SW side of the shoal area.

**Canal de Culebrita** and **Canal del Sur** are a continuation of the protected passage on the E and SE side of Isla de Culebra. The passages have a least width of 0.2 mile and depths of 26 feet or more. **Arrecife Culebrita,** extending nearly 3 miles SW from Isla Culebrita, protects the inside passage from S. The SW limit of the reef is marked by a buoy. **Cabezas Puercas** and **Cabezas Crespas,** shoal areas with depths of 2 to 28 feet and nearly awash in places, obstruct the SW part of Canal del Sur. Buoys mark the NW side of Cabezas Puercas and the NE side of Cabezas Crespas.

**Anchorages.**-The best anchorage is in Canal de Culebrita in 60 feet of water with the extreme W end of Cayo Botella in line with the E side of Cayo Sombrerito, and the SE extremity of Isla Culebrita bearing 067°. Vessels can anchor closer under the lee of Isla Culebrita according to draft.

**Puerto del Manglar,** at the SE end of Isla de Culebra, is a small but well-sheltered bay. The entrance is constricted to a width of 100 yards by reefs, but once inside vessels can anchor in depths of 18 to 37 feet near the middle of the bay; sand and mud bottom. The sides and head of the bay are shallow.

**Bahia de Almodovar,** on the S side of Puerto del Manglar, is a small bight, well sheltered from all winds, where small boats can anchor in depths of 20 to 24 feet. The bight is entered from Puerto del Manglar over a 10-foot bar 0.2 mile NW of Pela.

**Currents.**-The current velocity is 1.5 knots between Cayo Norte and Cayos Geniqui and sets S and N, and 2 knots in Canal del Sur and sets SW and NE.

**Routes.**-To enter Canal de Cayo Norte from N, steer **132°** between Cayo Norte and Isla de Culebra until 300 yards off Punta Garay, then draw in toward the Culebra side to avoid the middle ground, heading **146°** between the buoy marking Tierra a Medio and Isla de Culebra. The fringing reef off Cabeza de Perro may be avoided by giving the shoal a berth of more than 300 yards.

To enter Canal Tiempo from N, steer toward Cayo Norte and, having passed 150 yards W of Cayo Tiburon, bring the W extremity of Cayo Botella in line with Cabeza de Perro and steer **186°** until Cerro Balcon on Isla de Culebra bears **240°**, then make a sharp turn and head for Cerro Balcon on **241°**, passing midway between the 23-foot spot on the N side and the 12-foot spot on the S side of the channel; continue SW, swinging to get on course **146°**, passing 300 yards off Punta Garay.

If going through Canal del Sur, after leaving Canal de Culebrita, steer about **224°** with Isla Culebrita Light astern, passing 150 to 200 yards off the buoys marking Cabezas Puercas until WNW of Buoy 5, then either swing left to pass midway between Buoys 1 and 5, and thence to Sonda de Vieques, or continue on **237°** with Buoy 3 astern. A clear depth of 35 feet is on the course line, but vessels drawing more than 30 feet should attempt the passage only in calm weather because of frequent swells.

**Bajos Grampus** comprises a group of small coral heads rising from a bank of 60 feet lying 2 to 4 miles from the SE extremity of Isla de Culebra. The S head, on which there is a depth of 23 feet, lies with Punta del Soldado in range with the S extremity of Cayo de Luis Pena bearing 293°. A lighted buoy is on the S side of Bajos Grampus. A buoy marks the N edge of the innermost or W head of these shoals. A 23-foot spot lies 0.3 mile NE of this buoy. Virgin Passage is discussed in chapter 14.

**Canal de Grampus** is a channel between this W knoll and Arrecife Culebrita; it is a clear navigable channel about 0.6 mile wide and marked by buoys. The tidal current sets diagonally across Canal de Grampus SW and NE.

To pass S of Bajos Grampus, keep on or S of the line of Sail Rock and Signal Hill on St. Thomas Island until Cayos Geniqui show E of Cabo del Pasaje, the NE point of Isla Culebrita. Bajos Grampus will then be cleared, and the course can be shaped as desired.

**Chart 25654 (913).-Ensenada Honda,** on the S side of Isla de Culebra between bluff **Punta Vaca** on the E and Punta del Soldado on the W, is the most secure anchorage in the area. The harbor is about 1.5 miles long and in some parts 0.5 mile wide, but of irregular shape with several small shallow bays indenting the shore. The land around the bay is hilly and partly covered with a scrubby forest growth.

**Channels.**-The entrance to Ensenada Honda is obstructed by shoals with depths of 4 to 26 feet, but the entrance channels are marked by buoys and unlighted ranges. The controlling depth into the harbor is 27 feet.

**Dangers.-Bajo Amarillo,** 0.8 mile E of Punta del Soldado, is a 0.3-mile-long shoal with a least depth of 7 feet; it is marked by buoys.

**Bajo Grouper,** 0.2 mile N of Bajo Amarillo, is 0.3 mile in length with a least depth of 4 feet. A buoy marks the E extremity of the shoal.

**Bajo Camaron,** 0.2 mile S of Punta Vaca, has a least depth of 9 feet over the 0.2-mile-long shoal. A buoy is at the S end.

**Bajo Snapper,** 0.3 mile W of Punta Vaca, has a least depth of 6 feet over the shoal about 300 yards in diameter.

Many other shoals with depths of 18 feet or less are near the limits of the entrance channels.

**Routes.**-From S, bring the left tangent of Punta Vaca to bear **008°** before the S end of Cayo de Luis Pena closes behind Punta del Soldado and steer for Punta Vaca close up to Bajo Camaron; then swing on to the entrance range bearing **296°**. When nearly up to the buoy marking the 17-foot shoal, steer in on the inner range bearing **323°** until up to Buoy 8, then open the range to the W and anchor according to draft.

From SE, bring Punta Vaca in range with Monte Resaca, bearing about **322°**, and continue on this course past the buoy marking Cabezas Crespas until the entrance range comes on; then continue as directed in the preceding paragraph.

From W, when 0.5 mile S of Punta del Soldado Light, steer **064°** for about 1.3 miles until the left tangent of Punta Vaca bears **008°**, then head in on that course and follow directions above.

**San Ildefonso,** on the NE side of Ensenada Honda, is a naval reservation. The prominent house on the small hill above the wharf is used as the residence of the naval custodian. The wharf is a concrete L-shaped boat landing pier extending about 100 feet offshore. Depths of about 12 feet are alongside.

Only small boats can make a landing at the W end of Ensenada Honda. Vessels calling at Culebra use Bahia de Sardinas.

**Charts 25653 (914), 25654 (913), 25655 (915).**-The 5.5-mile-long **SW Coast** of Isla de Culebra from Punta del Soldado to Punta Noroeste is indented by small coves and reefs, but the dangers are within 0.4 mile of the shore. The coves between Punta Melones and Punta Tamarindo Grande are sheltered by Cayo de Luis Pena.

**Punta del Soldado**, the S point of Isla de Culebra, is wooded and terminates in a rocky bluff. A light is on the W side of the point.

**Bahia de Sardinas,** 1.5 miles NW of Punta del Soldado, is the harbor for the towns of Culebra and Clark Village. The boat and ferry landing at **Playa de Sardinas** has a depth of 8 feet at the end. Fishing boats use the harbor.

**Culebra**, locally known as **Dewey**, and **Clark Village**, both located on the neck of land between Bahia de Sardinas and the head of Ensenada Honda, are the only towns on Isla de Culebra. A local person is designated to handle insular immigration and customs traffic. Available supplies include gasoline in drums and groceries. Telephone and telegraph communications are available. A ferry service for both passengers and cargo operates between Isla de Culebra, Isla de Vieques, and the town of Fajardo; commercial air transport is available to Puerto Rico.

**Punta Melones**, the NW point of Bahia de Sardinas, is low and narrow, terminating in a small pinnacle rock. A light is on the tip of the point.

**Punta Tamarindo Grande,** 1.7 miles NW of Punta Melones, consists of a 75-foot hill with reddish bluffs at the end and a low neck behind it. Two low detached rocks are off its end.

Cayo de Luis Pena and the chain of islands and reefs to the NW have been described previously in this chapter.

**Canal de Luis Pena,** between the N end of Cayo de Luis Pena and Isla de Culebra, is a 0.3-mile-wide passage with depths of 21 to 65 feet. Strong currents and baffling winds render the passage hazardous for sailing vessels.

**Anchorages.**-Good anchorage with ordinary trade winds can be found between Cayo de Luis Pena and Isla de Culebra in depths of 30 to 79 feet. The rocky patch with depths of 42 to 53 feet, 0.6 mile W of Punta Melones, should be avoided in anchoring. A comfortable anchorage for small vessels in depths of 20 to 30 feet is in the entrance to **Bahia Tamarindo,** a mile NW of Punta Melones. A fair anchorage in depths of 40 to 55 feet is about 0.3 mile off the NW side of Cayo de Luis Pena.

**Currents.**-In Canal de Luis Pena the SE current is deflected N of **Bahia Tarja,** just N of Punta Melones, and thence sets toward the S end of Cayo de Luis Pena; it is weak at the entrance to Bahia de Sardinas. The NW current sets directly through the passage. The current velocity is about 2 knots.

**Charts 25650 (904), 25663 (917).-Sonda de Vieques** extends from the E coast of Puerto Rico to Virgin Passage between the chain of islands and reefs including Isla de Culebra on the N and Isla de Vieques on the S. The sound is about 20 to 22 miles long and from 8 to 15 miles wide. The E part is clear with depths of 7 to 17 fathoms, except for Bajos Grampus SE of Isla de Culebra. The W part has numerous shoals and reefs extending as much as 8 miles off the E coast of Puerto Rico.

A **danger area** for aerial gunnery and bombing extends 9 miles S and SW of Isla de Culebra. (See 204.230, chapter 2, for limits and regulations.)

**Explosives anchorage areas** are in Sonda de Vieques N of Isla de Vieques. (See 110.245, chapter 2, for limits and regulations.)

**Prohibited dumping grounds** are located in Sonda de Vieques between the E coast of Puerto Rico and Isla de Vieques. (See 204.80 (a) and (c)(13), chapter 2, for limits and regulations.)

**Boundary lines of inland waters.**-The lines established for Sonda de Vieques are described in 82.245, chapter 2.

**Isla Palominos,** 3.5 miles SE of Cabo San Juan, is a small 165-foot-high island with a rounded grassy summit and surrounded by steep-to reefs up to 0.6 mile from shore. A lighted buoy is on the NE side.

Good anchorage is afforded about 0.5 mile off the W side of the island in about 40 feet on the following bearings: Cabo San Juan Light 313°; Las Cucarachas Light 331°; and Punta Aguila, the extreme NW point of Isla Palominos, 037°. (See chart 25667 (921).)

**Bajo Blake,** 2 miles E of Isla Palominos, is 0.4 mile in diameter and has a least depth of 20 feet. The S side is marked by a buoy.

**Bajo Hodgkins,** 7 miles SE of Isla Palominos, is a narrow 0.8-mile-long ridge with a least depth of 27 feet; buoys mark the E and S sides of the shoal.

The area between Bajo Hodgkins and the E coast of Puerto Rico is full of shoals and should be used only with local knowledge. Many of the shoals have rocks awash or reefs on which the sea breaks while others have rocks that show 1 to 15 feet.

**Anchorages.**-Deep-draft vessels can find good anchorage in 28 to 60 feet during ordinary weather in **Rada Fajardo,** in the NW end of Sonda de Vieques between Cabo San Juan and Isla Palominos.

**Routes.**-Vessels bound from San Juan to Isla de Culebra and E frequently enter Sonda de Vieques through Pasaje de San Juan and proceed S of the chain of islands and reefs to gain comparatively smooth water.

A buoyed N-S route along the E coast of Puerto Rico is used by vessels with a draft of 22 feet or less. Large deep-draft vessels bound for the S coast of Puerto Rico usually enter Sonda de Vieques through Pasaje de San Juan and continue around the E coast of Isla de Vieques. Vessels from NE points use Virgin Passage and pass S of Isla de Vieques to go to ports on the S coast of Puerto Rico.

**Charts 25650 (904), 25664 (940).-Isla de Vieques,** 6 miles off the nearest point of the E coast of Puerto Rico, forms the S side of Sonda de Vieques. It is 18 miles long E and W and 3.5 miles wide near its middle. A range of hills extends the entire length of the island with a prominent hill at each end-**Monte Pirata** near its W end and **Cerro Matias Jalobre,** 3 miles from the E end. The island is wooded in places, especially its E half and around Monte Pirata.

Principal products are horses and cattle. Vegetables and tropical fruits are grown for local consumption. The rainy season lasts from May to October, but the rainfall is less than in adjacent parts of Puerto Rico. The island is subject to drought; the principal watersource is rainfall stored in cisterns.

Boats carrying supplies and passengers dock at Isabel Segunda on Bahia de Mulas on the N coast. When the trade wind is N of E a heavy surf runs and landing is difficult on the open N coast.

**Naval restricted areas** extend 1,500 yards offshore around the W part of the island. (See 207.815, chapter 2, for limits and regulations.)

**Pasaje de Vieques** is the strait lying between Puerto Rico and Isla de Vieques. **Radas Roosevelt** is the open-water portion of the passage lying within the shoals and banks N of the W end of Isla de Vieques and between that island and Puerto Rico. The current velocity is 1.2 knots in the passage and floods SW and ebbs E.

**Punta Arenas,** at the NW end of Isla de Vieques, is low and covered with a scrubby growth, with a white spit at its end. The point changes shape continually; at times the outer coconut trees are in the water.

At the W end of Isla de Vieques, S of Punta Arenas, there is a smooth anchorage with E winds but exposed to the S and W.

**Escollo de Arenas** is a continuation NW of a shoal which fringes the N side of Isla de Vieques to a distance of about 1 mile and extends E nearly to Punta Mulas. The W edge of the shoaler part of the bank extends 3.3 miles NNW from Punta Arenas to its outer end, where it is marked by a lighted buoy. Spots with depths of 5 feet are on the bank for 0.8 mile N of Punta Arenas, and thence to the lighted buoy, the bank is steep-to with about 40 feet on each side. The bank sometimes shows by discolored water and rips.

**Currents.**-A strong SW set is noted frequently N of Escolla de Arenas. The bank itself is generally indicated by the tide rips.

A 1.2 mile causeway extends from shore at **Desembarcadero Mosquito,** 3.9 miles E of Punta Arenas. A pier, marked on the outer and inner ends by Navy-maintained lights, is on the W side of the causeway about 350 yards from the seaward end. In 1965, a depth of 37 feet was available on either side of the pier; however, there are spots with lesser depths in the approaches, and the chart is the best guide.

**Arrecife Mosquito,** a reef awash, is 1.9 miles to the NE of Desembarcadero Mosquito. The reef is steep-to, and the sea always breaks on it. A shoal with a depth of 17 feet is about 0.5 mile WNW from the reef. During ordinary weather a fairly smooth anchorage is 0.3 mile S of Arrecife Mosquito, in 40 feet, sandy bottom. Several spots with a least depth of 9 feet are in the approaches to the anchorage, and vessels drawing more than that depth should use it only with local knowledge.

**Arrecife Corona,** a reef awash, is about 0.3 mile long and about 0.3 mile E of Arrecife Mosquito. Several shoals are around the reef, including a 9-foot spot 0.2 mile S. **Bajo Merail,** a shoal with least depth of 2 feet lies 0.8 mile S of Arrecife Corona.

**Caballo Blanco,** a low grassy islet is 1.7 miles NW of Punta Mulas. Several shoals surround the islet, the outer of which are 0.6 mile N and 0.2 mile S. **Bajo Comandante,** a shoal about 600 yards in extent with a least depth of 7 feet, lies about midway between Caballo Blanco and the shore. There are spots with a least depth of 23 feet in the channel between Caballo Blanco and Bajo Comandante.

**Bahia de Mulas,** 8 miles E of Punta Arenas and 10 miles W of Punta Este, is an open bight on the N coast of Isla de Vieques. **Isabel Segunda** (P.O. Vieques), the principal town on the island, is on the SE side of the bay.

**Punta Mulas Light** (18°09.4′ N., 65°26.6′ W.), 68 feet above the water, is shown from a 32-foot white tower on a low bluff point on the NE side of the bay. An old Spanish brick fort and building is prominent on a hill 0.5 mile SE of the light. A depth of 12 feet can be taken to the 300-foot pier on the E side of the bay. Depths of 4 to 12 feet are along the pier.

Small vessels and schooners anchor N and S of the pier at Isabel Segunda according to draft. Large vessels anchor 0.5 mile or more offshore in the bay. The outer anchorage is exposed, but the small-boat anchorage affords fair shelter during ordinary weather. With N winds a heavy sea makes into the bay causing small craft to drag anchor. The nearest hurricane anchorages are Ensenada Honda (Isla de Culebra) and Ensenada Honda (E coast of Puerto Rico).

The approach to Bahia de Mulas is obstructed by shoals with depths of 5 to 30 feet. Caballo Blancho and Arrecife Corona can be avoided in approaching from the NW by staying in the white sector of Punta Mulas Light until inside the bay.

A local person is designated to handle insular immigration and customs traffic. Supplies and passengers are landed at the pier. Some cattle are exported. Available supplies include gasoline in drums and groceries. Telephone and telegraph communications are available. A ferry carries passengers and supplies between Isabel Segunda, Isla de Culebra, and Fajardo; the mail is delivered by airplane.

A **danger area** of a bombing and target area is off the NE and SE coasts of Isla de Vieques. (See 204.234, chapter 2, for limits and regulations.)

**Cabellos Colorados,** 3.1 miles E of Punta Mulas, is rocky and steep-to. **Puerto Negro** is a boat landing 4.8 miles E of Punta Mulas Light. It can be entered only by small craft with local knowledge. The entrance through the reefs is about 100 yards wide, with depths of 6 to 18 feet, and is generally indicated by breakers on either side. Anchorage space is limited; most of it is foul. **Punta Brigadier,** 0.6 mile W of the entrance, is marked by **Roca Roja,** a large bare rock close-in. **Punta Goleta** is the E entrance point.

**Roca Cucaracha,** 3.4 miles WNW of Punta Este Light, consists of two small rocks, close together, about 3 feet high. The rocks are about 0.3 mile from shore, and the depths inside them are 6 to 14 feet.

**Cano Hondo** extends 0.6 mile E of Roca Cucaracha to the reefs forming Bahia Salinas. It is open N and has depths of 18 to 42 feet. It has no sheltered anchorage except for small craft, which can anchor at its SE end. A narrow channel with a depth of 8 feet S of an islet about 15 feet high and 250 yards from shore leads from Cano Hondo to Bahia Salinas.

**Bahia Salinas,** 1.6 miles W of Punta Este, has an anchorage with depths of 12 to 24 feet. It is the best landing along the N coast E of Bahia de Mulas. It affords good shelter for small craft with local knowledge, but should not be attempted by strangers. The bay is protected on the N by a reef 0.6 mile long, the highest part of which is awash. The entrance from E is between the reef and those reefs which fringe the shore. About 1.5 miles NW of Punta Este is a high bluff point with bare white cliffs to the E.

**Punta Este,** the E point of the island, is moderately low and grassy, with rocky bluffs at the water. A light, 40 feet above the water, is shown from a red skeleton tower on the point.

The S coast of Isla de Vieques is irregular and indented by sandy bays. **Bahia Salina del Sur,** 2 miles W of Punta Este, is 0.5 mile in diameter and affords a boat landing with the wind N of E. **Roca Alcatraz** consists of several rocks 10 to 15 feet high, 0.4 mile from the points at the entrance. A larger islet about 40 feet high, wooded on top and with a large bare rock close to its SE end, lies 0.3 mile off the W entrance point. Anchorage is in the W half of the bay in 18 to 24 feet, sheltered from winds N of E. The clearer entrance is between Roca Alcatraz and the island off the W point of the bay. For 1 mile W of the island, shoals with 18 feet and less extend nearly 0.5 mile from shore.

**Ensenada Honda,** about 6 miles W of Punta Este, is 1.2 miles wide, and has several bare rocks and reefs awash. The bay is rough with SE winds, but with the wind N of E it affords a good boat landing. Owing to the foul ground in the bay, it should be avoided by strangers. A reef bare at low water is off the entrance 0.8 miles ENE from **Punta Conejo,** the W entrance point. A light is on the E side of the point. **Cayo Jalovita** and **Cayo Jalova** are small islands on the E side of the harbor.

**Bahia de la Chiva** is a shallow bight on the W side of Punta Conejo. **Isla Chiva,** about 30 feet high, is a cay in the entrance to the bight. A reef with 2 to 18 feet of water over it extends nearly 0.5 mile from shore 1.5 to 2.1 miles W of Punta Conejo. **Bahia Tapon,** a bight N of the reef, has depths of 2 to 3 feet.

An offshore fueling line, marked by buoys, extends about 700 yards from the tank W of Bahia de la Chiva.

A naval **restricted area** is off the S shore of Isla de Vieques. (See 207.815, chapter 2, for limits and regulations.)

**Puerto Ferro,** 9 miles W of Punta Este, is a boat harbor with 6 to 8 feet of water at the entrance and 7 to 15 feet inside. Its entrance is 250 yards wide, with high land on both sides, and is prominent. **Puerto Ferro Light** (18°05.9′N., 65°25.4′W.), 56 feet above the water, is shown from a skeleton tower on a point S of the SW entrance point. A sunken rock lies about 0.5 mile inside the entrance in 18°06′21″N., 65°25′30″W.

**Puerto Mosquito** is a boat harbor about 1 mile W of Puerto Ferro Light. Least depths in the narrow entrance are 2 to 3 feet. A sunken rock is on the W side of the entrance in 18°05′43.5″N., 65°26′32.5″W.

**Ensenada Sun Bay,** 2.3 miles W of Puerto Ferro Light, is about 0.6 mile wide. It offers anchorage in 18 to 24 feet exposed to winds from SE to SW. A shoal extends 200 yards W from the E point of the bay, and a shoal with 17 feet over it lies W from the middle of the entrance. The depths in the S half of the bay are 17 to 27 feet. Several sunken rocks are about 100 and 250 yards W and SW, respectively, off the E entrance point.

**Puerto Real,** on the S coast of Isla de Vieques 3 miles W of Puerto Ferro Light, provides good anchorage in ordinary weather. The port is somewhat protected by **Punta de Tierra** on the E and **Cayo Real** on the S; depths are 15 to 25 feet. A pier in the NE part of Puerto Real has 10 feet alongside and is marked on the seaward end by a private light. The radio tower lights 0.3 mile inshore are prominent.

The principal outlying danger is a shoal covered 13 to 17 feet, with 30 to 50 feet around it, lying 0.7 mile from shore and 0.9 to 1.3 miles WSW from the S end of Cayo Real; its E and W ends are each marked by a buoy. A spot with 23 feet is about 0.4 mile SW from the S end of Cayo Real. A shoal with 15 feet of water is 0.2 mile from shore and 0.6 mile W from the N point of Cayo Real.

Vessels can anchor in 35 feet about 550 yards W of Cayo Real. The approach to the anchorage is between the buoy marking the E end of the principal offshore danger and a 23-foot spot nearly 0.4 mile SW of Cayo Real.

**Punta Vaca,** 3 miles W of Puerto Real, is the southernmost point of the island. Outlying rocks are a short distance offshore.

A **267°31′-087°31′ measured nautical mile** is off Punta Vaca; the front and rear markers are shown from poles.

**Punta Boca Quebrada,** 2.9 miles WNW of Punta Vaca, is a low wooded point which terminates in a dry ledge outside of a white sand beach. From Punta Boca Quebrada the coast trends N for 1 mile to Punta Arenas.

**Charts 25650 (904), 25663 (917).**-The **E coast** of Puerto Rico extends 10 miles S from Cabo San Juan to Punta Puerca and then 22 miles SW to Punta Tuna. The coast is very irregular with projecting rocky bluffs separating the numerous small shallow coves and bays, and with grass-covered or mangrove hills within a mile of the shore. Reefs awash or bare at low water and shoals with less than 10 feet over them extend more than a mile offshore in places. A depth of 24 feet can be carried through a partially buoyed channel from 2 to 5 miles off the E coast, but entrance caution is necessary to avoid the shoals near the route. The principal ports on the E coast are Fajardo and the private oil-handling facilities at Puerto Yabucoa. Ensenada Honda is the site of the Roosevelt Roads Naval Station ship base.

**Chart 25667 (921).-Playa Canalejo,** 0.2 mile SSE of Cabo San Juan Light, is a shallow indentation leading to the ruins of a small pier.

**Punta Gorda,** 1.4 miles S of Cabo San Juan Light, is a conspicuous high head. A 360-foot hill, 0.4 mile WNW from the point, is the N end and highest part of a high ridge which extends SW nearly to Playa de Fajardo.

**Punta Bateria,** 2.2 miles S of Cabo San Juan Light, is a rocky 70-foot cliff from which a grassy ridge makes inland.

**Bahia de Fajardo,** 2.5 miles S of Cabo San Juan Light, affords good shelter for medium-draft vessels. It is somewhat protected on the E and S by two islands and surrounding reefs. Ferry service for both passengers and cargo operates between Playa de Fajardo, Isla de Culebra, Isla de Vieques, and the Virgin Islands. Commercial air transport is available to the Virgin Islands. Small interisland vessels trade in general cargo, building materials, and livestock.

**Prominent features.**-Cabo San Juan Light is the principal landmark in making the approach to Bahia de Fajardo. A hotel with two cupolas, each marked by a red light, just S of Punta Gorda, and two stacks of a sugar central, and a radio tower near Fajardo are prominent.

**Storm warning signals are displayed.** (See chart).

**Channel.**-The principal entrance to Bahia de Fajardo is from N through the channel marked by buoys W of Bajo Laja, although small vessels can enter from E and S with local knowledge. The N entrance has a controlling depth of 23 to 30 feet to Buoy 5, thence 11 feet to the public pier. The controlling depth from E is 17 feet to Buoy 5, and from S, 9 to 11 feet to the public pier.

**Anchorages.**-Large vessels anchor NE of Punta Bateria according to draft. During ordinary weather the protection is fair and the holding ground is good. Small vessels anchor inside the bay on either side of the entrance channel.

The hurricane anchorages for large vessels are Ensenada Honda (Isla de Culebra) and Ensenada Honda, 10 miles S of Fajardo. Small vessels can anchor S of Isla Marina.

**Dangers.**-The approaches to Bahia de Fajardo have reefs that usually show breakers and shoals with 7 to 18 feet over them. Inside the bay depths range from 3 to 24 feet.

**Bajo Laja,** with least depths of 7 to 10 feet over it, lies on the E side of the N entrance and is marked with buoys.

**Isla Marina,** with surrounding reefs up to 0.5 mile, is on the E side of the bay.

**Storm warning signals are displayed.** (See chart.)

**Arrecife Corona Carrillo** and a long reef to the W obstruct the S entrance to the bay. **Bajo del Rio,** a bank with depths of less than 5 feet, extends more than 0.2 mile offshore along the S entrance to the bay.

**Currents.**-The current velocity is 0.3 knot in the SSE direction on the flood and 1 knot in a NNW direction on the ebb in the channel in Bahia de Fajardo.

**Pilotage.**-A local pilot is available. (See Pilotage for harbors of Puerto Rico at the beginning of this chapter.)

**Towage.**-Tugs are not available at Fajardo.

**Quarantine.**-A representative of the U.S. Public Health Service quarantine office at San Juan enforces the national quarantine laws. Vessels subject to such inspection generally make arrangements in advance through the ships' agent. (See Public Health Service, chapter 1.)

**Agricultural quarantine.**-Vessels subject to such inspection are usually inspected at their berths by officials with an office at the customhouse. (See appendix for address.)

**Customs and immigration.**-Fajardo is a **customs port of entry.** A deputy collector of customs handles customs matters and acts as immigration inspector. The customhouse is on the waterfront at Playa de Fajardo. (See appendix for address.)

**Harbor regulations.**-Local regulations are enforced by a Commonwealth Captain of the Port.

**Wharves.**-The landing facilities are at **Playa de Fajardo** on the SW side of Bahia de Fajardo. The westerly 300-feet public pier has 12 feet at the outer end and 8 feet alongside; two private white lights are off the outer end of the pier. An 80-foot bulkhead pier with 12 feet alongside for the ferry boat is 100 yards W of the public pier.

A privately owned pier 125 yards E of the public pier is 400 feet long with 5 feet at the outer end. The former limestone pier to the E is in ruins.

**Storm warning signals are displayed.** (See chart.)

**Supplies and repairs.**-Water is available and gasoline can be trucked in. Groceries can be ob-

tained from **Fajardo,** 1.5 miles inland. Limited facilities are available for repairs. The principal source of marine supplies is San Juan, 38 miles by highway from Playa de Fajardo.

**Small-craft facilities.**-A marina on Isla Marina, on the E side of Bahia de Fajardo, has facilities for small craft. Depths of 8 to 14 feet can be taken to the marina. Berths, electricity, gasoline, diesel fuel, water, ice, and covered storage are available at the finger piers. Lifts can haul out vessels up to 200 tons for hull and engine repairs. Vessels up to 65 feet in length can be accommodated at the marina.

A private marina 0.3 mile NE of Playa Sardinera, N of Playa de Fajardo, has facilities for small craft. A depth of 12 feet can be taken to the berths inside a 700-foot breakwater that is marked on the seaward end by a fixed red light. Berths, electricity, gasoline, diesel fuel, water, and ice are available.

A marina at the hotel just S of Punta Gorda has berthing facilities inside a manmade basin. A depth of 12 feet can be taken through the lighted entrance and then 12 to 7 feet to the berths. Berths, electricity, gasoline, diesel fuel, water, and ice are available.

**Chart 25663 (917).-Isla de Ramos,** 4 miles S of Cabo San Juan Light, is 0.2 mile in diameter and covered with palm trees except on its summit which is a grassy 35-foot knoll with a house on top. A reef surrounds the island to a distance of 200 to 300 yards. A buoyed shoal with a least depth of 16 feet is 0.6 mile ESE of the island.

**Cayo Largo,** 1.5 miles E of Isla de Ramos, consists of a narrow 1.8-mile-long ridge steep-to on all sides. The S half is awash at low water, and the sea always breaks on it; the N half has depths of 4 to 15 feet. Buoys mark the W side. The velocity of the current is 0.5 knot in the channel W of Cayo Largo; it floods S and ebbs NW.

**Isla Pineros,** 8 miles S of Cabo San Juan Light, is a 1-mile long wooded island with a 249-foot peak near the middle. **Isla Cabeza de Perro,** just E of Isla Pineros, has a large detached rock off the rocky bluff NE end. **Cabeza de Perro Light** (18°15.1'N., 65°34.6'W.), 90 feet above the water, is shown from a 30-foot red skeleton tower on the E point of the island. **Pasaje Medio Mundo,** W of Isla Pineros, is foul, but a depth of 15 feet can be taken through the narrow crooked channel by small boats with local knowledge.

**Punta Puerca,** 10 miles S of Cabo San Juan, is a prominent bold wooded head with a high rock bluff at the shoreline. The highest point, 0.3 mile inland, is the site of several large white dish-shaped radar tracking units. The units show up well from offshore.

**Chart 25666 (922).-Ensenada Honda,** 11 miles S of Cabo San Juan, is the site of the **Roosevelt Roads United States Naval Station.** The harbor is well protected by the circular shore and the reefs which constrict the entrance to 0.3 mile. The harbor is included in a **restricted area** which extends from **Punta Figueras** (see chart 25663 (917)), 3.5 miles N of Ensenada Honda, to 2 miles W of the entrance. (See 207.815, chapter 2, for limits and regulations.)

**Bahia de Puerca,** a mile NE of Ensenada Honda, has depths of 37 feet or more, leading to a pier with 37 feet alongside at the head of the bay. A 26-foot spot is 150 yards SW of the pier. The 1,000-foot pier consists of a series of caissons connected by walkways; a large inactive graving dock is inshore of the pier.

**Isla Cabras,** on the E side of the entrance to Ensenada Honda, has a rocky bluff on the E side. **Isla Cabras Light** (18°12.9'N., 65°36.0'W.), 70 feet above the water, is shown from a skeleton tower with a rectangular-shaped red daymark with a central white stripe near the E end of the island. The island is connected to the mainland by a causeway. **Cabra de Tierra** is the southernmost point of a low neck covered with mangroves and palms separating Ensenada Honda from Bahia de Puerca.

**Punta Cascajo,** the W point at the entrance to Ensenada Honda, has rocky cliffs on the S side and a bare reef 250 yards off the SE side. Many houses are on the high part of the point, and trees fringe the shoreline. An unnamed cove just NW of the point is blocked at the entrance by a permanent shark net.

**Channels.**-A dredged channel, marked by lighted and unlighted buoys and a **315°** lighted range, leads to a large turning basin in Ensenada Honda. Vessels anchor inside the harbor according to draft; the holding ground is soft mud, which may cause some dragging during a hurricane. In 1965-68, a controlling depth of 40 feet was available in the channel and turning basin.

**Wharves.**-Pier 1, U.S. Navy fuel pier, the more W pier on the NE side of Ensenada Honda, is 450 feet long with 32 feet along the W side and 36 feet along the E side; water is available. A small boat landing with about 15 feet alongside is inshore of the E side of the fuel pier.

Pier 2, U.S. Navy cargo pier, SE of Pier 1, is 398 feet long with 32 feet alongside; water is available. An LST landing ramp is about 400 yards SE of the cargo pier.

Pier 3, a 1,200-foot-long U.S. Navy aircraft carrier pier marked at its seaward end by fixed red lights, is 0.25 mile S of Pier 2. Depths of about 39 feet are alongside.

**Quarantine.**-A representative of the U.S. Public Health Service quarantine office at San Juan enforces the national quarantine laws. Vessels subject to such inspection generally make arrangements in advance through the ships' agent. (See Public Health Service, chapter 1.)

**Customs** and **immigration,** services are handled by representatives from Fajardo.

An **agricultural quarantine** official is at the Roosevelt Roads Naval Station.

**Chart 25665 (923).-Puerto de Humacao,** 19 miles S of Cabo San Juan, affords some shelter for medium-draft vessels. The port is exposed SE and S, and a heavy sea sometimes makes in with SE winds. The port is inactive and the piers and cargo handling facilities of Playa de Humacao are in ruins. Small boats can make a landing at the ruins of the old sugar central pier during good weather.

**Prominent features.-Punta Lima,** 3 miles NE of Puerto de Humacao, is a projecting wooded hill with low land back of it. A reef 0.5 mile E of the point usually shows breakers on it.

**Cayo Santiago,** 0.7 mile SE of the waterfront at **Playa de Humacao,** is the most prominent feature when approaching the port. The island is low at the N end, rising to 162 feet at the S end. The Caribbean Primate Research Center maintains a monkey colony for experimental purposes on the island; no visitors are permitted.

**El Morrillo,** 1.8 miles SW of the port, is a small rocky hill which rises abruptly from the water and the lowland around it.

**Morro de Humacao,** 3.5 miles SW of the port, is a 100-foot rocky point with higher ground inland. Grass-covered **Cayo Batata** is 0.4 mile off the point. A bare ledge, with five rocks and a reef, awash and steep-to, extends up to 0.2 mile E and S of Cayo Batata.

**Channels.**-The principal entrance to Puerto de Humacao is from S through an unmarked channel leading W of **Bajo Parse** and **Bajo Evelyn;** small vessels can enter from N.

**Anchorages.**-Large vessels can anchor inside the entrance lighted buoy, 2.3 miles S of Cayo Santiago, as close inshore as draft permits.

Ensenada Honda, 10 miles NE, is the nearest hurricane anchorage.

Small vessels anchor in depths of 3 to 10 feet in the NE part of **Puerto de Naguabo,** 2 miles NE of Puerto de Humacao. Good anchorage is afforded except with SE or S winds. A boat landing in about 7 feet of water can be made at a small pier SE of Puerto de Naguabo. Gasoline is available nearby.

**Dangers.**-Several shoal spots with depths of 12 to 18 feet are in the approaches to Puerto de Humacao. The 12-foot shoal 1.2 miles E of Cayo Santiago and the shoals at the S entrance are unmarked. The chart is the best guide. A shoal area with depths of 1 to 6 feet extends for 0.4 mile from Cayo Santiago towards the waterfront at Playa de Humacao. A wreck reportedly covered 8 feet is 300 yards SE of the ruins of the long pier.

**Supplies and repairs.**-Some groceries are available at Playa de Humacao, but most supplies must be obtained from **Humacao,** 6 miles inland. The principal source of marine supplies is San Juan, 44 miles by highway from Playa de Humacao.

**Chart 25661 (918).-Puerto Yabucoa,** 23.5 miles SW of Cabo San Juan Light and 6 miles NE of Punta Tuna Light, is an open bay with numerous reefs and sunken rocks with depths of less than 5 feet between rocky **Punta Guayanes** on the N and **Punta Quebrada Honda** on the S. The port is the site of a deep-draft oil-handling facility. Large tankers call here to deliver crude petroleum and load petroleum and petrochemical products.

**Channels.**-A privately dredged 500-foot channel leads from deepwater to a turning basin and petroleum wharf. A jetty extending about 200 yards from the NE side of the basin entrance is marked by a light. The channel is marked by private lighted aids and a **296°50′** lighted range. In April-May 1971 controlling depths were 49 feet in the entrance channel, thence 50 feet in the main basin except for depths of 34 to 36 feet along the S edge; 25 feet was available in the smaller basin to the W of the main basin.

The storage tank farm and several tall stacks are conspicuous NW of the turning basin.

**Anchorages.**-A suitable anchorage is available for several deep-draft vessels SE of Punta Guayanes.

**Dangers.**-The area seaward of the dredged channel is relatively open and free from dangers, but care should be exercised in approaching the channel as depths shoal extremely rapidly at the channel entrance. Outcrops of hard seafloor material exist close to the edges of the channel; give the edges of the channel a good berth. A shoal area that is partially bare with breakers is 0.5 mile SW of the channel. Prevailing winds from ESE cause a good swell in the basin most of the time.

**Pilotage.**-(See Pilotage for harbors of Puerto Rico at the beginning of this chapter.) Local pilots are available. Pilots board in-bound vessels about one mile seaward of the channel entrance.

**Towage.**-The use of a tug is compulsory for arriving and departing vessels. Tugs up to 3,800 hp are available.

**Quarantine.**-A representative of the U.S. Public Health Service quarantine office at San Juan enforces the national quarantine laws. Vessels subject to such inspection generally make arrangements in advance through the ships' agent. (See Public Health Service, chapter 1.)

**Agricultural quarantine, customs, and immigration** services are handled by representatives from Fajardo. (See appendix for addresses.) Authorities board vessels at their berths.

**Harbor regulations.**-Local regulations are enforced by the local Commonwealth Captain of the Port.

**Wharves.**-The petroleum wharf on the N side of the main basin is 450 feet long with turning and berthing dolphins extending off the ends. Depth alongside is 50 feet. The barge and dry cargo wharf on the S side of the basin just inside the entrance is 200 feet long with a depth of 10 feet reported alongside.

An unused pipeline trestle pier formerly used for loading molasses is at **Playa de Guayanes** in the N part of Puerto Yabucoa.

**Supplies** and **repairs.**-Bunker C, diesel oils, and water are available at the petroleum wharf. Limited marine supplies are available in Puerto Yabucoa. Stores and supplies can be ordered through the ship agents for delivery to the vessel with at least 48-hours advance notice.

No repair facilities are available.

**Chart 25659 (924).-Punta Yeguas,** 1.2 miles S of Punta Quebrada Honda, is a low point with a rocky bluff at the end, which rises gradually in a smooth grassy ridge that joins the E end of Cuchilla de Panduras.

**Punta Toro,** the point 1.4 miles WSW of Punta Yeguas, is a 500-foot-high spur of **Cuchilla de Panduras,** which has elevations of over 1,800 feet to the N.

**Punta Tuna Light** (17°59.4'N., 65°53.1'W.), 110 feet above the water, is shown from a 49-foot white tower on dwelling, near the end of the point. A radiobeacon is at the light. **Storm warning signals are displayed.** (See chart.) The point projects as a high cliff; a 400-foot hill 0.5 mile N is prominent.

**Arrecife Sargent,** 0.5 mile SE of Punta Tuna is 1.8 miles long and 0.3 mile wide at its widest point. Because it breaks the force of the SE swell, the reef affords some protection from the SE for vessels anchored well in by Punta Tuna where the reef is from 0.3 to 0.2 mile from shore. A bare part of the reef, 0.7 mile E of the light, has the appearance of a rowboat and black can buoy. Other parts of the steep-to reef have depths of 6 to 17 feet. The break on the reef does not show well except when there is considerable sea, and on parts of it the sea rarely breaks. The natural channel between the reef and the shore is not recommended for strangers.

**Charts 25671 (901), 25677 (902).-** The **S coast** of Puerto Rico from Punta Tuna to Cabo Rojo extends in an almost W direction for 75 miles. The coast is very irregular with projecting brush-covered points between shallow coves and bays; fringing reefs close to shore make landing difficult and often dangerous in most places. Except at the E and W ends of Puerto Rico, the land is generally low near the shore with prominent high hills in the interior. Many reefs and islands are from 2 to 5 miles offshore, then the bottom increases rapidly to great depths, making soundings of little use to indicate danger or distance from shore. Numerous lights and other prominent features along the coast can be used for position determination. Safety will be ensured by giving a berth of at least 3 miles to the coast and to Isla Caja de Muertos. Small vessels with local knowledge sometimes hug the coast inside the outer reefs to avoid heavy seas outside.

In 1967, a rock pinnacle, covered 6 fathoms, was reported about 12.5 miles ESE of Isla Caja de Muertos Light in 17°50'35"N., 66°18'14"W.

**Chart 25689 (925).-Puerto Arroyo,** 11 miles W of Punta Tuna Light, is an open bay exposed to S winds. The harbor is used only by small fishing vessels that anchor near **Arroyo** in the NE part of the bay.

**Punta Figuras,** a projecting point on the E side of Puerto Arroyo, is marked by a light. **Cerro Range,** 3 miles N of the light, is a distinct sharp conical hill. The stacks of several sugar centrals are also prominent.

The principal entrance channel is from SW; a lighted buoy is on the E side of the approach. Several shoals with depths of 24 to 30 feet are in this approach, and the bottom is irregular. There is a small- boat passage from E between Punta Figuras and Arrecife Guayama; the passage should be used only with local knowledge. Depths of 24 to 30 feet can be taken to the anchorage area, thence about 5 feet to the private pier at Arroyo. The E passage has depths of 13 to 30 feet to the anchorage.

The best anchorage is in 23 to 30 feet a mile WSW of Punta Figuras Light. The prevailing SE wind is always felt in the anchorage, although the force is somewhat broken by the outlying reef. Some small fishing vessels anchor near Arroyo according to draft. Bahia de Jobos, 10 miles W, is the nearest hurricane anchorage.

**Arrecife Guayama,** 1 to 1.5 miles off Punta Figuras, is nearly 3 miles long and is dangerous to approach. Its E part is awash, and the sea usually breaks on it; the middle part has little water on it with patches awash on which the sea breaks. **Arrecife Corona** 1.4 miles W of Punta Figuras, has a least depth of 5½ feet.

**Arrecife Algarrobo,** 2.3 miles W of Punta Figuras, has 1 foot or less over it. Several shoals with depths of 6 to 18 feet extend up to 2 miles offshore S of **Punta Barrancas,** a point on thw W side of Puerto Arroyo 3.8 miles W of Punta Figuras.

Local harbor regulations for Puerto Arroyo are enforced by a Commonwealth Captain of the Port.

**Chart 25677 (902).-Laguna de Las Mareas** about 6.5 miles W of Punta Figuras is the site of a deep-draft oil-handling facility. Large tankers call here to deliver crude petroleum products and load petrochemicals and motor fuels.

**Channels.**-A privately dredged channel and land-cuts lead through the reefs from deepwater to the facilities' basin and pier in Laguna de Las Mareas. The breakwater extending from the E entrance point, **Punta Ola Grande,** is marked at the seaward end by a light. The channel is marked by private lighted aids and a **025°04'36"** lighted range. In 1968, the reported controlling depths were 40 feet in the entrance channel and 38 feet in the basin.

The 1,100-foot pier in the basin extends from the N shore and consists of a series of connected mooring and breasting dolphins with a 90-foot loading platform (pierhead) near its center. In 1968, depths of 38 feet were reported alongside.

**Pilotage.**-(See Pilotage for harbors of Puerto Rico at the beginning of this chapter.) Pilots board vessels 1 mile off the entrance to the harbor. A 48-hour and a 24-hour notice of time of arrival are requested.

**Towage.**-Tugs up to 1,800 hp are available for docking vessels. The tugs monitor 2182 kHz and VHF-FM channel 16 (156.80 MHz).

**Quarantine.**-A representative of the U.S. Public Health Service quarantine office at San Juan enforces the national quarantine laws. Vessels subject to such inspection generally make arrangements in advance through the ships' agent. (See Public Health Service, chapter 1.)

**Customs, immigration** and **agricultural quarantine** services are handled by representatives from Ponce. (See appendix for addresses.) Officials board vessels at their berths. **U.S. Public Health Service** doctors are available for attendance on vessels upon receipt of notice 48 hours prior to arrival. A hospital is at nearby Guayama.

**Repairs.**-The nearest port for major repairs is San Juan; limited emergency above-the-waterline repairs are available at Ponce.

**Supplies.**-No bunkers are available; in emergencies bunkers and lube oils may be delivered from Ponce. Limited quantities of water are available at the pier. Marine supplies are available on 48-hour notice.

**Tides.**-The reported mean range of tide is 0.8 foot.

**Chart 25687 (909).-Bahia de Jobos,** 20 miles W of Punta Tuna Light, is a good hurricane anchorage. The harbor is formed by **Punta Pozuelo,** a projecting point on the E side, and many islands on the S and SW sides. The shore and islands are low and are covered with thick brush and mangroves. **Central Aguirre,** on the NW side of the bay, is one of the largest sugar centrals of Puerto Rico. The E part of the bay is shoal and is used only by local fishing boats.

A privately dredged and marked channel leads E from Punta Rodeo along the N side of Punta Pozuelo to a private basin and barge receiving wharf of an oil company. In 1967, the channel and basin were reported dredged to a depth of 15 feet.

**Prominent features.**-A light on the E end of **Cayos de Ratones** marks the entrance to Bahia de Jobos. The stacks at Central Aguirre and the water tank at **Salinas** show up well from offshore.

**Boundary lines of inland waters.**-The lines established for Bahia de Jobos are described in 82.230, chapter 2.

**Channels.**-The principal entrance to Bahia de Jobos is from the W between **Cayo Morrillo** and Cayos de Ratones, and thence through a marked dredged channel that leads to a turning basin and facilities of a powerplant, and to a 1,000-foot-long pier at the head of the channel at Central Aguirre. In June 1974, the dredged channel had a controlling depth of 25 feet for a midwidth of 150 feet to the turning basin and 1,000-foot-long pier. In 1972, the basin, marked by private lighted buoys, had depths of 27 feet.

**Boca del Infierno,** a small-boat entrance into Bahia de Jobos between **Cayos Caribes** and **Cayos de Barca,** has a depth of 11 feet over the bar which breaks with a heavy sea. This passage should be used only with local knowledge.

**Anchorages.**-Vessels sometimes anchor just inside the entrance between Cayo Morrillo and Cayos de Ratones to await daylight. There is a good anchorage in depths of 26 to 35 feet with grassy bottom NE of **Cayos de Pajaros.** The anchorage inside the bay is S of the pier at Central Aguirre in depths of 19 to 24 feet with soft mud bottom. A slight swell makes in through Boca del Infierno with S winds.

**Dangers.**-Numerous wooded islands with reefs awash and steep- to surround the S and SW part of Bahia de Jobos up to 1.5 miles from the mainland. There are passages between some of the island groups, but only the principal entrance E of Cayos de Ratones should be used by large vessels and small boats without local knowledge.

**Pilotage.**-Pilots from Ponce serve this harbor. (See Pilotage for harbors of Puerto Rico at the beginning of this chapter.) Vessels are boarded off Cayos de Ratones.

**Quarantine.**-A representative of the U.S. Public Health Service quarantine office at San Juan enforces the national quarantine laws. (See Public Health Service, chapter 1.)

**Customs, immigration** and **agricultural quarantine** services are handled by representatives from Ponce.

**Wharves.**-The 1,000-foot-long pier at the head of the dredged channel at Central Aguirre was reported, in 1975, to be in poor condition and not usable. The fuel oil barge loading platform of the powerplant, on the NW side of the turning basin, has about 300 feet of berthing space with dolphins.

**Supplies and repairs.**-Supplies have to be obtained from inland towns; San Juan is 67 miles by highway. Some above-the-waterline emergency repairs can be made by the machine shop at Central Aguirre.

**Small-craft facilities.**-A private yacht club is 0.3 mile NE of the pier at Central Aguirre. A depth of 4 feet can be taken to the pier where water is available. Gasoline can be brought in from nearby Central Aquirre.

**Bahia de Rincon,** 26 miles W of Punta Tuna Light, is a 5-mile-wide bay used only by local fishing boats that anchor near **Playa Salinas** in the NE part. There is a good anchorage in depths of 25 to 28 feet in the E part of the bay during ordinary weather. The bay shoals to 18 feet and less within a mile of the shore in some places. A covered crash boat wharf, marked by fixed red lights, is at the head of the cove just E of Playa Salinas. The wharf is under control of the Puerto Rico Air National Guard.

**Arrecife Media Luna** and **Cayo Alfenique (Arrecife Alfenique)** obstruct the entrance to Bahia de Rincon from S. The reefs are partly bare or awash, steep-to, and the sea breaks on them. The W side is obstructed by **Cayos de Caracoles** and **Cayos Cabezazos.** Reefs awash or bare and nearly steep-to surround the islands, and the sea always breaks on their S sides. Foul ground with depths of 3 to 8 feet extends N to **Punta Petrona,** the W point of the bay.

Depths of 23 to 28 feet can be taken to anchorage in Bahia de Rincon on either side of Arrecife Media Luna; avoid the 11-foot shoal 0.4 mile W of Cayos de Ratones. Small vessels with local knowledge also use the narrow channel N of Cayos de Ratones.

In 1967, a rock pinnacle, covered 6 fathoms, was reported in about 17°50.6'N., 66°18.3'W., about 5 miles S of the light on the E end of Cayos de Ratones. (See chart 25677 (902).)

**Chart 25685 (926).**-The 15-mile indentation in the coast between Bahia de Rincon and Bahia Ponce is obstructed by islands and shoals up to 5 miles offshore. The stacks of several sugar centrals and several water tanks are prominent along the coast line. Anchorage in depths of 15 to 30 feet can be found within 0.5 mile of the shore during ordinary weather. Small local fishing boats anchor near the settlements along the shore.

**Playa Santa Isabel,** 31 miles W of Punta Tuna Light, is a small settlement near the beach where water can be obtained. A depth of 4 feet can be taken to the landing. Gasoline, groceries, and some supplies are available at **Santa Isabel,** 0.7 mile inland.

**Cayo Berberia,** 33 miles W of Punta Tuna Light, is 2 miles offshore and is surrounded by a reef and shoals. The fringing reef, on which the sea breaks on the S and E sides, extends up to 0.4 mile from the island. A shoal with depths of 2 to 12 feet extends for 0.2 mile N of the island and over a mile W of it. In ordinary weather, a good anchorage in 45 to 60 feet of water 1 mile NW of the island was reported by the NOAA Ship MT. MITCHELL. Care must be taken when approaching the area because of shoals with depths of 16 to 18 feet, 2 miles NW of the island.

**Isla Caja de Muertos,** about midway of the 75-mile stretch of coast between Punta Tuna Light and Cabo Rojo, is 5 miles offshore and prominent. The SW end is low except for a 170-foot steep hill at the extreme SW end. When viewed from a distance the 170-foot hill appears to be a separate island. At such times the hill is easily mistaken for Isla Morrillito. Care should be taken when shooting tangents to these islands. Landings can be made on the W side of the island during ordinary weather. **Isla Morrillito** is a small 31-foot flat-topped island 200 yards off the SW point.

**Isla Caja de Muertos Light** (17°53.7'N., 66°31.3'W.), 297 feet above the water, is shown from a 63-foot gray tower on the summit of the island.

Shoal water with depths of 3 to 18 feet extends up to 0.5 mile from the shore of Isla Caja de Muertos and Isla Morrillito. A reef is reported to extend about 0.4 mile seaward in all directions from a point on the NE end of Isla Caja de Muertos in 17°54.0'N., 66°30.6'W. A bar with a least depth of 15 feet extends NE from Isla Caja de Muertos gradually curving E and joins the shoal area W of Cayo Berberia. The sea rarely breaks on the bar; it is dangerous to approach.

A passage N of Cayo Berberia and Isla Caja de Muertos is used in the daytime by small coasting vessels with local knowledge. There are several shoals with depths of 14 to 17 feet along the route.

A good anchorage in ordinary weather in 90 to 120 feet of water about 0.8 mile NW of the center of Isla Caja de Muertos was reported by the NOAA Ship MT. MITCHELL. The island offers a good lee.

**Isla del Frio (Cayos Frios)** (see chart 25683 (927)), 4.3 miles NNW of Isla Caja de Muertos and 0.4 mile offshore, is surrounded by a 0.4-mile-long reef that is steep-to on the S edge.

**Chart 25683 (927).-Bahia de Ponce,** 43 miles W of Punta Tuna Light and 32 miles E of Cabo Rojo Light, is the most important commercial harbor on the S coast and one of the three leading ports of Puerto Rico. The harbor is protected from the prevailing E trade winds by Punta Penoncillo and Isla de Gata with their surrounding reefs, but it is exposed to the S causing a swell at times in the anchorage. The port facilities are in the E part of the 3.5-mile-wide bay, which is surrounded by shoals and reefs; the N part of the bay shoals to less than 18 feet within 0.4 mile of the shore in places.

**Ponce,** the second largest city in Puerto Rico, is 2 miles inland from the port at **Playa de Ponce,** and 71 miles by highway from San Juan. Most cargo is landed at the municipal pier and bulkhead on Punta Penoncillo. The principal imports include foodstuffs, textiles, building materials, and machinery. Exports include sugar, cement, and canned fish.

**Prominent features.**-(See also chart 25677 (902).) Isla Caja de Muertos with the light on its summit is the most prominent feature in the approach. The stacks of the cement factory W of Ponce, the large microwave tower in Ponce, the hotel on the hill back of Ponce, and the radio towers and stacks surrounding the bay can be seen from well offshore. Also prominent is the aerolight at Mercedita Airport, about 2.5 miles E of Ponce.

**Isla de Cardona** (Cayo Cardona), in about the middle of the entrance to Bahia de Ponce, is marked by a light shown from a white tower near the middle of the island. **Isla de Gata,** S of the municipal pier on **Punta Penoncillo** is connected by a dike to **Punta Carenero.**

**Boundary lines of inland waters.**-The lines established for Bahia de Ponce are described in 82.225, chapter 2.

**Channels.**-The principal entrance is E of Isla de Cardona, where in September 1971, the controlling depth was 25 feet in the buoyed approach to the municipal pier and bulkhead. Lesser depths exist N of the inner harbor basin buoys and NE of the municipal pier and bulkhead. The channel is also marked by a **015°** lighted range; do not confuse the rear range light with the flashing red radio tower lights back of it. A 0.2-mile-wide channel between Isla de Cardona and Las Hojitas is sometimes used by small vessels with local knowledge.

**Anchorages.**-The usual anchorage is NE of Isla de Cardona in depths of 30 to 50 feet, although vessels can anchor in 30 to 40 feet NW of Las Hojitas. A special anchorage area for small craft is NE of Las Hojitas in depths of 18 to 28 feet. (See 110.1 and 110.255, chapter 2, for limits and regulations.) A well-protected anchorage for small boats in depths of 19 to 30 feet is NE of the yacht club on Isla de Gata. A comfortable anchorage with little swell during ordinary weather in depths of 18 to 30 feet can be found in **Caleta de Cabullones (Caleta de Cabullon)**, the bight E of Isla de Gata.

Bahia de Ponce is not safe as a hurricane anchorage because it is exposed to the S. The nearest hurricane anchorages are at Bahia de Jobos, 28 miles E, Bahia de Guayanilla, 8 miles W, and Bahia de Guanica, 16 miles W.

**Dangers.**-**Bajo Tasmanian,** an extensive bank on the E side of the principal harbor entrance, is about a mile long with several spots of 16 to 18 feet. Vessels should pass 200 yards or more W of the buoy to clear the W limit of the bank.

The bank on the W side of the entrance extends almost to Isla de Cardona and has general depths of 28 to 48 feet, but there are several spots of 18 to 23 feet within an area 0.5 mile SW of the island.

**Bajo Cardona (Bajo Cayo Cardona)** extends 600 yards ESE from Isla de Cardona with depths of 12 to 17 feet. A bare reef on which the sea breaks extends 300 yards NE of the island; depths of 11 to 14 feet continue in the same direction for 200 yards.

A reef bare at low water and steep-to extends 300 yards W and SW from Isla de Gata. The sea always breaks on the outer side of this reef.

It is reported that with an E wind of 25 knots or more, the mud from the reef off Isla de Gata discolors the water across the channel to Isla de Cardona and beyond making the channel off the piers at Punta Penoncillo appear shoal.

Other unmarked shoals and reefs are dangerous in approaching Bahia de Ponce through any of the inshore passages. A reef with four islets extends 0.4 mile from shore to Punta Cabullones, 2.5 miles E of Isla de Cardona. The reef is steep-to, and the sea breaks on the S side. **Roca Ahogado,** a bare rock in the middle of Caleta de Cabullones, has shoal water of 4 to 18 feet extending up to 0.2 mile from it.

**Las Hojitas (Arrecife Cayito),** NW of Isla de Cardona, is 0.8 mile long in a NE direction with a small patch awash near the SW end. The reef has depths of 4 to 11 feet and is steep-to E and NE of this patch.

**Cayo Viejo (Escollo Hojas),** 0.8 mile W of Isla de Cardona, is about 0.3 mile in diameter and awash at its shoalest point.

**Isla de Ratones (Cayo Ratones),** on the W entrance to Bahia de Ponce and a mile offshore, is a low island with a reef that bares at low water extending a mile ESE of it. **Cayo Arenas,** 0.5 mile E of Isla de Ratones, is surrounded by a reef and shoals that extend up to 200 yards from its shore. Crooked channels with a least depth of 10 feet are between these islands and the shore; they should be used only with local knowledge.

**Storm warning signals are displayed.** (See chart.)

**Routes.**-From E: When 3 miles S of Isla Caja de Muertos Light steer **303°** for 8 miles until Isla de Cardona Light bears 005°, distant 2.5 miles, then head in on the lighted range bearing **015°.** From W: When 5 miles S of Guanica Light steer **079°** for 15.4 miles to the position off the entrance of Bahia de Ponce.

**Pilotage.**-(See Pilotage for the harbors of Puerto Rico at the beginning of this chapter.) Pilots board vessels at the entrance buoys.

**Towage.**-Vessels enter and clear the harbor under their own power. Two tugs are available in emergencies and may be contacted by calling the Coast Guard station at Ponce.

**Quarantine.**-A representative of the U.S. Public Health Service quarantine office at San Juan enforces the national quarantine laws. Vessels subject to such inspection generally make arrangements in advance through the ships' agents. (See Public Health Service, chapter 1.) The U.S. Public Health Service maintains a **contract physician's office** in Ponce. (See appendix for address.)

Customs and **Immigration.**-Ponce is a **customs port of entry.** The customhouse is in Playa de Ponce. The deputy collector of customs and his inspectors act as immigration inspectors.

**Agricultural quarantine** officials are stationed in Ponce. (See appendix for address.)

**Harbor regulations.**-A Commonwealth Captain of the Port with an office at Playa de Ponce enforces the local rules and regulations for Bahia de Ponce.

**Wharves.**-The municipal pier and wharf on Punta Penoncillo are administered by a board with a dock superintendent in charge. The municipal pier on the SE side is 450 feet long and has depths of 26 to 30 feet along both sides; transit sheds and pipelines for water, molasses, and bulk cement are on the pier. Immediately NW of the pier is a 63-foot-wide loading ramp which slopes to about 1 foot above the water.

On the N side of Punta Penoncillo is a 1,900-foot bulkhead wharf, locally known as Alcoa Pier and has depths of 17 to 28 feet alongside; transit sheds

and pipelines for water and diesel oil are on the wharf; general cargo is received.

About 350 yards E of the municipal pier is a L-shaped pier with a 350-foot face which in 1972 had reported depths of 30 feet alongside and 31 feet in the approach. Pipelines on the pier handle water and vegetable oil, and unload polluted water from fishing vessels.

A maneuvering basin extends 250 yards N of the municipal wharf, the northerly limits marked by buoys. In September 1971, the basin had depths of 24 to 30 feet with shoaling to lesser depths in the E end.

**Supplies.**-Most supplies are available at Ponce. If necessary, additional supplies can be brought in by truck from San Juan in a few hours. Freshwater, bunker C oil, and diesel oil are available at the municipal pier; gasoline is available by truck.

**Repairs.**-Above-the-waterline repairs and minor electrical and small-engine repairs are available in Ponce. There is no drydock or large marine railway available at the port.

**Small-craft facilities.**-The Ponce Yacht and Fishing Club has mooring facilities with depths of about 8 feet alongside on the N side of Isla de Gata. A 20-ton marine railway can haul out craft up to 45 feet for hull and engine repairs. A 3-ton hoist and freshwater are also available.

**Chart 25681 (928).-Bahia de Tallaboa,** 27 miles E of Cabo Rojo Light, is an open bay somewhat protected by islands and surrounding reefs. The shoreline is heavily industrialized; large vessels call here to deliver and load petroleum and chemical products.

**Prominent features.**-The beach is intensely developed with tank farms, cracking towers, buildings, and stacks. The most prominent objects in 1972 were two large cracking towers topped by red and white checkered tanks which constantly emit smoke, a large elevated water tank SE of the cracking towers, and a castlelike house on a hill above the extreme W edge of the bay. The two red and white striped stacks of the South Coast Steam Plant on the NE shore of Bahia de Guayanilla and the large sugar mill stack NW of Bahia de Guayanilla are also prominent from offshore.

**Channels.**-The principal entrance channel, marked by buoys, leads into Bahia de Tallaboa between **Cayo Caribe** on the E and **Cayo Maria Langa** and **Cayo Palomas** on the W. It is recommended that inbound vessels when abeam of Buoy 4, steer directly for Buoy 6 until Buoy 5 is abeam to the W. This avoids the danger of being set onto the 15-foot bank W of the channel by strong prevailing E winds. Shoals and reefs with depths of 10 feet and less extend from the islands nearly to the buoyed channel.

It is reported that depths of 32 feet or more can be taken to the offshore loading platform W of **Cayo Rio** and 37 feet can be taken to the oil pier NE of Cayo Rio. Private aids mark the best approach to each facility.

Ponce Salt Industries maintain a small harbor in the NE part of Bahia de Tallaboa. A channel leading to a riprap salt unloading area is marked by a private **013°** unlighted range and by buoys. Depth in the channel is about 5 feet. The approach across the bay to the harbor is marked by a private **057°** unlighted range with a depth of about 29 feet to the point where the 013° range is intersected. A mooring buoy, in about 13 feet of water, is just outside and to the E of the 5-foot channel leading to the inner harbor.

There are numerous private piers and boathouses for yachts and small craft along the NE shore of Bahia de Tallaboa extending from 66°42.2'W., to 66°43.0' W. This area is mostly foul with unmarked coral heads and reefs. Small craft should not attempt passage without local knowledge.

**Anchorages.**-Holding ground in Bahia de Tallaboa, charted as sticky, is poor, and dragging should be expected in winds greater than 25 knots. Bahia de Guayanilla, 1.5 miles W, is a good hurricane anchorage.

**Pilotage, towage, quarantine, customs, immigration,** and **agricultural** quarantine services and **harbor regulations** for Bahia de Tallaboa are discussed under Bahia de Guayanilla later in this chapter.

**Wharves.**-The Commonwealth Oil Refining Company, Inc., maintains a 2,100-foot pier, marked by a light at the seaward end, in the N part of the bay, about 0.3 mile NE of Cayo Río. In February 1971, a reported controlling depth of 38 feet was available along the outer 1,100 feet of the E side. Crude petroleum and chemicals are received, and petroleum products are shipped.

Union Carbide Caribe Company, Inc., has a 60-foot-long offshore tanker loading platform with dolphins about 700 yards SW of Cayo Rio. A reported depth of 32 feet can be taken to the platform. The platform is used to load bulk chemicals. The corners of the platform are marked by lights.

A 35-foot-long barge wharf with dolphins is at the mouth of a 100-yard-wide outlet canal about 0.6 mile N of the tanker loading platform. Two buoys about 600 yards NW of the platform mark the best approach to the canal. In 1970, the reported controlling depth in the approach to the canal was 10 feet with about 3 feet in the canal. The mouth of the canal is subject to silting.

Anchorage should not be attempted shoreward of the loading platform as there is a possibility of rupturing the submerged chemical lines leading to the platform.

**Bahia de Guayanilla,** 25 miles E of Cabo Rojo Light, is the largest hurricane harbor and one of the best in Puerto Rico. The reefs and islands to the SE break the sea but not the wind; some dragging can be expected. The harbor, between low and wooded **Punta Guayanilla** on the E and bluff-faced **Punta Verraco** on the W, is protected at its entrance by extensive reefs which extend a mile or more offshore. The E part of the bay is a

continuation of the industrial complex at Bahia de Tallaboa; large vessels call here to deliver and load petroleum and bulk chemical products.

**Prominent features.**-The features discussed for Bahia de Tallaboa are also prominent approaching Bahia de Guayanilla. The rectangular container lift structure of the Union Carbide Caribe Company off **Punta Gotay,** on the W side of Punta Guayanilla, and the tank farms to the E of Punta Gotay are also prominent. The tanks of Punta Pepillo and a large stack S of **Guayanilla** are conspicuous. A square white tower and a large white bulk storage tank bear 356° directly down the channel from the entrance.

**Cerro Toro,** on the SW side of Punta Verraco, has a 100-foot hill with a bluff head at its W end and a gentle slope NE to the low part of Punta Verraco. There is a bright yellow spot in the bluffs on the SE side. A low break separates the hills from **Punta Ventana,** 0.4 mile to the SW. The hill and point usually show well.

**Boundary lines of inland waters.**-The lines established for Bahia de Guayanilla are described in 82.220, chapter 2.

**Channels.**-The entrance channel, marked by buoys, leads into Bahia de Guayanilla between the shoals extending 0.4 mile from Cayo Maria Langa on the E and the shoals extending 1.4 miles from Punta Verraco on the W. Reported depths of about 40 feet can be taken from the entrance buoy to the privately dredged channel leading to the PPG Industries pier in the N part of the bay. In 1975, a controlling depth of 35 feet was reported in the privately dredged and marked channel. A least depth of 31 feet can be taken to the Commonwealth Oil Refining Company piers E of the PPG channel entrance, and 30 feet can be taken to the pier off Punta Pepillo.

**Anchorages.**-The usual anchorage is 0.5 to a mile NE of Punta Verraco in depths of 35 to 50 feet, although vessels can anchor any place in the bay according to draft. There is good holding bottom of thick mud. Small fishing boats anchor in the N end of the bay. A good hurricane anchorage for small craft drawing less than 10 feet can be had in the center of the cove about 1 mile 035° from Punta Gotay. The approach channel to the cove is about 200 yards N of Cayo Mata, thence E between two jutting points of land; the channel is privately marked and maintained; local knowledge is required.

**Dangers.**-Cayo Maria Langa is surrounded by reefs on which the sea breaks. The 30-foot curve is 0.3 mile S and about 0.6 mile ESE from the island, descending abruptly to great depths.

**Storm warning signals are displayed.** (See chart.)

**Arrecife Fanduco,** the SW end of the shoal that extends 0.6 mile S of Punta Guayanilla and 0.4 mile W of Cayo Maria Langa, is partly bare at low water, and the sea always breaks on it. A shoal with a depth of 13 feet extends 0.2 mile SSW from **Punta Gotay,** the W end of Punta Guayanilla.

**Arrecife Guayanilla** and **Arrecife Unitas,** on the W side of the entrance to Bahia de Guayanilla, form the S and SE sides of the reefs which extend 1.1 miles from Punta Verraco. The reefs are mostly bare at low water, and the sea always breaks on them. The 30-foot curve is about 0.2 mile from the S side, and the slope is abrupt to great depths. It has been reported that several deep-draft vessels have grounded on the 30-foot and shallower banks off the SE end of Arrecife Guayanilla while approaching the harbor entrance.

Inside the bay, the water is shoal with depths of less than 5 feet up to 0.5 mile or more from shore. The least depth inside the limit of the buoys is 30 feet.

**Routes.**-Vessels approaching in the daytime from E or W can follow the coast at a distance of 2.5 miles until the entrance to Bahia de Guayanilla is recognized, then follow the channel marked by buoys into the harbor. At night vessels should keep well offshore to avoid the reefs off the entrance until the entrance buoys are identified.

**Pilotage.**-(See Pilotage for harbors of Puerto Rico at the beginning of this chapter.) Vessels are usually boarded 1 mile outside the entrance buoys for Bahia de Guayanilla and Bahia de Tallaboa. Pilots can be contacted on 2182 and 2738 kHz. At least 2 hours' advance notice of arrival should be given.

**Towage.**-Tugs up to 2,200 hp are available for Bahia de Guayanilla and Bahia de Tallaboa. The tugs monitor 2182 kHz and VHF-FM channel 16 (156.80 MHz).

**Quarantine.**-A representative of the U.S. Public Health Service quarantine office at San Juan enforces the national quarantine laws. Vessels subject to such inspection generally make arrangements in advance through the ships' agents. (See Public Health Service, chapter 1.)

The nearest U.S. Public Health Service facility is the **contract physician's office** in Ponce. (See appendix for address.)

**Customs, immigration,** and **agricultural quarantine** services are handled by representatives from Ponce who board vessels at their berths or anchorage for both Bahia de Guayanilla and Bahia de Tallaboa.

**Harbor regulations.**-Local regulations are enforced by a Commonwealth Captain of the Port whose office is at Playa de Guayanilla.

**Wharves.**-The Union Carbide Caribe Company offshore wharf, on the W side of Punta Guayanilla at Punta Gotay, is 100 feet long with dolphins and had a reported depth of about 38 feet alongside in 1972.

The Commonwealth Oil Refining Company oil piers at the end of a causeway, 0.4 mile SW of Punta Pepillo, provide about 3,000 feet of berthing space. Depths alongside the N pier are reported to be about 32 feet, and about 37 feet alongside the S pier. The ends of the piers are marked by private lights. Mooring buoys are available to assist in

clearing the piers and mooring dolphins. There are pipelines on the piers for water and petroleum products. A 250-foot work-barge wharf with dolphins 0.1 mile E of the N pier has a reported depth of about 30 feet alongside.

Texaco's distributing plant 525-foot pier off Punta Pepillo has a reported depth of 31 feet at the end; depths of 12 to 18 feet are alongside the pier. A private light marks the outboard end of the pier.

The PPG Industries (Caribe) Company has a 1,100-foot pier in the N part of the bay. The privately dredged approach channel leading to the pier is marked by private lighted buoys. In 1972, depths of 40 feet were reported in the channel and 39 feet alongside the pier. A 200-foot-long tug pier is about 0.1 mile E of the pier.

A private 150-foot-long marginal barge wharf is at the N end of the large cove, known as **Cano de Los Placeres,** about 0.8 mile NE of Punta Gotay. A privately dredged channel leads from the entrance to the cove to the wharf; the channel has reportedly been dredged to 10 feet.

**Supplies.**-Bunker C, light diesel oil, other petroleum products, and at times marine diesel oil are available at the Commonwealth Oil Refining Company piers; 3 days advance notice is required to obtain the marine diesel oil. Water, in limited quantities, is available at the piers of the Union Caribe Company and the Commonwealth Oil Refining Company. Groceries and marine supplies can be obtained from Ponce, 12 miles by highway from Bahia de Guayanilla.

**Repairs.**-No repair facilities are available. Above-the-waterline and minor electrical and small engine repairs can be made in Ponce.

**Chart 25679 (929).-Bahia de Guanica,** 16 miles E of Cabo Rojo Light, is small but one of the best hurricane harbors in Puerto Rico. The bay is protected by the steep, high, and wooded shores on the E and W sides. Large vessels call here to load fertilizer, sugar, and molasses.

**Prominent features.-Guanica Light** (17°57.2'N., 66°54.3'W.), 132 feet above the water, is shown from a 40-foot white skeleton tower on **Punta Meseta,** on the E side of the entrance to Bahia de Guanica. An abandoned lighthouse tower just SE of the light is prominent in the daytime. Power transmission towers located on either side of the channel and a 39-foot water tower NW of Guanica Light are visible from seaward. Once inside the harbor, the most prominent objects are: two stacks at the sugar mill, a cupola at a large house near the sugar mill, and a fixed crane at the fertilizer wharf 0.5 mile N of Guanica Light.

**Boundary lines of inland waters.**-The line established for Bahia de Guanica is described in 82.215, chapter 2.

**Channels.**-Bahia de Guanica is entered through a buoyed approach channel, about 0.8 mile SE of **Punta Brea** (17°56.0'N., 66°55.2'W.), thence through a privately dredged channel, marked by a **354°30'** lighted range and buoys, which leads to a turning basin on the E side of the bay, and thence to the sugar mill at the W end of the bay. In 1970, the controlling depths in the dredged channel were 26 feet to the turning basin, thence 21 feet in the N half, and 27 feet in the S half of the channel to the W end of the bay.

An overhead power cable with a clearance of 150 feet crosses the channel about 0.4 mile inside the entrance.

**Anchorages.**-The usual anchorage is 0.6 mile E of the sugar mill pier in depths of 20 to 28 feet, although vessels may anchor any place in the bay according to draft. The bottom is soft and holding ground is good, except in the entrance. Small fishing boats anchor off Playa de Guanica.

**Storm warning signals are displayed.** (See chart.)

**Dangers.-Cayos de Cana Gorda,** 2 miles E of the entrance to Bahia de Guanica, extend 0.8 mile SW from **Punta (Criollo) Ballena.** They are low, covered with mangrove, and do not show well from seaward. Reefs partly bare at low water surround them to a distance of 0.3 mile.

**Arrecife Coral,** a mile E of the entrance, is an extensive coral reef partly bare at low water. The W end of the reef is nearly a mile SE from Guanica Light. Foul ground is between it, the N shore, and Cayos de Cana Gorda.

**Corona La Laja (Bajo La Laja),** 0.9 mile S of Guanica Light, is about 0.2 mile in diameter with 8 to 17 feet over it; the sea seldom breaks on the shoal. A ridge with depths of 22 to 24 feet extends over 0.3 mile W of the shoal almost to the buoyed channel.

On the W side of the entrance, a shoal with 11-foot and 12-foot spots extends 0.2 mile SE of Punta Brea.

A detached shoal, 0.6 mile NE of Punta Brea, has depths of 20 to 29 feet near the W side of the entrance channel. Other spots with depths of 25 to 28 feet are near the limits of the channel leading into the bay. A 29-foot depth is between entrance Buoys 2 and 3, and 24-foot depths are about 0.85 mile SE of the buoys.

**Ensenada las Pardas,** an open bay N of Punta Brea, is fringed with reefs, mostly bare at low water on which the sea breaks; the reefs make out as much as 0.4 mile from the shore.

**Routes.**-From a position 2.5 miles S of Guanica Light, head towards entrance lighted Buoy 2, passing midway between it and entrance Buoy 3, and head close by Buoy 5. When clear of Buoy 5 come left and pass 50 yards to the W of Buoy 6; then come right to pass close by the E side of Buoy 7 taking care to avoid the shoal with a least depth of 20 feet on the W side of the harbor approach and the 25-foot shoal to the E of the approach. When clear of Buoy 7, steady on the **354°30'** lighted entrance range into the harbor.

**Pilotage.**-(See Pilotage for harbors of Puerto Rico at the beginning of this chapter.) Pilots from Bahia de Guayanilla serve Bahia de Guanica. Ves-

sels are usually boarded 0.5 mile S of the entrance buoy. Pilots may be contacted on 2182 and 2738 kHz. Several hours' notice must be given to allow the pilot to come from Guayanilla.

**Towage.**-Tugs from Bahia de Guayanilla are available if necessary.

**Quarantine.**-A representative of the U.S. Public Health Service quarantine office at San Juan enforces the national quarantine laws. Vessels subject to such inspection generally make arrangements in advance through the ships' agents. (See Public Health Service, chapter 1.)

The nearest U.S. Public Health Service facility is the **contract physician's office** in Ponce. (See appendix for address.)

**Customs** and **immigration** services are handled by representatives from Ponce, and **agricultural quarantine** services by representatives from Mayaguez.

**Harbor regulations.**-Local regulations are enforced by a Commonwealth Captain of the Port whose office is near Playa de Guanica.

**Wharves.**-A 440-foot fertilizer bulkhead wharf with a conveyor, 0.5 mile N of Guanica Light, has 29 feet alongside. A chemical pier with dolphins, 0.7 mile N of Guanica Light, has 25 feet reported alongside; a conveyor system and pipelines are available.

The sugar mill on **Punta Pera** at the W end of the bay has two small wharves on the S side of the point which are used by small vessels for loading and have 28 feet alongside; pipelines for water, fuel oil, and molasses, and a conveyor system for bulk sugar are at the wharves. The Dominican Dock, extending off the E end of the point and marked by private lights on the outboard corners, has 25 feet alongside and is equipped for handling sugarcane.

**Supplies.**-Water is available at the sugar mill pier. Some marine supplies can be obtained at **Ensenada** and **Guanica.** Fuels are available by truck from Guayanilla.

**Repairs.**-Some emergency repairs can be made by the machine shop of the sugar central at Ensenada.

**Chart 25671 (901).**-The 13.5-mile stretch of coast between Punta Jorobado and Cabo Rojo includes numerous cays, islets, and reefs, some of which extend as much as 4 miles offshore. The area is important as a commercial fishing ground; many small fishing boats base in the coves and fishing villages.

A range of high hills shows up inland for virtually the whole distance. The highest points are **Cerro Vertero,** 4.4 miles NW of Punta Jorobado, and **Cerro Mariquita,** 6 miles NE of Cabo Rojo.

**Punta Jorobado,** 2 miles W of Punta Brea, is a small projecting point with a hummock 92 feet high. **Arrecife Baul** is a reef lying 0.7 mile SE of the point. **Turrumote II,** a mile W of Punta Jorobado, is a sandy islet 300 yards wide surrounded by reefs. **Bahia Montalva,** the bay about 2.8 miles NW of Punta Jorobado, offers some protection behind **Arrecife Romero** and **Arrecife Enmedio** for craft drawing up to 12 feet, but care is required in entering. **Turrumote I,** an islet 3.6 miles W of Punta Jorobado, is small and sandy, with shoals of 9 to 21 feet deep extending SE and SW.

At **La Parguera,** 8.5 miles E of Cabo Rojo Light, there is a somewhat protected harbor for small boats. Depths of 6 to 10 feet can be taken to the landing. Berths, electricity, gasoline, and some groceries are available. A small marine railway can handle craft up to 60 feet for hull repairs only.

**Arrecife Margarita,** 9 miles W of Punta Jorobado, is 1.5 miles S of **Punta Tocon,** and its W end is about 2 miles SE of Cabo Rojo. Rocks awash and depths up to 28 feet are on this reef, which extends nearly 4.5 miles in an E-W direction.

**Cabo Rojo,** the SW point of Puerto Rico, is a low neck 1.5 miles long at the S end of which are two hills with yellow bluff faces; the E hill is 118 feet high, and the W hill is 75 feet high. **Cabo Rojo Light** (17°56.1'N., 67°11.5'W.), 121 feet above the water, is shown from a 46-foot gray hexagonal tower attached to a flat-roofed dwelling on the SE point of the cape.

The **W coast** of Puerto Rico extends 26 miles N from Cabo Rojo to Punta Higuero and then 11 miles NE to Punta Borinquen. The coast is irregular with projecting wooded points between shallow bays. Places for small boat landings can be found in ordinary weather, but landing is dangerous in rough weather. In the S part the land is low near the shore with prominent high hills in the interior. Between Cabo Rojo and Bahia de Mayaguez reefs with depths of 30 feet or less extend up to 13 miles offshore; lighted buoys mark the extension of the shoal area. N of Bahia de Mayaguez the dangers are within 1 to 2 miles of the shore. Small vessels with local knowledge use an 18-foot buoyed passage 1 to 2 miles offshore between Cabo Rojo and Bahia de Mayaguez.

**Punta Aguila,** 1.7 miles NW of Cabo Rojo Light, consists of 2 small bluff heads with lower land behind them. A shoal with depths of 12 to 16 feet extends 1 mile W from the point. Water and gasoline are available at a fishing village a mile N of the point.

**Bajo Casabe** is a shoal that makes off between Punta Aguila and Punta Melones. The 18-foot curve is about 0.4 mile from shore at Punta Melones. Depths of 24 to 42 feet are near the W edge, which is fairly steep-to. A shoal with 22 to 28 feet extends W from the S part of Bajo Casabe, its W end lying about 2.7 miles WNW from Punta Aguila.

**Chart 25675 (932).**-**Bahia de Boqueron,** 6 miles N of Cabo Rojo, is a good harbor for vessels passing through Canal Guanajibo. It is easily entered but is rarely used, except by small local boats. The better

hurricane anchorage is at Guanica. The bay is 2.6 miles wide at the entrance between Punta Melones and Punta Guaniquilla, and extends 2 miles to its head where it is a mile wide. There are two entrances, N and S of **Bajo Enmedio,** the latter a rocky area with depths of 4 to 17 feet which lies across the middle of the bay. A buoy marks its S edge.

**Punta Melones,** the S point, is a bluff at the water's edge, backed by a 230-foot hill. Punta Guaniquilla, the N point, is sharply projecting and prominent.

For 0.6 mile inside Bajo Enmedio the depths are 27 to 35 feet. A ridge with depths of 19 to 23 feet extends in a N and S direction near the middle of the bay between Bajos Roman and Ramito. The depths E of the ridge decrease gradually from 26 to 12 feet.

**Canal Norte** is the channel leading into the bay between Punta Guaniquilla and the N end of Bajo Enmedio. It has a least width of about 350 yards, with depths of 21 to 28 feet. Owing to its nearness to the shore, this channel is easily followed and is the better one for strangers. **Canal Sur,** the S channel, leads between Bajos Enmedio and Palo. It is 350 yards wide between the 30-foot curves, with depths of 36 to 40 feet in the middle.

Anchorage can be had with soft bottom anywhere in Bahia de Boqueron, except on the shoals where the bottom is hard.

**Bajo Palo** is a shoal that extends nearly 0.7 mile N from the S shore of the bay, between 0.4 and 0.8 mile NE of Punta Melones. A depth of 5 feet is 0.3 mile from shore, and N of this the water deepens gradually from 8 to 13 feet at its N end. The W side of the shoal is steep-to.

**Bajo Ramito** is a small shoal with a depth of 8 feet and 20 to 24 feet close-to, 0.5 mile from the S side of the bay, and 1.7 miles NE from Punta Melones. **Roca Velasquez,** a rock which should be avoided by all vessels, lies nearly 0.2 mile W from the village of Boqueron. **Bajo Roman** is a small patch on which the least depth is 18 feet, with a surrounding depth of 27 feet. It lies about 0.4 mile from the N shore and 1 mile SE from Punta Guaniquilla.

**Boqueron,** a small fishing settlement on the N side at the head of the bay, is principally a bathing resort for Mayaguez. A private boating club has depths of 3-5 feet alongside. Berths, electricity, water, gasoline, and some groceries are available.

**Chart 25671 (901).-Canal de Guanajibo,** a buoyed passage inside the reefs between Punta Aguilla and Bahia de Mayaguez, has a least depth of 18 feet at its N end on the ridge extending NE from Escollo Negro. The least depth at the S end of the channel is 23 to 24 feet on a bank making W from Bajo Casabe. The current velocity is about 1 knot and sets N and S in the channel.

**Bajos Resuello,** the shoals off the entrance to Bahia de Boqueron, consist of three shoals separated by channels having depths of 24 to 36 feet; the S extremity of the shoals is W from Punta Melones and is marked by a buoy.

**Bajo Corona Larga** consists of two shoals with depths of 25 to 54 feet between them. The NW shoal, 1.3 miles long, is 4.5 miles W from Punta Guaniquilla; it has a least depth of 12 feet at its N end. The SE shoal is 1 mile long and has depths on the coral heads of 16 to 18 feet.

**Punta Carenero,** the N point at the entrance to Puerto Real, is low with many coconut trees, and at the water is a fringe of mangrove. **Punta La Mela,** the S point of Puerto Real, is low and covered with coconut trees that extend S to **Punta Boca Prieta.** A good anchorage in 36 feet is 0.5 mile W of Punta La Mela.

**Cerro Buena Vista,** an 850-foot hill 3.4 miles E of Puerto Real, is a prominent and useful landmark for many miles, especially from W. From that direction it shows a knob at the summit, with a steep convex slope on its N side.

**Puerto Real,** 8 miles N of Cabo Rojo, is a circular basin 0.7 mile in diameter used by local fishing vessels and small pleasure craft. Depths in the basin are 6 to 15 feet with shoal water toward the E end. **Puerto Real,** a small fishing community, is on the N shore of the basin. Water, gasoline, and some groceries are available. A small marine railway can haul out craft for minor repairs.

**Escollo Media Luna,** a rocky patch with a least depth of 25 feet, is 12 miles NW of Cabo Rojo and 6.5 miles offshore. **Las Coronas** consists of a shoal of numerous heads with depths of 9 to 14 feet, the S end of which is 3.2 miles NW of Punta Guaniquilla. The shoal extends 1 mile N and 2.5 miles ENE toward Punta Ostiones and, together with the shoals extending off that point, forms a ridge across Canal de Guanajibo. The depths are 9 to 15 feet on the shoalest section of this ridge 3 miles WSW from Punta Ostiones, and depths of 13 to 17 feet are along the center portion of the ridge.

**Escollo Negro** is the N shoal on the W side of Canal de Guanajibo. It is about 2.2 miles long in a NE direction and about 1.3 miles wide. Depths are 7 to 12 feet. A buoy marks an 18-foot passage across the ridge into Canal de Guanajibo.

**Arrecife Tourmaline** extends 5 miles W from Escollo Negro, with a width of 2.7 miles, its NW end lying 9.2 miles W from Punta Guanajibo. On the W and S parts of the reef are depths of 30 to 42 feet, decreasing to 18 and 24 feet on its NE part. A 30-foot spot off the NW end of the reef is marked by a lighted buoy.

**Punta Ostiones,** 9.5 miles N of Cabo Rojo and 1.3 miles N of the entrance to Puerto Real, is projecting and prominent, especially as seen from S. **Cayo Fanduca,** 0.8 mile SW from Punta Ostiones and about 0.5 mile from shore, consists of a few bare rocks. A narrow channel between it and the shore has a depth of about 3 feet, but it should not be attempted by strangers.

**Chart 25673 (931).-Bahia de Mayaguez,** about halfway along the 34-mile stretch of the W coast between Cabo Rojo and Punta Borinquen, is one of the three leading ports of Puerto Rico. The open roadstead is easy to enter day or night and is a good harbor in all but hurricane weather. The shipping terminal is in the N part of the 3.8-mile-wide bay which is protected somewhat by the shoals that extend across the entrance. Depths of 30 to 60 feet are in the N part of the bay, but the S part is shoal.

**Mayaguez,** the largest city on the W coast of Puerto Rico, is a mile S of the terminal and 101 miles by highway from San Juan. The principal imports include foodstuffs, building materials, machinery, fertilizers, textiles, and some petroleum products. Exports include clothing, fruit, vegetables, and tuna fish.

**Prominent features.-Punta Guanajibo,** 14 miles N of Cabo Rojo Light, is a 165-foot flat-topped ridge on the S side of Bahia de Mayaguez. A reform school on the point shows well from S.

**Cerro Anterior,** a 433-foot saddle-shaped hill 1.5 miles inshore at Mayaguez, is conspicuous, and **Pico Montuoso,** a dome-shaped peak 9 miles eastward of the bay is readily identified from W.

The city hall clock tower and a church are conspicuous above the other buildings at Mayaguez. Several red and white radio towers (seven in 1972) are visible along the S shore of the bay. A tall blue water tank is prominent behind the radio towers.

Storage tanks and two closely positioned stacks are visible back of a prominent marine crane at the shipping terminal pier.

A group of storage tanks and a tall boom on a conveyor pier are prominent about 750 yards SE of **Punta Algarrobo.**

**Boundary lines of inland waters.**-The lines established for Bahia de Mayaguez are described in 82.210, chapter 2.

**Channels.**-The principal entrance channel is between the lighted buoys marking Manchas Grandes and Manchas Interiores. Federal project depths in the Approach and Terminal Channels are 30 feet. See Notice to Mariners and latest editions of charts for controlling depths. The approach to the terminal is marked by a lighted **092°** range, and the approach to the anchorage is marked by **Mayaguez Harbor Light** (18° 12.6'N., 67°09.5'W.), 23 feet above the water and shown from a small white house on pile structure.

A secondary channel with depths of 18 feet or more leads into the bay from N inside of Manchas Exteriores and Manchas Interiores and W of Arrecife Algarrobo.

**Anchorages.**-The usual anchorage is SW of the shipping terminal in depths of 30 to 50 feet; the holding ground is good. The nearest hurricane anchorage is on the S coast of Bahia de Guanica, a distance of 60 miles.

Small fishing boats anchor in depths of 3 to 12 feet along the shore S of the shipping terminal. Pleasure craft anchor in depths of 7 to 12 feet along the shore 1.2 miles S of the terminal. Some small boats use Puerto Real, 10 miles S of Bahia de Mayaguez, as a hurricane anchorage.

**Dangers.-Escollo Rodriguez,** a bank with depths of 3 to 18 feet extending N for 2.5 miles from Punta Guanajibo, has a reef at the W end which is awash and always breaks. **Roca Blanca,** 0.7 mile NE of the reef, has 9 feet over it with deep water close-to.

**Manchas Grandes,** on the S side of the principal entrance, has depths of 10 to 20 feet and extends S to Escollo Rodriguez.

**Manchas Interiores** and **Manchas Exteriores** with depths of 12 to 18 feet extend in a NW direction for 2 miles on the N side of the principal entrance. The W side of the shoals are steep-to, but broken ground on the E side extends to within a mile of the shore; some spots have depths of 18 feet.

**Arrecife Algarrobo,** a mile NW of the terminal, has a few heads which bare at low water; the sea frequently breaks on the reef.

**Bajo Mondongo,** 500 yards SW of the terminal, is a small shoal partly awash. A sunken wharf is off **Punta Algarrobito,** 0.4 mile S of the terminal.

When winds are out of the W or SW, a surge is felt in the harbor causing vessels to pound against the terminal wharf. Smaller vessels are forced to anchor off under such conditions. **Tides and currents.**-Since the range of tide is about 1 foot, the variation in the water level depends considerably upon the wind.

The current velocity is about 1 knot and sets N and S across the entrance to Bahia de Mayaguez.

**Storm warning signals are displayed.** (See chart.)

**Routes.**-From S: When abeam of Arrecife Tourmaline Lighted Buoy 8, steer **060°** for about 7.5 miles, then head in on the lighted entrance range bearing **092°**. Note that this range leads to the N edge of the Approach Channel. If proceeding to the shipping terminal leave the range when abeam of lighted Buoy 5 and steer **096°** to line up with the Terminal Channel. If proceeding to anchorage leave the range just after passing between the buoys marking Manchas Interiores and Manchas Grandes and head for Mayaguez Harbor Light, then anchor according to draft.

From N: When Punta Higuero Light bears 120°, distant 2.3 miles, steer **153°** for about 10.7 miles and enter on the lighted range.

**Pilotage.**-(See Pilotage for harbors of Puerto Rico at the beginning of this chapter.) Vessels are boarded 1 mile W of the entrance buoys.

**Quarantine.**-A representative of the U.S. Public Health Service quarantine office at San Juan enforces the national quarantine laws. Vessels subject to such inspection generally make arrangements in advance through the ships' agents. (See Public Health Service, chapter 1.)

The nearest U.S. Public Health Service facility is at San Juan. (See appendix for address.)

Customs and **immigration.**-Mayaguez is a **customs port of entry.** The deputy collector of customs and his inspectors act as immigration officers. (See appendix for address.)

**Agricultural quarantine** officials are stationed in Mayaguez. (See appendix for address.)

**Harbor regulations.**-A Commonwealth Captain of the Port with an office on the Ports Authority shipping terminal wharf enforces the local rules and regulations for Bahia de Mayaguez.

**Wharves.**-The Ports Authority Terminal, in the N part of the bay, is under the control of the Puerto Rico Ports Authority.

The 1,280-foot bulkhead wharf, (18°13′12″N., 67°09′39″W.), has a reported depth of about 28 feet alongside. Covered transit sheds, pipelines for water, fuel oil, molasses, and conveyors are available. General cargo is received.

About 750 feet NW of the terminal wharf, a bulkhead wharf extends about 1,300 feet with wharves operated by three fish packing companies:

The Star-Kist Cannery Packing Company wharf, the easternmost one, is about 500 feet long with 28 feet alongside; covered storage, pipelines for water, and diesel fuel are available.

The Del Monte Cannery Packing Corporation wharf, immediately NW of the Star-Kist wharf, is 595 feet long with about 30 feet alongside; freshwater is available.

The Ibec Cannery Packing Company wharf, immediately NW of the Del Monte wharf, is 200 feet long with about 30 feet alongside; freshwater is available.

The Pecuarias de Puerto Rico conveyor pier (18°13′27″ N., 67°10′10″W.) is a 31-foot pier with dolphins with depths of 30 feet reported alongside. A conveyor system is used to receive bulk grains.

**Supplies.**-Most supplies are available at Mayaguez. If necessary, supplies can be brought in from San Juan by truck in a few hours. Water and diesel oil are available at the terminal; gasoline can be trucked in.

**Repairs.**-Machine shops in Mayaguez can make above-the-waterline repairs to vessels.

**Chart 25671 (901).-Bahia de Anasco,** 4.5 miles NW of Bahia de Mayaguez, is somewhat foul in the N part for about a mile from shore. There are shoals with 16 to 17 feet over them inside the 10-fathom curve. A tall stack, 1.8 miles inland, is prominent, and the entrances to the several rivers that empty into the bay show as breaks in the coconut groves.

**Punta Cadena,** together with the **Cerros de San Francisco** extending E, is quite prominent. The dome-shaped hills slope upward to **Pico Atalaya,** 3 miles inland. From the point to Punta Higuero many rocks and coral reefs extend up to 0.6 mile offshore, then the bottom increases rapidly to great depths, making soundings of little use to indicate danger or distance from shore.

Canal de la Mona and the W coast of Puerto Rico N of Punta Higuero has been described previously in this chapter.

**Chart *(28121).-Swan Islands** (17°25′N., 83°56′W.), two small islands in the W part of the Caribbean Sea, are described in H.O. Pub. No. 20, Sailing Directions, East Coasts of Central America and Mexico, published by the Defense Mapping Agency Hydrographic Center (DMAHC).

**Chart 26194 (953).-Navassa Island** (18°24′N., 75°01′W.), a small United States island lying about 30 miles W of the W extremity of Haiti, is described in H.O. Pub. No. 21, Sailing Directions, The West Indies, Vol. 1, published by the Defense Mapping Agency Hydrographic Center (DMAHC).

# 14. VIRGIN ISLANDS

This chapter describes the United States Virgin Islands, which include the islands of St. Thomas, St. John, and St. Croix, and 40 small islets or keys. Information is given on the ports and harbors of the islands including Charlotte Amalie, Christiansted, Krause Lagoon, and Frederiksted. A general description of the British Virgin Islands is also included; more complete information is given in H.O. publication 22, Sailing Directions, The West Indies, Volume II, published by the United States Defense Mapping Agency Hydrographic Center, and West Indies Pilot, Volume II, published by the United Kingdom Ministry of Defense Hydrographic Department.

The **United States Virgin Islands**, separated from the easternmost island of the Puerto Rico group by 8-mile-wide Virgin Passage, were purchased from Denmark in 1917, and United States citizenship conferred upon the islanders in 1927. Under the revised Organic Act of 1954, legislative powers are vested in a Senate, whose members are elected by the islanders for 2-year terms. The Governor, who has certain veto powers, is elected by the people of the U.S. Virgin Islands. The capital is Charlotte Amalie, on the island of St. Thomas.

The **British Virgin Islands** are N and E of the United States group. The United States-Great Britain boundary extends SE between Hans Lollik and Little Tobago Islands, thence through the narrows between St. John and Tortola Islands, and thence S through Flanagan Passage between Flanagan and Norman Islands.

**Prominent features.**-Making the Virgin Islands from the N, Virgin Gorda (British) will be seen on the extreme left, rising in a clear, well-defined peak about 1,400 feet high. Next to Virgin Gorda, Tortola (also British) will appear most conspicuous; the highest mountain appears flattened and elongated from N but rises to an elevation of about 1,800 feet. Immediately W of Tortola will be seen the rugged, pointed peaks of Jost Van Dyke (British), rising to about 1,100 feet, and behind them the irregular small peaks rising from the tableland of St. John (U.S.) to heights of 800 to 1,300 feet.

From about 20 miles N of the islands, a separation will be observed between St. Thomas and St. John, but St. John, Jost Van Dyke, Tortola, and Virgin Gorda will appear to be one large island. St. Thomas is less rugged in outline than the other islands, but it may be recognized from its large midisland saddle which has horns nearly 1,600 feet high; the saddle is equally conspicuous from the S.

**Boundary lines of inland waters.**-Specific lines are described in 82.235, 82.240, and 82.245, chapter 2.

**Control over movement of vessels.**-(See Part 124, chapter 2, for regulations requiring advance notice of vessel's time of arrival to Captain of the Port.)

**Routes.**-From Charlotte Amalie to the Straits of Florida, proceed through Virgin Passage and thence as direct as safe navigation permits along the N coasts of Puerto Rico and Hispaniola, and then along the N coast of Cuba through Old Bahama and Nicholas Channels to destination. The distance is 1,086 miles.

Bound to Baltimore, New York, or Boston, pass W of Sail Rock and, when clear of Virgin Passage, take a great circle course direct to destination. Distances from Charlotte Amalie are 1,418 miles to Baltimore, 1,435 miles to New York, and 1,517 miles to Boston.

**Tides.**-The range of tide around the Virgin Islands is only about 1 foot. Along the coasts bordering the Atlantic Ocean the tide is chiefly semidiurnal, and along the Caribbean shores it is mostly diurnal.

**Currents.**-The currents among the Virgin Islands, although of considerable importance to navigators, are not well established by observation. The tidal current is said to set SE and NW. In the general vicinity of the islands there is an oceanic current with a velocity of about 0.2 knot that sets in a direction varying from NW to W.

**Weather.**-The following description of weather conditions in the Virgin Islands was prepared by the Office of Climatology, Environmental Data Service. (See page T-8 for **St. Croix climatological table.**)

**Wind.**-One of the outstanding features of the climate in the Virgin Islands is the steadiness of the trade winds. They blow almost without exception from an E direction, or between NNE and SSE. The highest mean maximum wind speeds usually occur in July. Superimposed on the trade winds are the land and sea breezes, which are important in most coastal areas. Night winds are lighter than the daytime winds. About daybreak the wind speed begins to pick up, reaching a maximum late in the morning or early afternoon. A return to the lighter nighttime winds begins during the late afternoon, usually about 1600. It must be remembered that these islands are located in the path of occasional tropical storms or hurricanes and extremely high winds may be experienced during such passages.

**Precipitation.**-The time of maximum rainfall expectancy is roughly from May through November or December, with showers providing most of the rain. The heavier rains have usually been associated with tropical cyclones and hurricanes that are most likely to reach the area during the months of August, September, and October; or with fron-

tal systems or E waves which may reach the area in these or other months. (See chapter 3 for information about hurricanes.)

**Storm warning display** locations are listed on NOS charts and shown on Marine Weather Services Charts published by the National Weather Service.

**Pilotage.**-Vessels of and above 100 gross registered tons and those vessels carrying explosives and dangerous cargo must engage for the services of an Insular Government pilot in order to enter, leave, or shift berths in a U.S. Virgin Islands port. Vessels of less tonnage, and vessels of the United States or foreign governments and pleasure craft are exempt from pilotage unless a pilot is actually employed. Exempted vessels when requiring the services of a pilot will be charged the regular rate. Pilots will take vessels in or out, day or night, unless otherwise noted. Arrangements for pilots are generally made in advance by ships' agents.

**Quarantine.**-National quarantine laws are enforced in the U.S. Virgin Islands by officers of the U.S. Public Health Service. All vessels from foreign ports, vessels with sickness on board, and vessels from domestic ports where certain quarantinable diseases prevail are subject to inspection. (See Public Health Service, chapter 1.) An **outpatient clinic** of the U.S. Public Health Service is at Charlotte Amalie on St. Thomas Island.

**Customs.**-The customs collection district of the U.S. Virgin Islands is under the jurisdiction of the U.S. Treasury Department but has its own customs laws. Imports manufactured in the United States enter free of duty. All foreign goods coming into the islands are subject to an import duty of 6 percent, ad valorem, unless specified as free of duty, even if imported from continental United States.

**Agricultural quarantine** laws are enforced by officials at Charlotte Amalie and Christiansted.

**Immigration.**-The United States immigration laws apply in the U.S. Virgin Islands. Passports and visas are required by persons other than U.S. citizens.

**Wharves.**-Deep-draft facilities are at Charlotte Amalie, St. Thomas Island, and on St. Croix Island at Frederiksted, and at the private facilities at Krause Lagoon and in Limetree Bay. Vessels drawing up to 16 feet can go alongside Gallows Bay Dock at Christiansted, St. Croix Island. At other places only small craft go alongside the wharves.

**Supplies.**-Bunker fuels, diesel oil, and gasoline are available only at Krause Lagoon on an emergency basis. Diesel fuel, water, and marine supplies are available at Charlotte Amalie. Limited marine supplies can be obtained at Christiansted and Frederiksted. Gasoline, diesel fuel, and marine supplies for small craft are available at the marinas around the islands.

**Repairs.**-There are no facilities at any of the ports for major repairs to deep-draft vessels. Machine shops at Charlotte Amalie, Christiansted, and Frederiksted can make minor above-the-waterline repairs.

**Communications.**-The islands of St. Thomas, St. John, and St. Croix have good highways. Regular air service is maintained between St. Thomas Island, St. Croix Island, San Juan, United States, and some foreign ports. Steamship lines call at Charlotte Amalie, Christiansted, and Frederiksted. Small interisland vessels operate from United States Virgin Island ports to the British Virgin Islands, Puerto Rico, and other West Indies ports.

Telephone, radio, and cable service facilities are available on the islands of St. Thomas, St. John, and St. Croix.

**Currency.** The monetary unit is the U.S. dollar.

**Standard time.**-The U.S. Virgin Islands use Atlantic standard time, which is 4 hours slow of Greenwich mean time.

**Chart 25640 (920).**-Most of the Virgin Islands are situated on the S side of **Virgin Bank** which extends in an E and ENE direction for 86 miles from the E end of Puerto Rico. For about 50 miles the bank trends E, averaging 25 miles in width, and then swings slightly ENE, increasing in width to 32 miles. It terminates close beyond the SE extremity of Anegada Island in a point several miles wide.

The bank is an ocean shelf, with abrupt drops in depths near its edges. On the N side of the island group, W of 64°40'W. and within half a mile of the islands, the general depths range from 18 to 40 fathoms except for the outlying banks. E of this line, the depths gradually decrease until soundings of 6 fathoms are found about 0.8 mile off the W end of Anegada Island. On the S side of the island group, the depths differ considerably from those on the N side. The S side is bold and wall sided, and lies from 1 to 7 miles off the islands; general depths of 8 to 33 fathoms are found in this area. Close within the outer edge of the bank is a narrow ledge of coral that extends almost unbroken from Horse Shoe Reef, at Anegada Island, to Isla de Vieques. This ledge, about 200 yards wide, has depths of 11 to 19 fathoms.

**Whale Banks,** about 13 miles N of Tortola Island and 15 miles W of Anegada Island, are two patches with depths of 12 to 20 fathoms on the N bank and a least depth of 10 fathoms on the S bank. **Turtle Head,** a coral reef covered 6 fathoms, is about 10 miles N of Jost Van Dyke Island and 13 miles NW of Tortola Island. **Barracouta Banks** about 8 miles NW of Jost Van Dyke, consist of several patches covered by 11 to 20 fathoms. **Kingfish Banks,** about 5 miles NNE of Jost Van Dyke Island, are two coral patches with 8 fathoms over them.

**Chart 25650 (904).**-**Virgin Passage** is 8 miles wide between Savana Island and Isla Culebrita, with depths of from 11 to 17 fathoms in the S part and up to 27 fathoms in the N part. It is clear except for Bajos Grampus on the SW side and Sail Rock on the SE side.

**Tidal currents.**-In the middle of the passage the current velocity is about 0.5 knot and sets S and N. On the E side of the passage near Savana Island the velocity increases to about 2 knots.

**Chart 25641 (905).-Sail Rock,**on the E side of Virgin Passage about 7.6 miles ESE of Isla Culebrita, is so called from its resemblance to a vessel under sail. It rises precipitously from the sea to a height of 125 feet. It is about 100 yards in diameter, quite barren, and light gray in color. It is steep-to on all sides, but a rock awash is about 200 yards W of the islet. A lighted buoy is about 0.5 mile W of the islet.

**St. Thomas Island,** commercially the most important of the U.S. Virgin Islands, is 34 miles E of Puerto Rico. It is 12 miles long and from 1 to 3 miles wide. A lofty ridge extends along its whole length. **Signal Hill,** nearly in the center of the island, is 1,504 feet high, and **Crown Mountain,** 1.7 miles to the W, is 1,550 feet high. Lights are shown from towers on the summit of each.

The W half of St. Thomas presents the appearance of a steep ridge sloping precipitously to the N and the S, with numerous ravines widening at their lower ends into small tracts of level land on the seacoast. Between these level tracts the coast is usually bold with rocky promontories of considerable height. The higher hills are flat-topped and plateaulike, whereas the lower ones are for the most part dome shaped. The country is almost entirely wooded; the region W of Perseverance Bay presents a forestlike appearance of a thick growth of trees, shrubs, and vines.

The E end of St. Thomas has the appearance of two main ridges, separated by a large basin and sloping to the N and S with numerous smaller ridges and spurs making off from them. St. Thomas is almost surrounded by small islands and cays, in general, bold and steep-to, with very few hidden dangers to guard against.

**Savana Island,** 2 miles WSW from the W end of St. Thomas, is nearly a mile long and 0.5 mile wide. **Savana Island Light** (18°20′22″N., 65°05′00″W.), 300 feet above the water, is shown from a white tower at the SW end of the island. The island is covered with a dense growth of vines, small trees, and underbrush. The entire NW shore is bold and precipitous with rock cliffs rising abruptly from the water's edge to as much as 120 feet. **Din Point** is a bold dark headland, with cliffs 80 to 100 feet high, at the NW extremity of the island. The SE shore of the island is generally rocky with short stretches of gravel beach in the bights. Depths of 34 feet and less extend up to 0.5 mile from the E side of the island. Just N of **Virgin Point,** the SW extremity of the island, the cliffs are of crushed rock and sandstone formation and from offshore appear as red cliffs. Detached rocks extend 200 yards S of Virgin Point. **Domkirk Rock,** a crag with twin steeple-shaped pinnacles which resemble a cathedral, is 100 yards SE of Virgin Point. Some rocks 8 to 10 feet high and steep-to are on a sunken ledge which extends about 700 yards off the NE point.

The currents in the vicinity of the NE point of Savana Island are very strong, and small boats should give the reef a wide berth. Boat landings may be made in smooth weather.

**Kalkun Cay,** in the middle of **Savana Passage,** is a narrow islet, 275 yards long and about 20 to 30 yards wide, which is covered with grass and small underbrush. About 0.5 mile SE of the cay is **Saltwater Money Rock,** 8 feet high, steep-to, with a clear channel between.

**Little St. Thomas** is a low grass-covered peninsula connected with the W end of the island of St. Thomas by a sandspit. A 50-foot hill is near the NE point and a 21-foot bluff is at the S end. **Mermaids Chair,** 15 feet high, is a conspicuous rock that has the shape of a chair at the apex of a triangular coral reef projecting from the SW point of Little St. Thomas. Small boats stay in the small gravel cove S of the peninsula when the sea is too rough to land at Sandy Bay or Botany Bay. A boat passage is between Little St. Thomas and a 42-foot islet 100 yards to the N.

**Big Current Hole** is a passage separating West Cay from Little St. Thomas. There are rocks awash extending E from West Cay; the outer one, **Drum Rock,** 2 feet high, constricts the channel, the strong currents and heavy tide rips render the passage difficult. Small boats using this passage, when passing through from S, head for Drum Rock and leave it close-to on the port hand.

**West Cay,** 0.2 mile NW of Little St. Thomas, consists of 2 hills, 121 and 114 feet high, connected by a neck of low land. The small stretch on the E side of the cay is gravel. Landing may be made in the bight on the S side.

**Salt Cay,** 242 feet high and 0.6 mile NW of Little St. Thomas, is generally rocky and rugged, particularly on the N coast where cliffs rise precipitously to 100 and 150 feet high. Many rocks awash are close-to on the SW, W, and E sides of the cay. The channel between Salt Cay and West Cay is shallow, and breakers extend across it.

**Salt Cay Passage** is about a mile wide, with deep water in the channel, and is free of dangers.

**Dutchcap Cay,** a mile NW of Salt Cay, rises abruptly from the sea to 278 feet high, with cliffs 100 feet high on the N shore.

**Cockroach Island,** 3.3 miles NNW from the west end of St. Thomas Island is 151 feet high and of irregular shape. The south shore is bold and precipitous with white rocky cliffs rising abruptly from the water's edge to a height of 120 feet. The N shore is rocky with cliffs back from the shore rising to a height of 80 feet, and indented by numerous small bights and crevices. **Cricket Rock,** 0.5 mile ENE from Cockroach Island, is 46 feet high, bold, and steep-to, with sharp pinnacle rocks on top.

**Dutchcap Passage,** just S of these islands, is free of dangers.

**Currents.**-In navigating the passages between this group of islands, it is necessary to guard against the tidal currents, which in Savana Passage run with a velocity of 3 knots and in the others about 1 knot. Sailing vessels beating up against the northgoing current should stand well to S of Savana Island, so as to avoid the strength of the inshore current.

The **N coast** of St. Thomas Island is very irregular with rocky cliffs and sandy beaches in the shallow bays. Much of the beach is fringed with coral reef making landing difficult in most places. The bays in the E half of the island are open to the prevailing E trade winds. Islands, rocks, and shoals are as much as 3 miles from the shore.

**Sandy Bay** and **Botany Bay** are shallow bights separated by a rocky point at the W end of St. Thomas Island. Small-boat landings can be made during calm weather.

**Santa Maria Bay,** 2.5 miles E of Botany Bay, has depths of 20 feet or more and is a fair shelter, but it is seldom used because of rollers.

**Inner Brass Island** and **Outer Brass Island** are off the N side of St. Thomas about 4 miles from the W end. A 22-foot channel is between St. Thomas and Inner Brass Island; **Brass Channel,** between the two small islands, has a depth of 48 feet.

Inner Brass Island has a generally rocky shore, with reefs extending as much as 300 yards off the E side. There are detached rocks and rocks awash within that area. NW of the S tip is a fine sand beach with a fringing coral reef. The reef has several breaks through which small-boat landings can be made. A well-sheltered anchorage for local boats is off the SW side of the island.

The E shore of Outer Brass Island is bold and precipitous with rocky cliffs rising vertically from the water. The W shore is rocky and slopes up uniformly. **Cave Cove,** in about the middle of the W shore, has a large cave opening into it. The N extremity of this island is sharp and jagged. A 15-foot spot lies 330 yards W of northern point.

Landings may be made on St. Thomas Island through breaks in the fringing coral reef in **Caret Bay** and **Neltjeberg Bay** SW and S of Inner Brass Island. **Hull Bay,** SE of Inner Brass Island, is shoal, but it is used to some extent by fishermen.

**Lizard Rocks,** 0.7 mile offshore and 0.8 mile W of Inner Brass Island, are a group of bare rocks and rocks awash. **Ornen Rock,** with 6 feet over it, is a mile E of Inner Brass Island.

**Magens Bay** is the only important bight on the N shore of St. Thomas. It is 1.6 miles long and 0.6 mile wide. Its E side is formed by a long, narrow tongue of land, which terminates to the NW at **Picara Point,** nearly midway between Hans Lollik and the Brass Islands. However, it is open to the NW, and consequently exposed to the rollers. It is safe only for small vessels. In entering, care must be taken to avoid Ornen Rock.

The depth in Magens Bay varies from 5 to 12 fathoms, but the S portion has a bank of 1¼ fathoms, extending 0.3 mile from the shore, surrounded by depths of 2 to 3 fathoms. A fine sand beach is at the head of the bay. **Reseau Bay** and **Lerkenlund Bay,** small bights on the W shore of Magens Bay, are used by fishermen to beach their boats.

**Hans Lollik Island,** 713 feet high, 1.3 miles long, and about 0.8 mile wide, is 1.8 miles NE of Picara Point. The W side of the island is precipitous and rocky, except in a bay on the W side which has a gravel beach. **Camp Bay,** on the SE face, is protected by outlying reefs, through which small boats make the beach. **Hansa Rock,** close inshore at the S point, is 19 feet high. **Hans Lollik Rock,** awash and on which the sea always breaks, is over 0.3 mile ESE of the S point of Hans Lollik Island.

**Little Hans Lollik Island** is 0.2 mile N of Hans Lollik Island and connected with it by a coral ledge over which the sea breaks. There is an opening in the reef. The shoreline consists mostly of rocky cliffs from 20 to 60 feet high. **Steep Rock,** the only detached rock on the E shore of the island, is 25 feet high.

**Pelican Cay,** 200 yards N of Little Hans Lollik Island, is a 20-foot grassy islet. Between the two are several rocks awash, and a reef over which the sea breaks is close NE of Little Hans Lollik Island. Except for these dangers, the channels on either side of the Hans Lollik group are clear.

**Chart 25647 (938).-Mandal Bay,** 3 miles E of Picara Point, is shoal, with a sandy beach at its head. **Mandal Point,** just E of the bay, is 277 feet high, with cliffs 100 to 120 feet high at the water's edge. An unmarked channel, W of the point, leads through the reefs and a landcut to a small dredged harbor. On the E side of the bay, a rubble mound breakwater extends 270 feet from shore on the N side of the channel entrance, and a smaller rubble mound jetty extends 70 feet from shore on the S side. A depth of about 10 feet was reported in the channel in 1972.

Water generally breaks on a reef close NE of Mandal Point. A 23-foot spot is 0.3 mile E of the point.

**Coki Point,** 1.9 miles ESE of Mandal Point, is 47 feet high. It forms the N shore of **Water Bay.** A conspicuous 235-foot cone-shaped hill is just S of Water Bay. **Turtleback Rock,** 2 feet high, is off the entrance to Water Bay 0.3 mile SE of Coki Point. **Cabes Point** is a low rocky hook 1 mile SE of Coki Point. **Shark Island,** 32 feet high, is about 0.3 mile ESE of Cabes Point. Foul ground encircles the island with several visible rocks 125 yards off the NE end.

**Redhook Bay,** at the E end of St. Thomas Island, consists of a S arm called **Muller Bay** and the W arm, **Vessup Bay.** Ferry boats to St. John Island use a small L-shaped pier in the NE part of Vessup Bay. In 1972, a depth of 9 feet was reported at its face. A marina is 200 yards W of the L-shaped pier. Berths, gasoline, electricity, water, ice, and

marine supplies are available. Repairs can be made to gasoline or diesel engines and to some electronic equipment. The National Park Service maintains a L-shaped pier on the S side of Vessup Bay; in 1972, depths of about 6 feet were reported alongside.

**Cabrita Point,** the E end of St. Thomas, rises to a height of 210 feet. A neck of land joins the remainder of St. Thomas. A 24-foot spot lies 0.6 mile ESE of Cabrita Point.

**Pillsbury Sound** is the body of water between St. Thomas, St. John, and the cays which bound the sound on the N side, forming an excellent roadstead about 2 miles in extent E and W and 1.5 miles N and S. This area is quite secure against rollers and all winds except from the S which blow only in the hurricane months, but the area can become quite rough. The current attains a velocity of 2 knots.

The depths in the sound are somewhat irregular, varying from 48 to 110 feet. All the main passages leading to it are deeper than the mean depth of the sound itself.

**Thatch Cay,** at the NW end of Pillsbury Sound, is 1.6 miles long. The island is in the form of a ridge, 482 feet high near the E end.

**Bull Point** and **Mother East Point** are prominent projecting points on the N side. **Lee Point** is the W point and **Grouper Point** the E point of the island. **Grass Cay,** 0.5 mile E of Thatch Cay, is 0.8 mile long. The N shore consists of rocky cliffs in places 150 feet high. A narrow rocky ledge, covered 12 feet at its E end, is close to shore near the W end, and a rock awash is 150 yards W of the same point.

**Mingo Cay,** E of Grass Cay, is 186 feet high. Between Mingo and Grass Cays is a narrow shoal passage with a bare rock 15 feet high close to the middle. **Lovango Cay** is E of Mingo Cay and separated from it by a shoal passage 300 yards wide; the tidal current is strong in the 15-foot boat channel. Several houses are in the bight along the S shore between **Murder Rock** and the SW point. **Blunder Rocks,** 250 yards E of Lovango Cay, are 4 feet high. **Congo Cay,** a narrow pointed cay N of Lovango Cay, is separated from it by a channel with depths of 14 feet. **Carval Rock** is 0.3 mile E of Congo Cay. There are several smaller rocks between it and the cay.

**Two Brothers** are two 10-foot high small barren rocks lying in the middle of Pillsbury Sound; a light 23 feet above the water is shown from the larger rock. A ledge extends off their NE side, deepening to 30 feet at a distance of 250 yards. Vessels can anchor in depths of 40 to 65 feet about 0.5 mile NE of Two Brothers on sand and mud bottom.

**Windward Passage** extends between Lovango and Durloe Cays; it is 0.3 mile wide. **Durloe Cays,** within the entrance, cannot be mistaken. On the W side of the channel are Carval Rock and Blunder Rocks. Vessels of deep draft may take the passage between Lovango and Durloe Cays. If the wind dies, sailing craft may anchor at any time; the bottom is rocky in less than 60 feet. With the NE current running against the wind, this channel has a race that looks like broken water. Through Durloe Cays and between them and Hawksnest Point on St. John Island are deep and clear passages, but these are not recommended.

**Middle Passage,** between Grass and Thatch Cays, is about 0.3 mile wide and presents no difficulties to powered vessels, the only dangers being a small rock awash nearly 200 yards W from the W end of Grass Cay, which is easily seen. Sailing vessels generally use this passage in leaving the sound. It may be entered from the N even on the ebb, provided the trades have not too much of a S slant.

**Leeward Passage,** between Thatch Cay and the N side of St. Thomas, is about 0.4 mile wide, with general depths of 60 feet or more. An unmarked fish haven, covered at least 60 feet and centered in 18°21′12″N., 64°51′21.5″W., is near the E end of Leeward Passage.

**Currents.**–Tidal currents with velocities up to 4 knots in Middle Passage and Windward Passage, and weaker currents in Leeward Passage, have been reported.

Three islands and several rocks extend SE for 2 miles from the E end of St. Thomas. The islands are rugged, with cliffs fronting much of the shores. **Dog Rocks,** 9 feet high, are the most E danger of the group close off the E point of **Dog Island.** Current velocities up to 4 knots have been reported in the vicinity of Dog Island. Other rocks are as much as 0.3 mile from the shores of the islands.

**Dog Island Cut,** between Dog Island and **Little St. James Island,** has depths of 7 to 21 feet and should be used only by small boats with local knowledge. **St. James Cut,** between Little St. James Island and **Great St. James Island,** has depths of 18 to 30 feet, but caution is necessary to avoid **Welk Rocks** in the E approach and **The Stragglers,** on the W side.

**St. James Bay,** between Great St. James Island and the E end of St. Thomas Island, provides secure anchorage in depths of 23 to 50 feet, except in hurricanes. Small craft can anchor securely in Christmas Cove either N or S of the small cay 300 yards offshore. **Cow Rock,** 9 feet high, is the W one of a group of rocks in the S approach to the bay. **Calf Rock,** 3 feet high, is close E of the same reef.

**Current Hole,** at the N end of St. James Bay, provides a passage from the S coast of St. Thomas Island to Pillsbury Sound. **Current Rock,** 13 feet high and marked by a light, is in about the center of the passage. A depth of 23 feet can be carried through the 100-yard-wide channel E of the rock. The current velocity reaches a maximum of 3 knots through Current Hole and sets N and S. To stem the current, sailing vessels using the passage should await a N current and a steady breeze.

**Cowpet Bay,** in the N part of St. James Bay, is 0.3 mile wide between **Water Point** and **Deck Point.** The St. Thomas Yacht Club has a pier and other private facilities at the head of the bay.

**Jersey Bay,** W of Cowpet Bay, is 1.4 miles wide between Deck Point and the cays E of **Long Point.** The bay has several cays and dangerous rocks scattered throughout the W part. **Benner Bay,** locally known as **The Lagoon,** is a smaller bay in the N part of Jersey Bay. It is one of the most protected small-boat harbors on St. Thomas Island. Several yacht clubs and marinas along the N shore of the bay have complete facilities for small craft. Berths, gasoline, diesel fuel, water, and some marine supplies are available. A 50-ton mobile hoist can handle craft up to 65 feet for hull, engine, and electronic repairs. To reach the facilities, pass E of **Cas Cay** and follow the best charted water toward the whitewashed area on **Rotto Cay.** Pass Rotto Cay keeping it 100 yards on your starboard and proceed past **Grassy Cay** keeping it close by on the starboard. Proceed past Grassy Cay to within 100 yards of **Bovoni Cay** then head in a N direction to the facilities. The channel leading into Benner Bay is privately maintained and marked. In 1973, a reported depth of 6 feet could be carried into the bay at high tide. The waters between Cas Cay and Patricia Cay are shoal with prominent breakers and entry in this area could be hazardous.

The **S coast** of St. Thomas is very irregular with projecting rocky cliffs between coves and bays that are obstructed by rocks and shoals. Dangerous rocks extend up to a mile from shore.

**Long Point,** the SE extremity of St. Thomas Island, is the terminus of a high prominent ridge with rocky cliffs 50 feet high.

**Packet Rock,** a coral shoal about 100 yards in extent with a depth of about 5 feet, lies 0.7 mile WSW of Long Point. The sea breaks over the rock only in heavy weather, and it cannot be seen until close-to. A buoy is 300 yards SSE of the rock.

**Capella Islands,** of which the westernmost is **Buck Island,** lie 1.7 miles SW of Long Point, and constitute a prominent landfall for making St. Thomas Harbor. The two small islands, of irregular outline, are partially covered with a scrubby growth and separated by a narrow channel almost closed by numerous uncovering rocks. A light, 125 feet above the water, is shown from a white tower on the highest point of Buck Island, near its E end. A shallow ledge extends 100 yards off the W end, and off the N side the depth is 30 feet. At the head of the SW bight is a small wharf and boat landing.

Between Capella Island and St. Thomas Island the currents are weak.

**Chart 25641 (905).-Frenchcap Cay** is about 3.6 miles SE of Buck Island, and, like Buck Island, is a useful landfall for making St. Thomas Harbor. It is 350 yards long and 183 feet high, and is covered with grass and steep-to. The shoreline for the most part consists of high rocky cliffs.

**Chart 25649 (933).-St. Thomas Harbor,** in about the middle of the S coast of St. Thomas Island, is the only sheltered harbor in the Virgin Islands that can be entered by large vessels. Although the oval-shaped harbor is small and open to the S, it is well protected by the high hills surrounding the other sides and provides safe anchorage except during a hurricane.

**Charlotte Amalie,** along the N shore of St. Thomas Harbor, is the most important city and capital of the U.S. Virgin Islands. Tourism comprises most of the commerce. Rum and bay rum are manufactured, and handicraft articles are made from raw materials imported from nearby islands.

The port facilites are at the West Indian Dock on the S side of **Long Bay,** the E part of St. Thomas Harbor, and at the Ports Authority piers and bulkhead on the N side of West Gregerie Channel. The principal imports include foodstuffs, textiles, clothing, building materials, machinery, and petroleum products. Exports include rum, perfumes, and sundry articles.

**Prominent features.-Muhlenfels Point,** the E entrance point to St. Thomas Harbor, is high and steep at the shoreline. A large hotel on the point is conspicuous.

**Hassel Island,** on the W side of the harbor entrance is indented by shallow coves and has several high wooded hills. **Cowell Point** is the S end of a ridge sloping up to **Cowell Battery,** the highest point on the island.

**Signal Hill,** about a mile NW of St. Thomas Harbor, is the second highest peak on the island with a lighted tower on top. From it the main ridge extends ESE, passing less than 0.5 mile N of Charlotte Amalie. The town is built around the three spurs that extend S from the ridge. **Frenchman Hill** is the W spur. **Berg Hill,** in the center, has a square white building on its S slope near the top. On **Government Hill,** the E spur, stands **Blackbeard Castle,** a remarkable 47-foot stone tower.

To the E of Government Hill, **Bluebeard Hill** rises abruptly from the shore at **Frederiksberg Point** to a 224-foot summit on which **Bluebeard Castle,** an old 34-foot stone tower, is located.

**Water Island,** SW of the entrance to St. Thomas Harbor, is indented by several small shallow bays, and the hilly land is covered by small trees and dense underbrush. **Flamingo Point,** the S end consists of brown rocky 100-foot cliffs. N of Flamingo Point on the W shore is **Flamingo Bay** which leads to **Flamingo Pond** and a small-boat harbor and marina. A water tower is on a 203-foot hill 0.2 mile NE of the point, and a square tower is on 256-foot **Providence Hill,** 0.8 mile N of the point. There is a small pier on Providence Point that is used by the ferry serving Water Island. **Red Point,** a mile NW of Water Island, is a rugged red cliff at the S end of a peninsula with a 218-foot flat-topped crest that has an aerolight on the summit.

**Boundary lines of inland waters.**-The lines established for St. Thomas Harbor are given in 82.235, chapter 2.

**Channels.**-The 30-foot channel leads W of Muhlenfels Point and close E of Scorpion Rock to the West Indian Dock. The entrance channel is marked by a lighted range and buoys. Depths of 12 to 15 feet can be taken to the waterfront at Charlotte Amalie.

**East Gregerie Channel,** between Hassel Island and Water Island, has depths of 30 to 50 feet for a 350-yard center width. **Haulover Cut,** between Hassel Island and St. Thomas Island, has a least depth of 8 feet at the SW entrance to the narrow passage. East Gregerie Channel is marked by lighted buoys. **Caution** is advised for all vessels traversing this area since it is an active seaplane landing area.

**West Gregerie Channel,** between Water Island and St. Thomas Island, has depths of 26 to 60 feet for a 250-yard center width to the junction with East Gregerie Channel N of Water Island. The channel is marked by buoys and a light. A partially submerged barge lies 0.25 mile SW of the light in West Gregerie Channel and is frequently used as a mooring facility by small boats. A lighted radio tower at the base of Careen Hill has been reported to be an excellent mark to steer for when entering West Gregerie Channel.

**Ruyter Bay,** a shoal bay on the NW side of Water Island, has a privately owned L-shaped dock, about 100 feet long with a 30-foot length at the outer end; in 1972, depths of about 6 to 10 feet were reported alongside. A depth of about 12 feet can be carried with local knowledge through the dredged area when approaching the dock from the NW.

**Anchorages.**-(See 110.250, chapter 2, for limits and regulations of the anchorage areas in St. Thomas Harbor.)

**Krum Bay,** NW of Water Island, has a 42-foot entrance channel, shoaling to 18 feet near the head. The bay affords excellent anchorage for small vessels during a hurricane. An overhead power cable with a reported clearance of 44 feet crosses the narrow part of the bay.

**Lindbergh Bay,** close W of Krum Bay, is used as an anchorage by small sloops and motorboats. The entrance depths are 30 feet, gradually decreasing to a fine sand beach and several small piers at the head of the bay.

**Dangers.-Green Cay,** a mile SE of Muhlenfels Point, is a small 24-foot islet covered with low underbrush. Several bare rocks and rocks awash lie up to 125 yards S of the islet; a reef partly awash extends NE from the islet to the shore.

**Triangle** is a group of dangerous rocks between Green Cay and Muhlenfels Point. The SW and outer rock group dries in places, while the N group is partly awash and frequently breaks. **Barrel of Beef,** 2 feet high, is the E foul area of the group. A detached coral rock covered 16 feet and marked by a lighted buoy is nearly 0.7 mile SSE of Muhlenfels Point.

**Point Knoll,** a coral head covered 3 feet, extends 50 yards SW from Muhlenfels Point; a depth of 18 feet is about 40 yards SW of the coral head. **Rohde Bank,** 0.2 mile NW of Muhlenfels Point, has a least depth of 17 feet.

**Scorpion Rock,** in the entrance between Muhlenfels Point and Cowell Point, is a small coral rock with a least depth of 26 feet surrounded by depths of 27 to 29 feet. A lighted buoy marks the rock.

**Rupert Rock,** 0.5 mile N of Muhlenfels Point at the narrowest part of the entrance channel, is 12 feet high and white on top. A drying reef and foul ground with less than 6 feet over it extends 100 yards W from the rock. A lighted buoy and a daybeacon are W of the rock.

Foul ground with depths less than 6 feet surround Hassel Island and Water Island up to 300 yards from shore.

**Porpoise Rocks,** a mile W of the S end of Water Island, consists of three reefs with rocks bare or awash and depths of 2 to 17 feet. A buoy is on the SW side.

A rocky ledge extends 0.4 mile S of Red Point. A steep-to rock at the outer end has a least depth of 2 feet over it.

**Sandy Point Rock,** an elongated shoal extending 300 yards NW from the N end of Water Island, has a least depth of 3 feet and is marked by a light at the NW end.

Care should be taken when navigating in the main harbor of Charlotte Amalie, Haulover Cut, and East Gregerie and West Gregerie Channels, because of their use as seaplane operating areas. The seaplanes generally take off on a SE heading from Cay Bay to Rupert Rock, and occasionally from Crown Bay through the East Gregerie Channel, also on a SE heading. The seaplanes generally land on a NE heading between the light in West Gregerie Channel and Haulover Cut, then proceed into Cay Bay. The seaplanes, when landing, usually traverse the narrow Haulover Cut area at a high rate of speed. Vessels navigating in these waters should remain alert to the presence of seaplanes when operating in the areas defined above.

**Tides and currents.**-The tide in St. Thomas Harbor is chiefly diurnal; the mean range is about 0.5 foot and the daily range is less than 1 foot. Water depths have decreased several feet after a severe tropical storm. The tidal current in the entrance is noticeable.

The current velocity in East and West Gregerie Channels is about 0.5 knot, although a greater velocity has been reported in the vicinity of Little Krum Bay. Caution should be exercised to avoid being set onto the piers in the bay, particularly with a strong E wind.

**Storm warning display** locations are listed on the NOS charts and shown on the Marine Weather Services Charts published by the National Weather Service.

**Routes.**-From W: pass 0.5 mile or more off the S end of Water Island, then steer for Muhlenfels Point until on the entrance range, and then proceed into the harbor on a heading of 344°. The prominent white catchment area on the W side of Berg Hill helps in picking up the range in the daytime. From S: pass a mile or more W of Buck Island and enter on the range. From E: set a course to pass about midway between Buck Island and St. Thomas Island and enter on the range.

**Pilotage.**-(See Pilotage for U.S. Virgin Islands at the beginning of this chapter.) Vessels are boarded by a pilot from a pilot boat with PILOT painted on the deck house, about 1 to 3 miles S of Hassel Island.

Vessels should not proceed into the narrow entrance until previous arrangements have been made with the harbormaster. Radio communication can be established with the signal tower, on Hassel Island, and the pilot boat on VHF-FM channels 12 (156.60 MHz) and 16 (156.80 MHz). The signal tower maintains a 24-hour watch on channel 16.

**Towage.**-Tugs are normally not required for docking, however, if required, tugs up to 2,000 hp operated by the West Indies Transport Company, Inc., may be available upon 24-hour advance notice.

**Quarantine.**-A representative of the U.S. Public Health Service quarantine office at San Juan enforces the national quarantine laws. Vessels subject to such inspection generally make arrangements in advance through ships' agents. (See Public Health Service, chapter 1.) Officials will board vessels at anchorage or at their berths 24 hours a day. The Public Health Service maintains a **contract physician's office** at Charlotte Amalie. (See appendix for address.) Seamen requiring emergency hospital attention are taken to the municipal hospital.

**Customs.**-Charlotte Amalie is a **customs port of entry.** Vessels are boarded at anchorage or at their berths. The customs office is in the Post Office Building.

**Immigration** and **agricultural quarantine** officials are stationed in Charlotte Amalie. (See appendix for addresses.) Vessels subject to inspection are boarded at their berths.

**Coast Guard.**-The Coast Guard maintains a **vessel documentation office** in Charlotte Amalie. (See appendix for address.)

**Harbor regulations.**-Local rules and regulations for the Port of St. Thomas are enforced by a **harbormaster** whose office is in the Senate Building on the point E of the waterfront at Charlotte Amalie.

**Wharves.**-The West Indian Company Dock, along the S side of Long Bay, is the primary deep-water commercial terminal at Charlotte Amalie. The well-protected 2,234-foot marginal wharf has depths of 30 feet reported alongside except for 27 feet alongside the easternmost 300 feet. Open and covered storage is available; one 90-ton mobile crane and a 25-ton swing crane are available for receipt of general and container cargo.

The waterfront of Charlotte Amalie, is a concrete marginal wharf with depths of 7 to 15 feet alongside. It is used by small sailing vessels and motor launches trading with the nearby islands.

A 300-foot finger pier extending from the point E of the waterfront is used by vessels assigned to the Coast Guard station on the point. A 3-foot depth is about 200 yards ESE from the outer end of the pier in 18°20'27"N., 64°55'49"W.

The waterfront of Crown Bay is a curved concrete marginal wharf operated by the Virgin Islands Port Authority. Depths of 14 to 15 feet are reported alongside. The wharf is used primarily for receipt of general cargo.

The piers in **Little Krum Bay** are operated by the Virgin Islands Port Authority and are primarily used by interisland cargo vessels, small fuel tankers, a private towage company, and deep-draft vessels. The piers are in poor but serviceable condition.

Pier A, the most S, is used by U.S. Navy and general cargo vessels. The N side of the pier has about 300 feet of berthing space with depths alongside shoaling from 26 to 20 feet.

Pier B, N of Pier A, has about 300 feet of berthing space with depths alongside shoaling from 27 to 20 feet. The West Indies Towing Company of St. Thomas operates from the pier.

Pier C, N of Pier B, has about 200 feet of berthing space with depths alongside shoaling from 23 to 19 feet. The pier is used by vessels engaged in interisland trade; forklifts are available. A scheduled motor launch service takes passengers and cargo from Pier C to the resort facilities on Water Island.

U.S. Navy Tender and Fuel Pier, N of Pier C, is about 400 feet long with lighted mooring dolphins positioned 100 and 300 feet off each side at the face. Depths alongside the pier shoal from 30 to 28 feet; depths alongside the dolphins shoal S to N from 36 to 27 feet. The pier is used by U.S. Navy vessels and as a pipeline transfer point for commercial tankers supplying the island's fuel needs. When space is needed, cruise ships tie-up along the dolphins.

**Supplies.**-Groceries and some marine supplies are available at Charlotte Amalie. When available, water can be delivered from pipelines at the West Indian Dock or at anchorage from a barge. Diesel fuel and lubricants are available at the West Indian Company Dock. Bunker C is not available.

**Repairs.**-There are no facilities for making major repairs or drydocking deep-draft vessels; the nearest drydocks and repair facilities are at San Juan and the Panama Canal. Machine shops can make minor above-the-waterline repairs.

**Small-craft facilities.**-A marina on the E side of Long Bay has finger piers with 10 to 12 feet alongside. Berths, water, electricity, and marine supplies are available. A fuel pier with 28 feet along-

side has gasoline and diesel fuel. A 20-ton drydock can handle craft up to 50 feet for hull, engine, and electrical repairs.

A marina on the W side of Cay Bay, N of Hassel Island, has berthing and mooring facilities in about 15 feet of water. Gasoline, electricity, water, ice, and marine supplies are available. A marine railway can handle craft up to 65 feet long for hull and engine repairs. The approach to the marina is in a seaplane operating area so be alert for aircraft.

**Chart 25641 (905).-Saba Island,** 202 feet high and triangular in shape, is 2.4 miles W of Flamingo Point. The N part of the island is low, but the S part has precipitous red cliffs 150 feet high along the S shore. Two small lagoons surrounded by mangroves are near the N end. A landing can be made on the sand beach along the NW shore. About 150 yards E of the island is a reef with a bare rock 5 feet high, and numerous rocks awash over which the sea always breaks. Another reef awash lies 100 yards S of the W end of the island.

**Turtledove Cay,** 50 feet high, 100 yards N of Saba Island, is connected with Saba Island by a reef bare at low water. About 0.1 mile W of the cay is a cluster of rocks awash. Between these rocks and the cay is a boat channel. **Dry Rock,** about 0.5 mile SW of Saba Island, comprises a group of rocks bare and awash; the highest rock is 2 feet high. **Flat Cays,** 0.8 mile NE from Saba Island and 1.3 miles SW from Red Point, consist of two small islets, 32 and 11 feet high, respectively. About 300 yards E of the S cay is a rock awash, surrounded by a breaking reef.

**Currents.**-Inshore the current is weak, but between Flat Cays and Saba Island, a tidal current sets ESE and WNW with velocities up to 1 knot.

**Southwest Road,** between Flat Cays and Perseverance Bay, affords an excellent anchorage with the wind as far S as ESE.

Vessels may anchor as convenient after entering through any of the channels between the islands and shoals S. Sailing vessels should enter from the E between Water Island and Porpoise Rocks, favoring Water Island and pass between Flat Cays and the shoal S of Red Point.

**Range Cay,** an islet 21 feet high, lies close to the shore 0.7 mile NW of Red Point. **Black Point,** 1.2 miles NW of Red Point, terminates in rocky cliffs 40 to 50 feet high.

**Perseverance Bay,** between Black Point and **Lucas Point** to the W, has depths of 13 fathoms, about 0.4 mile from the shore. Coral reefs, bare at low water, fringe the beach. Lucas Point rounding and rocky, is marked by 60-foot cliffs.

**Fortuna Bay,** between Lucas Point and **David Point,** consists of two small bays separated by a broad point that is high and faced by precipitous cliffs 200 feet high. The shore is generally rocky with cliffs up to 70 feet high.

**St. John Island,** about 2 miles E of St. Thomas Island, is 8 miles long, and up to 4 miles wide. Its E end for 3 miles is formed by a narrow neck of land from 1 mile to less than 0.5 mile across, and from its inner end the coast turns sharply S, forming a deep bight which terminates at Ram Head, the S point of the island. The central and W portions are comprised of irregular hills, the highest of which is **Bordeaux Mountain,** 1,277 feet high. The hills and mountains are mostly covered with trees, brush, and some patches of grass.

Most of the population of St. John Island is located in two small settlements, Cruz Bay at the W end and Coral Bay at the E end. Tourism is the principal commerce; foodstuffs and building material are brought into Cruz Bay by small interisland vessels.

The Government administration is at Cruz Bay. **Customs** and **immigration** laws are enforced by officials who have an office near the public pier. Some groceries, gasoline, diesel fuel, and water can be obtained at the settlement. Small ferryboats carry passengers and mail between St. Thomas Island and St. John Island; float planes operate between St. John and St. Croix from Cruz Bay. Land transportation is mostly by taxi or by small sightseeing buses. Telephone and radiotelephone services are available.

**Chart 25647 (938).-Moravian Point,** on the end of a peninsula S of Cruz Bay, is the westernmost part of St. John Island. **Mingo Rock,** which is awash and breaks, is 175 yards WSW of Moravian Point. A group of four rocks awash, with surrounding depths of 17 to 30 feet, is about 0.1 mile WSW of Mingo Rock.

**Steven Cay,** 0.4 mile W of Moravian Point, is 28 feet high and marked by a light. A 31-foot rock is just S of **May Point,** the S extremity of Steven Cay. **Skipper Jacob Rock** is 0.1 mile E of the S end of Steven Cay.

**Cruz Bay,** on the W side of St. John Island, is a small cove used by small interisland vessels bringing supplies and tourists to the island. The entrance is marked by a light 12 feet above the water. Depths of 10 to 12 feet can be taken to the public pier in the SE part of the bay. The Government House on the peninsula extending to **Battery Point** is a prominent landmark. A marina of the National Park Service is in the cove SE of Battery Point; a depth of 6 feet can be taken to the 80-foot pier and bulkhead. **Storm warning signals are displayed.** (See chart.)

**Caneel Bay,** 0.8 mile NE of Cruz Bay, is the site of the Caneel Bay Plantation resort development. A line of private marker buoys restricts the use of boats in the bay except for the channel leading to a small pier at the head of the bay. Motorboats provide transportation for tourists to St. Thomas from the pier.

**Durloe Cays** are three islets W of Hawksnest Point. **Henley Cay,** the largest, is 70 feet high and about 300 yards wide. **Ramgoat Cay,** 310 yards NE of Henley, is 30 feet high, and **Rata Cay,** the smallest, is 0.2 mile WNW of Henley Cay.

**Hawksnest Point,** a projecting point forming the W shore of Hawksnest Bay, is wooded. In the N part is a circular hill 130 feet high. Off the extreme point is **Hawksnest Rock,** bare and 25 feet high. **Hawksnest Bay,** E of the point, is small and of no commercial importance. Off its S shore are numerous rocks.

**Perkins Cay** is an islet close to the E point of Hawksnest Bay. **Trunk Cay,** a grass-covered islet 48 feet high, is about 0.5 mile E of Perkins Cay. **Trunk Bay,** between the two cays, is used extensively by skindivers. An area in the bay in which boats are restricted is marked by private buoys.

**Johnson Reef,** a coral formation 0.4 mile NE of Perkins Cay, is 500 yards long and over 0.1 mile wide; it breaks except in very smooth weather. A ledge, over which is a 30-foot passage, connects this reef with the mainland to the SE. The reef is marked by a lighted buoy at its N end and by an unlighted buoy at its S end.

**Cinnamon Cay,** 32 feet high and covered with tall grass and cactus, is about 0.7 mile E of Trunk Cay. An underwater reef, SW of Cinnamon Cay, is marked by a private buoy. Private buoys also mark an area in which boats are restricted from Cinnamon Cay to America Point to the E. **America Point** is 2 miles E of Hawksnest Point; back of America Point rises **America Hill,** 526 feet high; which separates Cinnamon Bay from **Maho Bay.** The head of Maho Bay is shoal and has a fine sand beach. **Maho Point** is the tip of a short peninsula between Maho and Francis Bays, formed by the spur of a 198-foot hill 300 yards E.

**Francis Bay,** S of Mary Point, is somewhat protected to the N by Whistling Cay, and affords good anchorage in 50 feet, sandy bottom.

**Whistling Cay,** the 202-foot islet 300 yards W of Mary Point, is covered with trees. Its N shore is precipitous, with cliffs 130 feet high. A gravel beach is along the SE side. **Fungi Passage,** between the cay and Mary Point, has a least depth of 21 feet, but on account of the baffling winds from the adjacent high land it is difficult for sailing vessels.

**Chart 25641 (905).-Mary Penisula,** a 578 foot-high headland in the form of a ridge, is connected with St. John by a low divide, separating Francis Bay from Mary Creek. **Mary Point,** the W end of the peninsula, has bluffs 135 feet high. The N shore consists of high weatherbeaten cliffs with large boulders along the waterline.

**The Narrows,** a channel about 0.3 mile wide between the 10-fathom curves, is the W entrance to the passage between the N coast of St. John and the SW coast of Tortola. This passage leads into Flanagan Passage and Sir Francis Drake Channel. Tidal currents in The Narrows and the passage E attain velocities of 2 to 4 knots.

**Leinster Bay** is a double indentation between Mary Peninsula on the W and **Leinster Point,** 48 feet high, on the E; it is about 0.8 mile in length. **Mary Creek,** the W part of this bight, makes well in behind high land to N. The E part, **Waterman Bay,** is partially protected by **Waterlemon Cay,** 30 feet high, 250 yards W of Leinster Point. The cay is bold, and is separated from St. John Island by a channel 200 yards wide with 12 feet of water. Vessels may anchor under the cay about 200 yards from shore. **Annaberg Point,** 96 feet high, SW of Waterlemon Cay, is faced by a conspicuous landslide.

**Threadneedle Point,** 0.5 mile E of Leinster Point, is precipitous, with cliffs up to 70 feet high. From Threadneedle Point the coast trends in a general ESE direction for 3.5 miles to **East End Point,** the E extremity of the island. **Haulover Bay,** 3 miles SE of Leinster Bay, offers the best anchorage of the small bights along the N coast.

**Privateer Point,** 0.4 mile S of East End Point, is a projecting point 164 feet high, separating **East End Bay** from **Privateer Bay,** two small bights open to the SE. **Red Point,** a headland W of Privateer Bay, is the S end of a high ridge.

**Flanagan Island,** 127 feet high, lies 0.7 mile SE of Privateer Point. A rock off the W side is 45 feet high.

**Flanagan Passage,** the westernmost of the passages leading into Sir Francis Drake Channel from S, consists of a group of channels separating St. John and Norman Islands. The channel between Privateer Point and Flanagan Island is 0.7 mile wide; that between Flanagan Island and the Indians is about 1.2 miles wide; and that between Flanagan and Norman Islands is 1.4 miles wide.

Approaching Flanagan Passage from E, haul close around the W side of Norman Island, inside Santa Monica Rock, which may be done at a distance of 300 yards. From W, line up the Indians and Mount Bellevue, the highest hill on the E end of Tortola, and enter W of Santa Monica Rock on a heading of about **016°.**

**Coral Bay,** the large bay extending N into St. John between Red Point and Ram Head, is open to the SE. The narrowest part of the entrance, between Moor Point and Lagoon Point, is 1.2 miles wide. **Leduck Island,** 85 feet high, lies in the entrance to Coral Bay, midway between Red Point and Ram Head. **Storm warning signals are displayed.** (See chart.)

**Currents.**-The current velocity is about 0.7 knot and sets SW and NE across the entrance to Coral Bay; between Flanagan Island and Privateer Point its velocity is reported to be 1.5 knots. In the bay there is no current, and the range of tide is about 1 foot.

**Moor Point** is the thin rocky SW extremity of East End Peninsula. **Turner Point** is the knob at the end of the peninsula separating Round Bay and Hurricane Hole. **Fortberg Hill,** N of Harbor Point, is nearly circular in shape, 426 feet high, covered with trees, and very prominent. **Lagoon Point,** the S entrance point of Coral Harbor, is fringed by a coral reef 200 yards wide and bare at low water. **Sabbat Point,** 0.5 mile S of Lagoon Point, is the

end of a long high rock forming the buttress of **Sabbat Hill,** 101 feet high.

**Ram Head,** the S point of St John is a bold headland, with two conspicuous hills. The E side of the head has rocky cliffs 100 to 150 feet high. A heavy sea generally runs off the point.

The only danger in the approach to Coral Bay for vessels drawing less than 18 feet is **Eagle Shoal,** about 0.7 mile S of Leduck Island. The shoal consists of three round patches of coral; the least depth is 1½ feet. Close to and around them the depths are 6 to 7 fathoms, and 13 fathoms a little over 100 yards to the S. Coral Bay has no towns; the community is scattered among several points along the shore.

**Round Bay,** the NE of the three arms of Coral Bay, is 0.9 mile wide at the entrance. The several shoal patches of about 2¼ fathoms should be avoided. **Pelican Rock,** 7 feet high, is in the NE part of the bay. The best anchorage in Round Bay is off Moor Point.

**Hurricane Hole,** the N arm of Coral Bay, is 0.6 mile wide at the entrance W of Turner Point. The shoreline is indented by several small bays that afford protection from almost any direction for small vessels. A shoal with rocks awash extends out 100 yards on the W side of Hurricane Hole.

**Coral Harbor,** the NW arm of Coral Bay, is narrow, and the deep part of the bay is restricted to a width of 100 yards or less by encroaching shoals from the side and head of the harbor. The anchorage ground, although smooth with ordinary winds, is narrow, and being on a lee shore it is available only for small vessels. A small-boat wharf with 3 feet alongside is at the head of the bay.

The S coast of St. John is very irregular with bold projecting points terminating in cliffs over 100 feet high between the small bays and coves that have fringing reefs and shoals near the shores. The dangers are within 0.5 mile of the coast.

**Lameshur Bay,** 1.5 miles NW of Ram Head, is divided into three smaller bays by projecting points. The easterly one affords good shelter for small vessels in 6 fathoms about 0.2 mile offshore. The middle bay has a good anchorage generally used by sailboats, and a sand beach.

The shore for 0.6 mile W of Lameshur Bay consists of very prominent 150-foot white cliffs.

**Chart 25647 (938).-Reef Bay,** 2.7 miles W of Ram Head, is a large open bight, but the shores are fringed by coral reefs. A passage leads through the reefs to a protected small-boat harbor in **Genti Bay.**

**Great Cruz Bay,** 5.5 miles W of Ram Head, affords good shelter for small vessels. The depth is 24 feet in the entrance, decreasing to less than 10 feet in the middle of the bay.

**Chart 25641 (905).-St. Croix Island,** 32 miles S of St. Thomas and St. John Islands and 50 miles SE of the mainland of Puerto Rico, is the largest of the U.S. Virgin Islands. The island is 19 miles long and averages about 3.5 miles wide. The N side is somewhat mountainous, particularly in the W part. **Mount Eagle,** 1,165 feet high and about 5 miles from the W end, is the highest point on the island. Southward from the mountains, the land is composed of fertile undulating valleys. The S side is nearly straight and generally low.

Water commerce with St. Croix Island is handled through Christiansted on the N coast, Frederiksted on the W coast, and the industrial complexes in Krause Lagoon and Limetree Bay along the central S coast. Tourism accounts for a good part of the commerce on the N and E coast; a petroleum refinery and a bauxite refinery are the major commerce on the S coast. Some cattle are raised for export to nearby islands.

**Tides and currents.**-The tides are chiefly diurnal and are small, the mean range being about 0.5 foot and the diurnal range less than a foot. There is usually a slight W current between St. Croix Island and St. Thomas Island. No perceptible current has been observed at Christiansted Harbor, but a moderate W flow is reported outside Fort Louise Augusta Light.

National Ocean Survey parties have reported that off East Point tidal currents of about 1 knot set NW and SE in calm weather. Close to East Point strong currents set N and S. Trade winds increase the NW flow and decrease the SE flow. A very strong W current setting around East Point and through Buck Island Channel was noted when the trade wind was blowing. A strong NW current was noted off Southwest Cape.

**Weather.**-Rainfall is irregular causing droughts at times. For a 37-year period annual rainfall varied from 26 to 70 inches.

There is no regular land breeze at St. Croix Island, but when the trade wind is light during the day it generally falls calm in the night. From June to September, when the trade wind is usually light, occasionally strong winds from the SW blow across the island, with much rain. Northers, with the accompanying heavy ground swell, do not appear to reach the island.

**Storm warning display** locations are listed on NOS charts and shown on Marine Weather Services Charts published by the National Weather Service.

**Hams Bluff,** the NW extremity of St. Croix Island, is a conspicuous 100-foot cliff with the land back of it rising to high hills. **Hams Bluff Light** (17°46.3'N., 64°52.3'W.), 394 feet above the water, is shown from a white tower.

From Hams Bluff the N coast of St. Croix Island has slightly jutting rocky points with sandy beaches between for 5.5. miles to Baron Bluff.

**Baron Bluff** is the sea front of the triple spurs of a 395-foot hill. From Baron Bluff E to **Salt River,** the shore consists of low rocky cliffs.

**Salt River Point** is 1.7 miles E of Baron Bluff. W of the point a narrow passage with depths of 6 feet

leads through a reef to **Salt River Bay.** The shores of the bay are mostly mangrove swamps with several openings leading to boat landings.

**White Horse,** 400 yards N of Salt River Point, is a rock over which the sea always breaks. A boat channel with a depth of about 11 feet leads between the rock and the shore.

From Salt River Point the coast turns abruptly SE for 3 miles to Christiansted. In this area the hills near the coast are covered with grass and low bushes, and the low shoreline has a narrow sand beach.

**Chart 25645 (935).-Christiansted Harbor,** on the N coast of St. Croix Island 10 miles E of Hams Bluff and 7.7 miles W of East Point, is a port of call for vessels drawing up to 16 feet. The harbor is protected by a reef and bank that extends clear across the entrance, except for the channel opening. **Gallows Bay** is in the SE part of the harbor. Most of the harbor is shoal.

**Christiansted,** on the S shore of the harbor, is the largest town on St. Croix Island. The principal imports include foodstuffs, building materials, petroleum products, and clothing. Exports include rum, cattle, and scrap iron.

**Prominent features.-Fort Louise Augusta,** on the E side of the harbor entrance, is an old battery on a projecting point. Christiansted Harbor Channel Entrance Front Light, 45 feet above the water, is shown near the fort. The radio tower adjacent to the front range light is prominent.

**Protestant Cay,** an islet in the harbor, is surmounted by an old stone building and a hotel. The ruins of Fort Sofia Frederika are at the N end of the cay.

**Boundary lines of inland waters.**-The lines established for Christiansted Harbor are described in 82.240, chapter 2.

**Channels.**-The entrance is N of Fort Louise Augusta through a crooked dredged channel marked by buoys, lights, and a **164°** lighted entrance range, thence E and S of Protestant Cay to a turning basin and to Gallows Bay Dock. In April 1972, the controlling depth was 15 feet. Shoaling has occurred close to the edges of the marked channel into Christiansted Harbor; extreme caution is advised in transiting the channel.

Inside the harbor, a privately dredged channel with private aids leads W of the main channel to facilities in the SW part of the bay. In 1972, a depth of 17 feet was reported in the channel and alongside the berthing facilities.

A 15-foot passage over the S portion of Scotch Bank is used by small vessels coming from E; local knowledge is necessary. A 13-foot channel E of Round Reef is sometimes used by schooners and small boats with local knowledge.

**Anchorages.**-Vessels anchor NE of Protestant Cay in depths of 9 to 30 feet according to draft. Holding ground in this area is reported to be hard; caution is advised to ensure against dragging. Small boats anchor in Gallows Bay and along the E side of the harbor. During a hurricane or gale vessels anchor in Gallows Bay and small boats sometimes anchor in Salt River Bay.

**Dangers-Scotch Bank,** a 1.8-mile-long sand shoal extending NE from Fort Louise Augusta, is on the E side of the harbor entrance. Depths of 2 to 20 feet are on the shoal, which is easily seen except when the sun is ahead.

**Long Reef,** a 2-mile-long strip nearly awash in places, forms the NW side of the harbor. Shoal water extends E from the reef to the channel marked with buoys.

**Round Reef,** W of Fort Louise Augusta, is circular with a spot bare at low water near its center and several spots with depths of 1 foot.

The harbor is shoal with depths less than 6 feet outside the circuitous channel marked by buoys.

**Routes.**-Approaching Christiansted Harbor from NE, give Buck Island a berth of 2 miles or more to avoid the bar N of it. From W all dangers will be avoided by staying a mile or more off the N coast. The entrance is marked by a lighted **164°** range, and buoys mark the entrance channel into the harbor.

**Pilotage.**-(See Pilotage for U.S. Virgin Islands at the beginning of this chapter.) Vessels are boarded from a motorboat just outside the sea buoy (Buoy 1, 17°45.9'N., 64°41.8'W.). Strangers are advised to take a pilot and should not attempt to enter at night without one.

**Quarantine.**-Officials from the U.S. Public Health Service quarantine station at Christiansted enforce the national quarantine laws. Vessels subject to such inspection generally make arrangements in advance through the ship's agents. (See Public Health Service, chapter 1.) A municipal hospital is at Christiansted.

**Customs.**-Christiansted is a **customs port of entry.** Vessels subject to inspection are boarded at their berths.

**Immigration** and **agricultural quarantine** officials are stationed in Christiansted. (See appendix for addresses.) Vessels subject to inspection are boarded at their berths.

**Harbor regulations.**-Local rules and regulations for Christiansted harbor are enforced by the **harbormaster,** whose office is on the waterfront.

**Wharves.**-Gallows Bay Dock (17°44'57"N., 64°41'57"W.), in the E part of Gallows Bay, has berthing space of 400 feet on the W side and 300 feet on the E side; depths of 16 feet are reported alongside. A roll-on/roll-off ramp with 16 feet alongside is E of the dock. Forklifts, mobile cranes up to 70 tons, and covered and uncovered storage are available. General cargo is received and shipped.

Kings Wharf, the 600-foot bulkhead stone quay about 300 yards W of Gallows Bay Dock and W of the fort, has depths of about 8 feet alongside; this bulkhead is used occasionally by auxiliary powered schooners engaged in the interisland trade.

A 380-foot-long pier, 0.9 mile W of Gallows Bay Dock, is operated by the Virgin Island Cement Company. Pipelines for handling raw cement and fuel oil are on the pier. A reported depth of 17 feet is alongside.

An L-shaped pier, just W of the long pier, has about 200 feet of berthing space with 17 feet reported alongside and is operated by Masonry Products, Inc. A pipeline for handling raw cement is on the pier.

**Supplies and repairs.**-Some marine supplies and limited amounts of water are available at Christiansted. Gasoline and diesel fuel are available near the waterfront; bunkers can be trucked in from the S side of the island. Facilities for repairs to oceangoing vessels are limited to minor above-the-waterline repairs.

**Small-boat facilities.**-St. Croix Marine and Development Company, NE of Gallows Bay Dock, has four finger piers; three, 100 feet long, and one, 200 feet long; depths of 10 feet are reported alongside. A marine railway at the facility can haul craft up to 75 feet long, and 10-foot draft; a transfer lift can handle craft up to 40 tons, 60 feet in length, and 10-foot draft. Gasoline, diesel fuel, and water are available. Limited engine repairs can be made.

**Chart 25641 (905).**-Beyond Fort Louise Augusta, the N coast trends E for 7.3 miles to East Point, the E end of the island. The coast is fringed by coral reefs, behind which in several places small vessels may find protection.

**Punnett Point** (chart 25645 (935)) 1.4 miles E of Fort Louise Augusta, forms the E side of **Punnett Bay,** a semicircular cove 0.2 mile wide. NE of Punnett Point, at a distance of about 0.4 mile, is **Green Cay,** an islet 55 feet high at its S end. S to the beach and between Green Cay and Pull Point, the area has depths of only 6 to 18 feet with numerous coral heads.

**Pull Point,** 2.3 miles ENE of Fort Louise Augusta, is a small projecting point terminating in cliffs 35 feet high. A house with a conspicuous green roof is visible at the point. **Chenay Bay** is the bight W of the point.

**Buck Island,** 340 feet high, is 4.3 miles ENE of Fort Louise Augusta and about 1.5 miles off St. Croix. The island is on the S edge of a coral bank which extends W about 0.8 mile, then sweeps around a mile N of the island. This forms **Buck Island Bar,** 1.5 miles long. Shoals extend about 1.8 miles E of Buck Island. The island lies on the route from E to Christiansted Harbor. A light, 360 feet above the water, is shown from a red skeleton tower on the summit of the island. Buck Island lies within the Buck Island Reef National Monument, the boundary of which is marked by private buoys.

**Diedrichs Point,** the S extremity of Buck Island, is low. Several spots with 12, 17, and 20 feet lie from 1 mile E of the island to 1.7 miles ESE of it. **Buck Island Channel** lies between Buck Island and the adjacent reefs and St. Croix. Moderate-draft vessels may approach it from either N or E. **Channel Rock,** awash, lies 1.8 miles W of East Point.

The N coast of St. Croix from Pull Point to East Point is fringed by a coral reef. Behind this reef are several anchorages for small boats, but local knowledge is necessary to use them. Entrance is made at **Coakley Bay,** a bight 0.8 mile E of Pull Point. The opening in the end of the reef can be entered by steering **180°** with Coakley Mill directly ahead.

**Pow Point,** 1.5 miles E of Pull Point, is rocky with a 130-foot hill 250 yards inland. **Tague Point,** 1.1 miles E of Pow Point, is sharp and rocky with a 155-foot hill 0.2 mile SSW. **Tague Bay,** 0.7 mile wide between the bluffs at Tague Point and **Romney Point** , has a curving beach of sand and shingle. The bay provides anchorage for light-draft vessels entering behind the reef through a break NE of Tague Point. A marina, a private yacht club, and the Fairleigh Dickerson University research pier are along the shore. A depth of 10 feet can be taken to the marina pier where gasoline, diesel fuel, water, and minor repairs are available.

**Cottongarden Point,** a prominent rocky point with a 55-foot knoll, is 1.6 miles E of Tague Point and opposite the E end of the long reef paralleling the coast. **Cramer Park** a public beach and park operated by the Insular Government, is W of the point.

**East Point,** the E extremity of St. Croix, is a bluff. A 225-foot hill is 100 yards WNW, and **Morne Rond,** 380 feet high, is a conspicuous round hill near the point.

**Lang Bank,** an extensive bank 3 to 5 miles wide stretches 9 miles NE from the E end of St. Croix Island. Along its edge is a wall-sided narrow coral ledge which, commencing about 3 miles E of Buck Island, sweeps around in a convex form for about 14 miles, terminating 2 miles S from East Point. Its N part is from half a mile to 1 mile wide, with depths of 5½ to 10 fathoms. The S portion is about 100 to 600 yards wide, with 7 to 10 fathoms on it. The shoalest part of Lang Bank breaks in heavy weather and should be given a wide berth.

From East Point, the S coast of St. Croix Island trends WSW for 20 miles to Southwest Cape. This coast is bordered by a dangerous broken coral reef which extends from East Point to nearly abreast of Long Point, 3.6 miles E of Southwest Cape. Behind this reef are several anchorages suitable for small local boats. Along the coast are many small bights and indentations, but all are shallow and do not afford anchorage except for small craft. Many old mills and the aerolight on the SW part of the island are prominent.

**Point Cudejarre,** a sharp point with a 25-foot bluff and a 120-foot hill NNW, is 0.3 miles SW of East Point. **Grass Point,** 3 miles WSW of East Point, is a long narrow point marked by a 43-foot knob.

**Mount Fancy,** about 4.7 miles W of East Point, is a conspicuous double hill, 245 feet high, which forms the E point of **Great Pond Bay.** Good anchorage for vessels of 10-foot draft, in hard sand bottom, can be had in this bay. An entrance range is the E tangent of Milord Point in line with Sight Mill; when about 100 yards off the point haul around to **064°**, pass W of a 7-foot shoal 200 yards E of Milord Point, and run for 0.3 mile, anchoring in 13 to 14 feet. **Milord Point,** the west entrance point of the bay, is a promontory of **Fareham Hill,** 192 feet high and prominent.

**Vagthus Point,** sharp and rocky, is 9.5 miles WSW of East Point. **Canegarden Bay,** 1.2 miles wide, forms an irregular crescent to the W of Vagthus Point.

**Limetree Bay,** close W of Canegarden Bay, is the site of a private deep-draft oil-handling facility operated by Hess Oil Company. Large tankers call here to deliver crude oil and to load petroleum and petrochemical products.

**Channels.**-A privately dredged channel leads from deepwater to a large turning basin and oil-handling terminal. The channel is Privately marked by a **334°** lighted range visible 2° on each side of the channel centerline and by an auxiliary **334°** lighted range, close E of the first range, visible 4° on each side of the channel centerline, and by lights and lighted buoys. In 1973, the reported controlling depth was 60 feet.

**Pilotage.**-(See Pilotage for U.S. Virgin Islands at the beginning of this chapter.) Pilots board vessels 1 mile S of the harbor entrance. Night entry is limited to vessels less than 85,000 dwt.

**Towage.**-Three tugs up to 2,400 hp are available for docking.

**Quarantine, customs, immigration,** and **agricultural quarantine** matters are handled by representatives from Christiansted who board vessels at their berths. Documents required are the same as at U.S. ports.

**Wharves.**-A total of seven oil-handling docks are on the E and W sides of a 0.7-mile-long causeway that extends into the basin from the N shore. Depths alongside range from 35 feet at the northernmost dock to 60 feet at the southernmost docks.

**Supplies.**-Emergency supplies of bunker fuels, diesel oil, and limited amounts of water are available.

**Krause Lagoon** indents the S shore of St. Croix Island immediately W of Limetree Bay and about 12.3 miles WSW of East Point. The bauxite ore refining facility at the head of the lagoon is known as **Port Alucroix** and is owned by the Martin Marietta Aluminum Corp. Large vessels call here to deliver bauxite ore and load alumina, a white powder that is the principal raw material for the manufacture of aluminum.

**Channels.**-Krause Lagoon Channel, a privately maintained dredged 35-foot channel with dikes paralleling it on either side in the N part, leads from deepwater through the reefs to a large turning basin and pier at the head of Krause Lagoon. The channel is privately marked by buoys, lights, a daybeacon, and a lighted range. In 1972, the reported controlling depth in the channel, turning basin, and to the pier was 35 feet. In 1974, it was reported that the maximum acceptable draft for this channel was 33 feet 3 inches.

**Pilotage.**-(See Pilotage for U.S. Virgin Islands at the beginning of this chapter.) Vessels are boarded 1 mile S of the harbor entrance; daylight only.

**Towage.**-Two tugs, up to 1,200 hp, are available.

**Quarantine, customs, immigration,** and **agricultural quarantine** matters are handled by officials from Christiansted who board vessels at their berths. Documents required are the same as at U.S. ports.

**Wharves.**-The concrete bulkhead pier at the terminal has 1,000 feet of berthing space along both the E and W sides. Depths alongside are 37 feet; recommended berthing depth is 32 feet.

**Supplies.**-Emergency supplies of bunker fuels, diesel oil, and freshwater are available. The terminal has no ballast disposal facilities.

Dumping of waste oil in the harbor is prohibited. Masters are cautioned that the discharge of any oil, oily waste, or other refuse in the harbor can result in serious damage to the shore plant cooling water intakes and every precaution should be exercised to prevent such an occurrence.

**Chart 25644 (937).-Long Point,** 3.6 miles E of Southwest Cape, is a low projecting point covered with grass. W of the point is **Long Point Bay,** which is shoal. **Southwest Shoal,** 1.2 miles S of Long Point, has only 6 feet of water over it, and E to Krause Point the outlying reefs are the most dangerous along the S coast. They generally break, but as several shoal spots are S, the area should be approached with caution.

**Southwest Anchorage,** between Long Point and Southwest Cape, offers temporary anchorage in 7 fathoms 2 miles offshore. Small vessels can anchor in 4 fathoms a mile from shore.

A channel, privately marked and entered about 1.5 miles 125° from Southwest Cape, leads in an E direction to mooring buoys about 1.1 miles E of Long Point; channel and mooring buoys are maintained by Texaco Antilles Ltd., St. Croix, Virgin Islands. The channel is primarily for the use of tankers arriving at the mooring buoys.

**Southwest Cape,** the SW extremity of St. Croix Island, is a low point projecting 1.2 miles in a SW direction. The point is covered by low bushes and trees. A coral reef extends S, with a least depth of 9 feet, at a distance of 0.8 mile from the shore. A buoy marks the SW extremity of this shoal. The 5-fathom curve is 1.6 miles S of Long Point and nearly a mile S of Southwest Cape, but W of the point it is only 200 yards off. The 100-fathom curve lies nearly 2.5 miles SW of Southwest Cape. **Southwest Cape Light**(17°40.8'N., 64°54.0'W.), 50

feet above the water, is shown from a red skeleton tower near the tip of the cape.

Caution is necessary in approaching Southwest Cape. The point, fringed by shoals, is low for some 3 or 4 miles to the high land of the interior. This may cause the mariner to overestimate his distance from the coast, especially at night.

**Sandy Point,** the W extremity of the island, is 0.5 mile NNW of Southwest Cape.

The W coast of St. Croix Island trends NNE from Southwest Cape for 2.4 miles to Frederiksted, thence NW for 2 miles, and then curves NE for 2 miles to Hams Bluff. The coast consists mostly of sand beach with the land back of it sloping gently upward in the S part and the hills gradually working W to the shore in the N part. The slopes are covered by grass and bushes. The beach is steep-to with the 10-fathom curve lying 0.5 mile or less offshore.

**Frederiksted,** on the W coast of St. Croix Island 2.4 miles N of Southwest Cape and 3.7 miles S of Hams Bluff, is a port of call for cruise ships and cargo vessels. Large vessels can dock at the long pier in the 4-mile-wide open roadstead. The principal imports include foodstuffs, building materials, petroleum products, and clothing. Exports include rum and scrap iron.

**Prominent features.-Frederiksted Harbor Light** (17°43.0'N., 64°53.1'W.), 42 feet above the water, is shown from a white skeleton tower with a white and red daymark on a small wharf at the N part of the waterfront. **Fort Frederik** is 125 yards NE of the light.

A radar tracking station (17°43'13"N., 64°51'18"W.), illuminated at night, is on **St. George Hill** about 1.5 miles E of Frederiksted. The station is reported to be prominent for many miles.

**Storm warning signals are displayed.** (See chart.)

**Anchorages.**-Vessels anchor in depths of 30 to 60 feet NW and SW of the long pier according to draft. Small boats anchor near the waterfront.

**Restricted areas** have been established off the W coast of St. Croix Island, N and S of Frederiksted Harbor. (See 207.817, chapter 2, for limits and regulations.)

**Routes.**-From S, the shoals S of Southwest Cape will be avoided by staying a mile or more offshore. At night stay in the white sector of Frederiksted Harbor Light on the approach to the pier.

**Pilotage.**-(See pilotage for U.S. Virgin Islands at the beginning of this chapter.) Vessels are boarded 1 mile off the long pier.

**Quarantine.**-Officials from the U.S. Public Health Service quarantine station at Christiansted enforce the national quarantine laws. Vessesl subject to such inspection generally make arrangements in advance through the ships' agents. (See Public Health Service, chapter 1.) A municipal hospital is at Frederiksted.

**Customs** and **immigration.**-Frederiksted is a **customs port of entry.** Officials from Christiansted serve Frederiksted. Vessels subject to inspection are boarded by officials at their berths.

**Harbor regulations.**-Local rules and regulations for Frederiksted harbor are enforced by a **dockmaster,** whose office is on the shoreward end of the long pier.

**Wharves.**-A 1,600-foot pier extends from the waterfront at Frederiksted. A 242-foot loading platform (pierhead) is about 250 feet inshore of the outer end. Depths along both sides of the pier decrease from about 42 feet at the outer end to 30 feet alongside the loading platform, thence to 24 feet, 350 feet inshore of the E end of the loading platform; breasting dolphins are along the N side of the pier. Warping buoys, three off the S side, and one off the N side of the pier are available to ships in maneuvering alongside.

A roll-on-roll-off facility with landing ramp is on the S side and about 400 yards E of the seaward end of the long pier. A line of dolphins extends about 65 yards SW from the ramp to an offshore platform. Submerged ruins are close N of the line of dolphins. Depths in the approach and alongside the ramp are about 17 to 20 feet. Covered and uncovered storage areas, and mobile cranes up to 20 tons are available at the facility.

A 125-foot-long by 20-foot-wide landing platform for ships' tenders is on the S side of the long pier about 90 yards E of the roll-on-roll-off facility. A small-boat stone landing pier is on the N side of long pier.

**Supplies and repairs.**-Some marine supplies and water are available. Bunker fuels, diesel oil, and gasoline can be trucked in from nearby. Limited above-the-waterline repairs are available.

Submarine cables extend WSW to the 100-fathom contour from **Sprat Hole,** 1.6 miles N of Frederiksted. Mariners are requested not to anchor in this area.

**Chart 25641 (905).**-A general description of the **British Virgin Islands** is included in this chapter for a convenient reference to both the United States and British groups. Complete information is included in H.O. Publication 22, Sailing Directions, The West Indies, Vol. II, published by the Defense Mapping Agency Hydrographic Center, and West Indies Pilot, Vol. II, published by the British Ministry of Defense Hydrographic Department.

**Little Tobago Island,** 3.5 miles NE of Hans Lollik Island, is nearly 0.5 mile long and 279 feet high. It is steep-to except on its SE side. **Tobago Island,** 1 mile NE of Little Tobago Island, is 0.8 mile long and about 538 feet high. A small rock, awash and steep-to, is about 100 yards off the N point. The SE side of the island is fringed with coral, but elsewhere the coastal cliffs are steep-to. A few rocks lie close off the NW point.

**Watson Rock,** steep-to and 89 feet high, is about 0.3 mile W of the SW point of Tobago Island. **King Rock,** 0.6 mile S of the SW point, is awash and steep-to. It is near the S end of a bank, over which are general depths of 6 to 9 fathoms, extending about 0.7 mile S of Tobago Island.

**Mercurius Rock,** 0.8 mile E of the N end of Tobago Island and the only danger between that island and Jost Van Dyke Island, is small and steep-to. It is covered 7 feet. When using the passage between Tobago and Jost Van Dyke Islands, the east side should be favored.

**Jost Van Dyke Island,** about 2 miles E of Tobago, is 3.5 miles long, lofty, rugged, and steep-to. Near the middle of the N part a summit rises to 1,070 feet. **Great Harbor** and **Little Harbor** (Garner Bay), on the S side of the island, are suitable only for small vessels. Great Harbor is about 0.5 mile in extent, with depths of 4 fathoms to about 0.2 mile from its head, and Little Harbor has depths of about 8 fathoms inside the entrance.

**Little Jost Van Dyke Island,** connected by a shallow ledge to the NE end of Jost Van Dyke Island, is 367 feet high. **Green Cay,** 108 feet high, is a small islet close E of Little Jost Van Dyke Island. **Sandy Cay,** nearly 1 mile S of Green Cay, is 66 feet high at its E end. It is surrounded by shoal water, and foul ground extends 200 yards from the E and W ends. The channel between it and Jost Van Dyke Island is 0.6 mile wide; the island shore must be favored.

**Tortola,** the largest of the British Virgin Islands, is 10 miles in length and 3.5 miles wide. **The West End,** the W extremity, is about 2 miles NE of Mary Point, St. John. The highest summit in the Virgin Islands is 1,740-foot **Mount Sage** in the W part of the island; rugged hills rise somewhat abruptly from the shores on all sides.

**Great Thatch Island,** about 0.6 mile N of Mary Point from which it is separated by The Narrows, is 1.7 miles long, and near its center rises to a peak 613 feet high. The E point is bold and steep-to. **Thatch Island Cut,** the channel between Great Thatch and The West End, is deep. Sailing vessels should not attempt Thatch Island Cut from the N except with a S current, as the eddies and currents are very strong.

**The Narrows,** between St. John Island and Great Thatch Island, give access to the channel which extends between Tortola and St. John and leads to Sir Francis Drake Channel and Flanagan Passage. Tidal currents in The Narrows and the passage E attain velocities of from 2 to 4 knots.

**Little Thatch Island,** 0.4 mile S of The West End, is about 0.5 mile long. **Frenchman Cay,** about 0.3 mile E of Little Thatch Islet, is 400 feet high. **Sopers Hole** is a deep little basin, 1 mile long and about 0.3 mile wide, between Frenchman Cay and Little Thatch Island, on the S, and the W end of Tortola, on the N side. At the E end of Sopers Hole the muddy bottom is the best holding ground. There is a small pier on the N side of Sopers Hole.

In the center of Sopers Hole is a depth of 13 fathoms which gradually decreases to 6 fathoms at 100 yards from the shore; the bottom is sandy. The passage between Little Thatch Island and Frenchman Cay is from 6 to 7 fathoms deep.

Vessels from S may enter Sopers Hole by the passage between Frenchman Cay and Little Thatch Island, or by that between the latter island and the W end of Tortola. These passages are not difficult, but the W ends of Tortola and Little Thatch Island must be given a berth of more than 200 yards.

Sailing vessels taking Thatch Island Cut should approach it with a S current, which will shoot a vessel into it. A vessel coming from the E will find the passage E of Little Thatch Island the best, as she will have a leading wind, can luff up closer under the W end of Frenchman Cay, which is steep-to, and shoot into Sopers Hole with either a S or N current. When leaving, pass out to the N through Thatch Island Cut, or, if bound into Sir Francis Drake Channel, round the W end of Little Thatch Island at a distance of somewhat more than 200 yards and haul to the wind. With the E tidal current of 3 or 4 knots on the lee beam, she will have a fair set through the channel between St. John and Tortola. The W tidal current has a similar velocity. There is no danger on either shore. A vessel must be prepared to meet the gusts and baffling winds which rush out from the valleys of Tortola.

On the NW side of Tortola are numerous small bays or bights, of which Cane Garden Bay, the largest, is the only one on the N side of the island that affords anchorage even for small vessels. Across its entrance is a bar with 12 feet of water, inside of which are depths of 18 to 24 feet. A 5-fathom shoal lies in the approach to the bay, about 0.4 miles N of the S entrance point.

**Chart *25611.-Road Harbor,** on the S side of Tortola 6 miles east of its W end, is the only port of entry in the British Virgin Islands for all vessels. Sopers Hole at the W end of Tortola is a limited port of entry. The harbor is exposed SE, but the other sides are surrounded by high hills with their spurs reaching the shores.

**Road Town,** on the W shore of Road Harbor, is the capital of the British Virgin Islands. Imports include foodstuffs, building material, and general merchandise. Livestock are exported.

**Prominent features.**-There are four prominent landmarks in Road Town, these being Fort Burt Hotel, a group of four pink buildings, situated on the W side of the harbor on Burt Point, the Administration Building (Customhouse), a white flatroofed building standing behind the main wharf, and about midway between these two positions stands the Administration Residence (Commissioner's House), an isolated, white concrete building standing on a low knoll. To the N of the Administration Building, the white belfry of the Anglican church shows above Wickham Cay, a low mangrove-covered islet, in the NW part of the harbor. The floodlighted oil tanks on Shirley Point on the E side of the harbor N of Scotch Bank are reported to be conspicuous.

**Channels.**-The principal channel into Road Harbor is between Scotch Bank and Lark Bank, thence on the lighted range to the pier at Road Town. Small vessels also enter the harbor between the lighted buoy marking the outer limits of the coral reef about 400 yards E of Burt Point and Lark Bank. The controlling depth is 36 feet to the anchorage area, but only 7½ feet to the dock.

**Anchorages.**-Deep-draft vessels anchor in depths of 8 to 12 fathoms inside of Scotch and Lark Banks. Anchorage may also be obtained in the N part of the harbor, N of Harbor Rock, in about 8 fathoms. Vessels proceeding to the deep-draft. anchorage should steer **321°** from a point about 1.5 miles 180° from Half Moon Point until the lighted buoy off Burt Point is abeam. Ships desiring to make the N anchorage should proceed as to the deep-draft anchorage until the Commissioner's House is abeam. Ships desiring to anchor S of Harbor Spit should proceed as previously mentioned until the range lights come in line 290°, which will lead to a depth of about 9 fathoms between Burt Point and Harbor Spit. The best berth is just S of the range line.

**Careening Cove,** in the lee of the dry reef off Burt Point, is small but well sheltered, with depths of 4 to 6 feet.

**Dangers.**-Although depths of 36 to 48 feet can be taken to the anchorage areas in Road Harbor, irregular bottom, and many patches of rock and coral, with depths of 13 to 36 feet lie within about 1.5 miles of Hog Valley Point (Hog Point) and 2 miles of Slaney Point.

Depths of from 22 to 25 feet will be found over extensive shoals with limits of about 1.1 miles S of Hog Valley Point and 1.1 miles S of Slaney Point. A 17-foot patch is about 0.5 mile SE of Hog Valley Point, and a 18-foot patch is about 0.75 mile SW of Slaney Point.

A coral reef about 250 yards wide and partially covered by mangrove extends NE from Slaney Point to Burt Point; a lighted buoy marks the outer limits of the reef at Burt Point.

**Denmark Banks,** 0.5 mile SE of Burt Point, has two rocky patches with a least depth of 13 feet. The Bluff, bearing 073° and open S of Nora Hazel Point, leads S of these banks. **Lark Bank,** 0.4 mile E of Burt Point, has a least depth of 15 feet over a coral head. **Scotch Bank,** 0.8 mile E of Burt Point and marked by a buoy at its S edge, has a least depth of 10 feet.

**Harbor Spit,** 0.4 mile N of Burt Point, is an extension of the shoal water in the NW part of the harbor. Depths on the spit are from 4 to 17 feet; a buoy marks the SE end of the spit. **Harbor Rock,** 250 yards SE from the end of the spit, has a least depth of 20 feet.

**Tides.**-The tides in Road Harbor are chiefly diurnal, and the range is small.

**Pilotage.**-No licensed pilots are available, but reliable mariners are available to bring ships into the harbor.

**Wharves.**-A 180-foot cargo pier at Road Town has depths of 7½ feet at the head and on the sides. A 106- foot passenger pier to the S has depths of 7 feet alongside. Small sloops are used for lighterage when necessary.

**Supplies.**-Limited amounts of groceries and water are available. Gasoline and diesel fuel can be obtained from offshore pipelines on the NE side of Road Harbor.

**Repairs.**-A small marine railway in Careening Cove can handle boats about 40 feet in length and 6 feet in draft. Another marine railway in **Bauger Bay,** on the NE side of Road Harbor, can handle small boats of 6-foot draft for repairs.

**Communications.**-Daily passenger launch service is maintained between Road Harbor and St. Thomas. Radiotelephone and radiotelegraph communications are available. There is air service between other islands.

**Chart 25641 (905).-Guana Island,** 810 feet high and 1.7 miles long, is about 0.3 mile N of Tortola. The passage between these islands has a depth of about 29 feet in the fairway. On the W headland separating **White Bay** and **Muskmelon Bay is a large rock shaped like an Iguana's head, known locally as Lizard Head Rock.** A safe anchorage in 7 to 12 fathoms is in the entrance to White Bay.

**Great Camanoe** , a mile E of Guana Island, is about 2.5 miles long. It consists of two parts connected by a low narrow neck of land between **Lee Bay** and **Cam Bay. Scrub Island** is close E of Great Camanoe, from which it is separated by a narrow channel with many shoals and rocks.

**Little Camanoe** and **Marina Cay** are SW and SE, respectively, of the S end of Great Camanoe Island. They are all connected to the N side of Beef Island by a shoal bank on which are several rocks and reefs. The channel N of Beef Island is quite open and easily navigated by large yachts. **Shallow Rock** is a 3-foot shoal off the W point of **Trellis Bay** on the N coast of Beef Island. A light is shown from **Bellamy Cay** in the middle of the bay. A small marine railway is in the bay.

A hotel is on Marina Cay; launches, yachts, air compressors for aqualungs and other diving equipment are available.

**Beef Island,** about 2.4 miles long and 660 feet high in its E part, is separated from the E end of Tortola by a narrow shoal channel which should be used only with local knowledge. In 1973, a bascule bridge with an unknown clearance was constructed across the channel. **The Bluff,** the S extremity of the island, is a good landmark for vessels bound to Road Harbor. During strong NE winds excellent anchorage will be found in the lee of Beef Island, about 0.7 mile W of The Bluff. An airfield is on Beef Island. **Buck Island,** 1.1 miles SW of Beef Island and close off the SE side of Tortola, is 170 feet high at its SE end.

**Sir Francis Drake Channel** is a passage bounded on the NW by Tortola and the islands off its E

end, and on the SE by the chain of islands extending between Virgin Gorda and St. John. It can be entered by most vessels through any of the passages in the latter chain of islands or the passages on either side of **Dog Islands.**

E of Buck Island the depths are regular, about 13 to 14 fathoms, but W of that island the bottom is very irregular, especially in the approach to Road Harbor. In the S portion of the W part, the general depths are 17 to 27 fathoms, but there are several coral patches with depths of 4 to 10 fathoms. Anchorage is found anywhere in this channel E of Buck Island, but the bottom is hard, being a thin bed of sand over coral, and therefore requires a good scope of chain.

In Sir Francis Drake Channel there is scarcely any current except close inshore, where small vessels may gain some advantage from it when beating to windward during the NE flow.

**Flanagan Passage,** the westernmost of the passages leading into Sir Francis Drake Channel from the S, is a group of channels between St. John and Norman Islands. It and connecting passages have been described previously in this chapter.

**Norman Island,** 1.6 miles E of Flanagan Island, is about 2.3 miles long and 440 feet high near its SW extremity. Foul ground is close off its NE and SW ends. **Ringdove Rock,** covered by 2 fathoms, is about 300 yards W of the NW point of Norman Island. **Santa Monica Rock,** 0.7 mile SW of Norman Island, is a small patch 1¾ fathoms deep.

**Pelican Island,** 180 feet high, is about 0.5 mile N of Ringdove Rock. About 200 yards W of it are **The Indians,** four remarkable small pinnacle rocks, 50 feet high. A 6½-fathom shoal lies 0.7 mile NNW of Pelican Island.

**The Bight,** a small inlet in the W side of Norman Island, provides excellent anchorage. The shores are steep-to, and Ringdove Rock is the only danger when entering. The wind in the lee of the island, however, is so baffling that sailing vessels may have to anchor at the entrance and warp in. Although the bight is open to NW, St. John Island prevents any sea from setting in, and holding ground is good. Safe anchorage with the regular trade wind may also be found in **Privateer Bay,** on the W side of Treasure Point.

**Peter Island,** NE of Norman Island, is in the form of an elbow, 440 feet high at its W part. **Carrot Rock,** 84 feet high, lies about 0.3 mile off the S end of the island, and **Carrot Shoal,** covered 1¾ fathoms, is about 0.4 mile SW of the rock. Some 6-fathom patches lie within 0.5 mile of the N side of the island.

**Great Harbor,** a small bight on the N side of Peter Island, is about 0.5 mile in extent. It may be entered easily at any time. Deep water is close to shore, and the holding ground is excellent. **Little Harbor,** a short distance W of Great Harbor, is smaller and more exposed, but has characteristics very similar to the latter.

Owing to the shape of Peter Island, the passage between it and Norman Island is rather crooked, but has a least depth of 6 fathoms. It is seldom taken by sailing vessels. Carrot Shoal can be avoided by keeping Norman Island abroad.

**Dead Chest,** nearly 0.5 mile off the NE end of Peter Island, is an islet 200 feet high; a group of rocks extends about 0.2 mile S from its E end. A 4½-fathom patch lies about 0.7 mile NW of the islet.

**Blonde Rock,** covered 1 1/2 fathoms, is about 0.6 mile ENE of Dead Chest. **Salt Island Passage,** 1.5 miles wide between Dead Chest and Salt Island, is generally smooth. Blonde Rock can be avoided by keeping 0.5 mile from the E side of the passage.

**Salt Island,** about 2 miles NE of Peter Island, rises to a height of 380 feet in its N part. A rock awash lies close off its NE end. The passage between Salt and Cooper Islands is constricted to a width of about 0.3 mile by the rocks and an islet off the nearest point of Cooper Island. This passage should never be attempted by a sailing vessel. **Cooper Island,** NE of Salt Island, is 1.7 miles long and 530 feet high at its S end. **Dry Rocks** are 300 yards off the NE side of Cooper Island, and **Carval Rock,** 110 feet high and steep-to, is 0.8 mile ENE of **Markoe Point,** the S point of Cooper Island.

**Ginger Island,** about 1 mile E of Cooper Island, is 500 feet high and steep-to at its NE and SE ends. Some rocks lie close off its W end. The passage between Ginger and Cooper Islands may be taken by powered vessels, but sailing vessels may meet trouble.

**Round Rock,** 220 feet high, is the southernmost of a chain of islets and rocks extending SSW from the SW end of Virgin Gorda. **Round Rock Passage,** between Ginger Island and Round Rock, is the easternmost of the passages leading into Sir Francis Drake Channel from S. It is the best for vessels coming from S. The passage is about 0.7 mile wide and easily located from its position in relation to Fallen Jerusalem, 1.2 miles to the NE. Sailing vessels will find it advantageous to use this passage as the islets on the weather side offer no obstruction to the prevailing winds. The SE and NW tidal currents attain a velocity of about 1 knot.

**Chart *25609.-Virgin Gorda** is easily distinguished on making the land, as it rises gradually to the distinct summit of 1,370-foot **Virgin Peak.** The island, extremely irregular in outline, consists of a central portion from which there are peninsulas extending E and SSW. The E peninsula consists of irregular rugged hills which terminate at **Pajaros Point** in an astounding pinnacle rock 120 feet high. The SW peninsula is more regular in outline and 250 to 450 feet high, but it is joined to the central portion by an isthmus only 200 yards wide.

The W side of the SW peninsula consists of immense granite blocks which lie scattered about on the shore. **Colison Point** is the NW extremity of the

peninsula. The islets and rocks to the S as far as Round Rock, 2 miles distant, are also of granite; the largest, about 140 feet high, nearly 0.5 mile from the S end of the island, is named **Fallen Jerusalem** because of its resemblance to a town in ruins.

Several islets are in the N part of Sir Francis Drake Channel. **Great Dog,** the southeasternmost, is 270 feet high and steep-to at its W end; rocks fringe its N and S sides. **George Dog,** the northernmost, is 250 feet high and has some detached rocks about 0.2 mile N of it. **Cockroach Rock** lies about 0.2 mile W of it. **West Dog,** the westernmost, is 150 feet high, with its W side bold and steep-to.

**Tow Rock,** 1.2 miles WNW of West Dog, has a depth of 2½ fathoms over it but is steep-to; it may be avoided by passing close to West Dog or Scrub Island.

**Seal Dogs,** 1.3 miles NE of George Dog and 1 mile W of **Mountain Point,** the NW extremity of Virgin Gorda, are a cluster of three small islets. The N islet is the smallest and only 6 feet high, the southeasternmost is 74 feet high, and the westernmost and largest is 100 feet high. The passage is clear on either side of the group.

In **Western Roads,** off the W side of Virgin Gorda, are two excellent anchorages for vessels of any draft. The N is situated in the bight between Mountain and Colison Points, and is partially protected to the NW by Dog Islets. It seldom, however, blows hard to the W of N, and the only thing to be prepared for is the ground swell in the winter when it is better to anchor in about 13 fathoms of water, midway between Great Dog and Virgin Gorda. Here, with good ground tackle and a long scope of chain, there will be nothing to fear, as the rollers seldom are accompanied by much wind.

The S anchorage, in 13 fathoms, between Colison Point and Fallen Jerusalem, is the best for sailing vessels because, if necessary, they can weigh and run out to W with more ease than from the N anchorage. The holding ground is good at both places, and the water is usually smooth. A small patch of 4¼ fathoms lies 0.4 mile W of Colison Point, and **Burrow Rock,** with 1½ fathoms, is 1 mile S of Colison Point. The anchorages may be approached from either N or S as the passages are clear except between West Dog and Scrub Island, where Tow Rock lies. On the N side of Virgin Gorda are several small slightly wooded islets and cays.

**Chart *25610.-Mosquito Island,** about 0.6 mile long and 290 feet high, the highest of the islets off the N side of Virgin Gorda, is 1 mile ENE of Mountain Point. The channel separating it from **Anguilla Point,** on Virgin Gorda, is shoal and only 175 yards wide. The NE end is fringed by a reef, and a chain of small detached rocks extends 300 yards NNE. **Mosquito Rock,** the outermost, is 23 feet high.

**Colquhoun Reef,** which dries in patches, extends nearly 0.6 mile SE from Mosquito Rock, and is steep-to on its NE side. On the SW side is a small sandy islet, about 2 feet high and sparsely covered with coarse grass. **Prickly Pear Island,** the largest of the islets off the N side of Virgin Gorda, is about 0.8 mile E of Mosquito Island. It is 1 mile long and 237 feet high. **Asbestos Point,** its E end, is 0.2 mile from the nearest part of a small peninsula of the E arm of Virgin Gorda, and the channel between is shallow and foul. In the middle of it is **Saba Rock,** 15 feet high.

**Cactus Reef,** extending 300 yards W of Cactus Point, the NW end of Prickly Pear Island, is steep-to on its N side; the sea breaks on it even with a slight swell.

**Gorda Sound,** is an excellent and roomy harbor between Virgin Gorda on the S and Mosquito Island, Colquhoun Reef, and Prickly Pear Island on the N. It is sheltered from all winds and protected from rollers. As there is no health officer or other Government representative, vessels before visiting it should obtain pratique at Road Harbor, Tortola.

In the approach are uniform depths of 9 to 12 fathoms. The entrance between the 3-fathom curves of Colquhoun and Cactus Reefs is 200 yards wide with depths of 19 to 35 feet. Deeper water is inside the entrance.

The W portion of the sound is foul, with several shoals of 2 to 3 fathoms and some coral patches of less than a fathom. **Gorda Rock,** 0.3 mile SE of Colquhoun Reef, has a least depth of 30 feet. **Creek Shoal,** off the S side of the entrance to **Gun Creek,** is of coral sand with a least depth of 21 feet.

**Oyster Rock,** about 150 yards off the S shore in the approach to Biras Creek, is a pinnacle rock with only 2 feet of water on it, surrounded by a shallow patch. **Biras Creek** is in the SE corner of Gorda Sound.

The tide in Gorda Sound is chiefly diurnal. The tidal currents at the entrance are seldom more than 0.5 knots, but the inward current sets toward Prickly Pear Island. Between Mosquito Island and Anquilla Point, the eastgoing current has a velocity of from 1 to 1.5 knots.

**Routes.**-Powered vessels coming from the E approach Gorda Sound by Necker Island Passage, which lies between Virgin Gorda and Herman Reefs. The approach is dangerous at night. Bring Virgin Peak to bear **261°**and steer for it on that bearing until the N extremity of Necker Island bears 279°, distant 6.8 miles. Then alter course to pass at least 0.5 mile N of Necker Island. When Virgin Peak bears 211°, steer for it until Gnat Point bears 177° and Mosquito Rock bears 255°, then steer for the center of the entrance channel between Cactus and Colquhoun Reefs, which should be entered on a **170°** course; no marks can be given for this narrow channel, but with a favorable light no difficulty should be experienced in passing safely through it.

Coming from N it is better to pass W of Anegada and approach with Virgin Peak on a bearing between 132° and 155°.

Sailing vessels can follow the direction for powered vessels, but if coming from the N and passing E of Anegada, they should not attempt to pass close to windward of Horse Shoe Reef. This has caused many disasters.

**Eustatia Island,** on the shoal bank E of Prickly Pear Island, is 172 feet high and 0.3 mile long. Its N side is foul for 300 yards off, from which a barrier reef extends to Pajoros Point. Outside this foul ground there are two detached patches with depths less than 3 fathoms, one about 0.6 mile ENE and the other about 0.5 mile E of the E extremity of Eustatia Island. These patches lie on an extensive bank with depths of from 3 to 5 fathoms.

In the lee of this barrier reef is **Eustatia Sound,** in which small vessels will find safe anchorage. The main entrance is through a small cut in the reef about 0.5 mile E of Eustatia Island; there are also several other small passages through the reefs which can be used, but these should be avoided by strangers because the ground is foul for some distance outside the entrance. Several rocks and shoals are in the sound.

**Virgin Sound,** a channel 0.2 mile wide, extends between the reefs and shoals N of Prickly Pear and Eustatia Islands and those S of Necker Island. It affords good temporary anchorage in 7 to 8 fathoms, but care must be taken to avoid the reefs on either side. The tidal currents set E and W with a velocity of about 0.5 knot.

**Necker Island,** 0.7 mile N of Eustatia Island, is nearly 0.5 mile long and 107 feet high at its N part. The NE side is fairly bold and steep-to, with depths of 6 to 10 fathoms within 300 yards. The SE and W sides are foul and dangerous up to 0.5 mile offshore. Foul ground, near which is a reef that dries, extends about 0.3 mile S of Necker Island.

**The Invisibles,** about 0.8 mile E of Necker Island, are three small rocky heads covered 4 to 5 feet. Depths of 5 to 8 fathoms are between the Invisibles and the reefs on the E side of Necker Island; greater depths are close off the E end. Caution is required when navigating in this area as the rocks do not always break and are hard to see.

**Chart *25609.-Anegada,** the northeasternmost island of the Virgin Group, lies with **East Point,** its SE end, about 12 miles NNE of Pajaros Point. Anegada is 9 miles long, about 30 feet high, and covered with brushwood except at a few places cleared for cultivation. Numerous saltwater lagoons are in the W interior. The principal settlement is on the S side, 2.5 miles from East Point.

The island is about 1.5 miles within the edge of the Virgin Bank, but the depths decrease so rapidly that sounding is of little help. The island is low, and owing to the strength and irregularity of the tidal currents in the vicinity, it is extremely dangerous to approach at night.

Anegada is skirted on its N side by a narrow barrier reef which is about 0.1 mile off at **Soldier Point,** the N point, and 1.5 miles E at East Point. Thence **Horse Shoe Reef,** a most dangerous reef upon which many vessels have been lost, extends SE for nearly 8 miles. From its SE end detached coral heads and shoal ledges extend 4.5 miles SW, where they terminate in Herman Reefs, which break only with a swell or a strong breeze. Horse Shoe Reef breaks in any weather.

**The White Horse** is a heap of white dead coral, 3 feet high, 2 miles W of the elbow of Horse Shoe Reef.

The edge of the bank is 2.5 miles E of the elbow of Horse Shoe Reef. Here are depths of 34 fathoms close within the 100-fathom curve, and 10 fathoms about 1 mile farther in. Abreast Herman Reefs, the edge of the bank is little more than a mile distant. The S end lies 5.5 miles ENE of Pajaros Point. A detached 5-fathom patch is 0.7 mile S of the reefs.

**Robert Reef,** 3.5 miles W of Herman Reefs, is a small rocky patch with 4½ fathoms on it. Another small rocky head, with 3¾ fathoms, is 1.1 miles NNE of this reef. **Hawks Bill Bank,** about 2 miles NNW of Robert Reef, is a small rocky ledge with 2¾ to 5½ fathoms.

The reef skirting the N side of Anegada terminates about 300 yards off **West End,** but the S side of the island is foul with detached coral patches lying up to 3.5 miles offshore. A 5-fathom patch is 3.3 miles W of West End.

Good temporary anchorage may be found in 5 to 6 fathoms about 1 mile off West End. During the period of rollers, October to May, however, it is advisable to anchor S of the island. The bank W of Anegada is chiefly fine sand, and in good weather vessels may anchor on it in safety, taking care to avoid the dangers.

# APPENDIX

**National Ocean Survey.**-Coast Pilots, Nautical Charts, Tide Tables, Tidal Current Tables, Tidal Current Diagrams, and Tidal Current Charts are sold by the National Ocean Survey and by authorized sales agents located in many ports of the United States and in some foreign ports. Mail orders should be addressed to National Ocean Survey, Distribution Division (C44), 6501 Lafayette Avenue, Riverdale, Md. 20840, and accompanied by a check or money order payable to NOS, Department of Commerce. Remittance from outside of the U.S. 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 Survey maintains over-the-counter cash sales offices at 6501 Lafayette Avenue, Riverdale, Md.; at 6001 Executive Boulevard, Room 713, Bldg. 1, Washington Science Center, Rockville, Md. (small orders only); at 439 West York Street, Norfolk, Va.; at Lake Survey Center, 630 Federal Office Bldg. and U.S. Courthouse, Detroit, Mich.; at 1801 Fairview Avenue East, Seattle, Wash.; and at 632 Sixth Avenue, Room 303, Anchorage, Alaska.

**National Ocean Survey Field Offices**

**Norfolk:** Director, Atlantic Marine Center, NOS, National Oceanic and Atmospheric Administration, 439 West York Street, Norfolk, Va. 23510.

**Detroit:** Director, Lake Survey Center, NOS, National Oceanic and Atmospheric Administration, 630 Federal Building and U.S. Courthouse, Detroit, Mich. 48226.

**Seattle:** Director, Pacific Marine Center, NOS, National Oceanic and Atmospheric Administration, 1801 Fairview Avenue East, Seattle, Wash. 98102.

**Coast Pilots**

U.S. Coast Pilot 1, Atlantic Coast, Eastport to Cape Cod, November 1974.

U.S. Coast Pilot 2, Atlantic Coast, Cape Cod to Sandy Hook, January 1975.

U.S. Coast Pilot 3, Atlantic Coast, Sandy Hook to Cape Henry, July 1975.

U.S. Coast Pilot 4, Atlantic Coast, Cape Henry to Key West, July 1975.

U.S. Coast Pilot 5, Atlantic Coast-Gulf of Mexico, Puerto Rico, and Virgin Islands, July 1975.

U.S. Coast Pilot 7, Pacific Coast and Hawaii, June 1975.

U.S. Coast Pilot 8, Alaska-Dixon Entrance to Cape Spencer, June 1969.

U.S. Coast Pilot 9, Pacific and Arctic Coasts, Alaska-Cape Spencer to Beaufort Sea, October 1964.

Distances Between United States Ports, Fifth (1973) Edition.

Coast Pilots 1, 2, 3, 4, 5, and 7 have been computerized and are published annually. When other Coast Pilots are computerized, they will be issued on an annual basis. In the meantime, all of the books except the computerized editions should be used only by reference to the latest supplement which can be obtained free from National Ocean Survey, Distribution Division (C44), 6501 Lafayette Avenue, Riverdale, Md. 20840, and from NOS sales agents.

**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.

**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.

Block Island Sound and Eastern Long Island Sound.

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.

San Francisco Bay.

Puget Sound, Northern Part.

Puget Sound, Southern Part.

**Tidal Current Diagrams**

Block Island Sound and Eastern Long Island Sound.

Long Island Sound and Block Island Sound.

**Publications.**-A resume of the U.S. Government publications of navigational value is included for the ready reference of the mariner. In addition to the agents located in the principal seaports handling sales publications, certain libraries have been designated by the Congress of the United States to receive the publications as issued for public review.

**Nautical Charts.**-Coasts of the United States and Possessions: Published by National Ocean Survey; for sale by NOS and its agents.

Black Warrior-Tombigbee Rivers System: Published and for sale by U.S. Army Engineer District, Mobile, Ala.

Alabama River: Published and for sale by U.S. Army Engineer District, Mobile, Ala.

Mississippi River (Cairo, Ill., to Gulf of Mexico): Published and for sale by Mississippi River Commission, Vicksburg, Miss.

Mississippi River (Cairo, Ill., to Minneapolis, Minn.) and Illinois Waterway (Mississippi River to Lake Michigan): Published and for sale by the U.S. Army Engineer District, Chicago, Ill.

Great Lakes, Lake Champlain, New York State Canals, and the St. Lawrence River-St. Regis to Cornwall, Canada: Published and for sale by NOS and its sales agents.

Foreign countries: Published by Defense Mapping Agency Hydrographic Center (DMAHC): for sale by that office and its sales agents.

**Coast Pilots.**-Coasts of the United States and Possessions: Published by National Ocean Survey; for sale by NOS and its sales agents.

**Great Lakes Pilot:** Published and for sale by NOS and its sales agents.

**Sailing Directions** (Foreign Countries): Published by the Defense Mapping Agency Hydrographic Center (DMAHC); for sale by that office and its sales agents.

**Tide and Tidal Current Tables, Tidal Current Charts, and Tidal Current Diagrams:** Published by National Ocean Survey; for sale by NOS and its sales agents.

**Marine Weather Services Charts:** Published by National Weather Service; for sale by NOS and its sales agents.

**Notice to Mariners** may be obtained free from the following: Local Notices to Mariners-District Commander of the local Coast Guard district; Weekly Notice to Mariners, coasts of the United States, Possessions, and foreign-Defense Mapping Agency Hydrographic Center (DMAHC); Local Notice to Mariners, Great Lakes-Commander, Ninth Coast Guard District, Cleveland, Ohio.

**Special Notice to Mariners are published annually in 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 Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Foreign countries: Published by Defense Mapping Agency Hydrographic Center (DMAHC); for sale by that office and its sales agents.

**Radio.**-Radio Navigational Aids, Atlantic and Mediterranean Area (Pub. 117A); Radio Navigational Aids, Pacific and Indian Oceans Area (Pub. 117B): Published by Defense Mapping Agency Hydrographic Center (DMAHC); for sale by that office and its sales agents. Worldwide Marine Weather Broadcasts, formerly Radio Weather Aids (Pub. 118): Published by the National Weather Service; for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

**Miscellaneous.**-The Nautical Almanac, The Air Almanac, and American Ephemeris and Nautical Almanac: Published by U.S. Naval Observatory; for sale by Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

American Practical Navigator (Bowditch) (H.O. Publication No. 9), and International Code of Signals (H.O. Pub. No. 102): Published by the Defense Mapping Agency Hydrographic Center (DMAHC); for sale by its sales agents or from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Rules of the Road, International-Inland (CG-169). Rules of the Road, Western Rivers (CG-184). Rules of the Road, Great Lakes (CG-172): Published by and free on application to the U.S. Coast Guard.

Port Series of the United States: Part 1 (port administration and services) published by Maritime Administration, U.S. Department of Commerce; Part 2 (port conditions and facilities) published by Corps of Engineers, U.S. Army. Both parts are for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Official U.S. Coast Guard Recreational Boating Guide (CG-340): Published by U.S. Coast Guard; for sale by the Superintendent of Documents, U.S. Governement Printing Office, Washington, D.C. 20402.

Marine Radio Telephony-How to correctly operate your radiotelephone set in the 2 MHz band; and Maritime Mobile VHF-FM Radio Telephony-Usage in the United States: Published by Radio Technical Commission for Marine Services; for sale by RTCM Services, c/o Federal Communications Commission, Washington, D.C. 20554.

**Corps of Engineers Offices**

**Galveston District:** Essayons Bldg., 400 Barracuda Avenue, Galveston, Tex. 77550. The district includes the coastal waters and tributaries of Texas.

**Jacksonville District:** Federal Bldg., 400 West Bay Street, Jacksonville, Fla. 32201. The district includes the coastal waters and tributaries of Florida E of St. Marks, Puerto Rico, and the Virgin Islands.

**Mobile District:** 109 St. Joseph Street, Mobile, Ala. 36628. The district includes the coastal waters and tributaries of Florida W of St. Marks, Alabama, Mississippi, and Louisiana to and including Pearl River.

**New Orleans District:** Foot of Prytania Street, New Orleans, La. 70160. The district includes the coastal waters and tributaries of Louisiana W of Pearl River and the Mississippi River to Natchez, Miss.

**Environmental Protection Agency (EPA) Offices.**-Regional offices and States in the EPA coastal regions:

**Region I** (New Hampshire, Maine, Massachusetts, Connecticut, Rhode Island): J.F. Kennedy Federal Bldg., Room 2303, Boston, Mass. 02203.

**Region II** (New Jersey, New York, Puerto Rico, Virgin Islands): 26 Federal Plaza, Room 908, New York, N.Y. 10007.

**Region III** (Delaware, Maryland, Virginia, District of Columbia, Pennsylvania): Curtis Bldg., 6th and Walnut Streets, Philadelphia, Pa. 19106.

**Region IV** (Alabama, Florida, Georgia, Mississippi, South Carolina, North Carolina): 1421 Peachtree Street NE., Atlanta, Ga. 30309.

**Region VI** (Louisiana, Texas): 1600 Patterson Street, Suite 1100, Dallas, Tex. 75201.

**Region IX** (California, Hawaii, Guam): 100 California Street, San Francisco, Calif. 94102.

**Region X** (Alaska, Oregon, Washington): 1200 Sixth Avenue, Seattle, Wash. 98101.

**Coast Guard District Offices**

Commander, Seventh Coast Guard District, Federal Bldg., 51 Southwest First Avenue, Miami, Fla. 33130. Coastal waters and tributaries of South Carolina, Georgia, Florida E of longitude 83°50'., Puerto Rico, and the United States Virgin Islands.

Commander, Greater Antilles Section, U.S. Coast Guard, P.O. Box 2029, San Juan, P.R. 00903.

Commander, Eighth Coast Guard District, Customhouse, New Orleans, La. 70130. Coastal waters and tributaries of Florida W of longitude 83°50'W., Alabama, Mississippi, Louisiana, and Texas.

**Coast Guard Captains of the Port**

Corpus Christi Captain of the Port, Federal Bldg., P.O. Box 1621, Corpus Christi, Tex. 78403.

Galveston Captain of the Port, Coast Guard Base, General Delivery, Galveston, Tex. 77551.

Houston Captain of the Port, P.O. Box 446, Galena Park, Tex. 77547.

Key West Captain of the Port, Coast Guard Base, Key West, Fla. 33040.

Mobile Captain of the Port, Federal Bldg., P.O. Box 1788, Mobile, Ala. 33601.

New Orleans Captain of the Port, 4640 Urquhart Street, New Orleans, La. 70117.

Port Isabel Captain of the Port, Coast Guard Station, P.O. Box 38, Port Isabel, Tex. 78578.

Sabine Captain of the Port, P.O. Box 412, Sabine, Tex. 77655.

San Juan Captain of the Port, Coast Guard Base, P.O. Box S2029, San Juan, P.R. 00903.

Tampa Captain of the Port, 500 Zack Street, P.O. Box 3172, Tampa, Fla. 33601.

**Coast Guard Marine Inspection Offices**

Baton Rouge, La.: 750 Florida Street, Room 318, 70801.

Corpus Christi, Tex.: Box 1621, 78403.

Galveston, Tex.: Customhouse, Room 201, 77550.

Houma, La.: Federal Bldg., Room 213, 423 Lafayette Street 70360.

Houston, Tex.: 7300 Wingate Street 77011.

Lake Charles, La.: Federal Bldg., Room 2022, 70601.

Mobile, Ala.: Federal Bldg., Room 563, 109 St. Joseph Street 36602.

Morgan City, La.: Post Office Bldg., Room 205, 70380.

New Orleans, La.: Gateway Bldg., Room 201, 124 Camp Street 70130.

Port Arthur, Tex.: Federal Bldg.-Customhouse, Fifth and Austin Avenue 77640.

San Juan, P.R.: P.O. Box 3666, 00904.

Tampa, Fla.: P.O. Box 3172, 33601.

**Coast Guard Documentation Offices**

Baton Rouge, La.: 750 Florida Street, Room 318, 70801.

Biloxi, Miss.: P.O. Box 556, 39533.

Brownsville, Tex.: 1940 East Elizabeth Street 78520.

Corpus Christi, Tex.: P.O. Box 1621, 78403.

Galveston, Tex.: Customhouse, Room 232, 77550.

Gulfport, Miss.: P.O. Box 1898, 39501.

Houma, La.: P.O. Box 508, 70360.

Houston, Tex.: 7300 Wingate Street 77011.

Key West, Fla.: P.O. Box 753, Post Office Bldg., Simonton and Caroline Streets 33340.

Lake Charles, La.: Federal Bldg., Room 2208, 70601.

Mobile, Ala.: Federal Bldg., Room 506, 36602.

Morgan City, La.: P.O. Box 935, 70308.

New Orleans, La.: 236 Gateway Bldg., 124 Camp Street 70130.

Pascagoula, Miss.: P.O. Box 448, 39567.

Pensacola, Fla.: P.O. Box Drawer B, 32502.

Port Arthur, Tex.: Federal Bldg.-Customhouse, Fifth and Austin Avenue 77640.

San Juan, P.R.: P.O. Box 3666, 00904.

Tampa, Fla.: P.O. Box 3172, 33601.

**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 156.80 MHz (channel 16). After contact on channel 16, communications with the Coast Guard should be on 157.10 MHz (channel 22). If channel 22 is not available to the mariner, communications may be made on 156.60 MHz (channel 12). Selected stations guard the International Radiotelephone Distress, Safety and Calling Frequencies.

**Puerto Rico:**

San Juan (18°27.7'N., 66°07.0'W.). N side of San Juan Harbor at La Puntilla.

**Florida:**

Key West (24°33.4'N., 81°48.5'W.). W side of Key West.

St. Petersburg Air Station (27°45.7'N., 82°37.7'W.). W side of Tampa Bay, 1.4 miles N of Lewis Island.

Clearwater (27°58′44″N., 82°49′12″W.). N side of causeway 0.2 mile NE of the W end of the causeway.

Yankeetown (29°01.9′N., 82°42.1′W.). About 4 miles above the mouth of Withlacoochee River.

Panama City (30°10.1′N., 85°42.3′W.). NW side of Buena Vista Point.

Santa Rosa (30°19.1′N., 87°15.3′W.). About 2.5 miles E of W end of Santa Rosa Island.

**Alabama:**

Mobile (30°39.0′N., 88°03.6′W.). At W end of Arlington Channel.

**Mississippi:**

Pascagoula (30°20.7′N., 88°33.8′W.). E side of Pascagoula River about 1 mile above the entrance.

**Louisiana:**

Grand Isle (29°15.9′N., 89°57.4′W.). Just inside Barataria Pass at the NE end of Grand Isle.

New Orleans (29°49.7′N., 90°01.2′W.). At Naval Air Station, Alvin Callender Field.

New Canal (30°01.6′N., 90°06.8′W.). E side of New Canal entrance, on Lake Pontchartrain.

**Texas:**

Sabine (29°43.7′N., 93°52.3′W.). W side of Sabine Pass, about 5.6 miles NNW of Sabine Pass East Jetty Light.

Galveston (29°20.0′N., 94°46.2′W.). E side of Galveston Channel, about 4 miles W of Galveston Jetty Light.

Houston (29°43′40″N., 95°15′30″W.). On N side of Ship Channel, and at the Ellington Air Force Base (29°37′N., 95°10′W.).

Freeport (28°56.5′N., 95°18.2′W.). NE side of Freeport Harbor entrance.

Port O'Connor (28°26.0′N., 96°25.6′W.). N bank of Intracoastal Waterway about a mile W of Port O'Connor.

Port Aransas (27°50.2′N., 97°03.5′W.). NE end of Mustang Island at E end of Corpus Christi Channel.

Corpus Christi (27°42.1′N., 97°16.5′W.). At Naval Air Station, Corpus Christi.

Port Isabel (26°04.3′N., 97°09.8′W.). S end of Padre Island, at Brazos Santiago Light.

**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 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 canceled; (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 156.80 MHz (channel 16), respectively. Safety broadcasts are preceded by the safety signal: TTT for radiotelegraph; SECURITE 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 156.80 MHz (channel 16) shifting to 157.10 MHz (channel 22).

**Scheduled broadcasts.**–The following Coast Guard radio stations make scheduled broadcasts, preceded by a preliminary call on 500 kHz and 2182 kHz, at the times and frequencies indicated:

**Radiotelegraph:**

NMA, Miami, Fla., 440 kHz, 1100 and 2000 e.s.t.

NMG, New Orleans, La., 428 kHz, 1120 and 1820 c.s.t.

NMR, San Juan, P.R., 466 kHz, 1220 and 2120 A.s.t.

**Radiotelephone:**

NMA, Miami, Fla., 2670 kHz, 0500, 0600, 0700, 0800, 0900, and 2350 e.s.t.

NOF, St. Petersburg, Fla., 2670 kHz, 0720, 0920, 1120, 1420, and 2320 e.s.t.

NMG, New Orleans, La., 2670 kHz, 0350, 0550, 0750, 1150, 1350, 1550, 1750, and 2350 c.s.t.

NOY, Galveston, Tex., 2670 kHz, 0320, 0520, 0720, 1120, 1320, 1520, 1720, and 2320 c.s.t.

NMR, San Juan, P.R., 2670 kHz, 1000 and 2300 A.s.t.

**Customs Ports of Entry**

**Miami Region:**

Tampa District: Tampa, Fla.; Boca Grande, Fla.; St. Petersburg, Fla.

Miami District: Key West, Fla.

San Juan District: San Juan, P.R.; Aguadilla, P.R.; Fajardo, P.R.; Guanica, P.R.; Humacao, P.R.; Jobos, P.R.; Mayaguez, P.R.; Ponce, P.R.

St. Thomas District: Charlotte Amalie, St. Thomas; Christiansted, St. Croix; Coral Bay, St. John; Cruz Bay, St. John; Fredriksted, St. Croix.

**New Orleans Region:**

Mobile District: Mobile, Ala.; Apalachicola, Fla.; Carrabelle, Fla.; Gulfport, Miss.; Panama City, Fla.; Pascagoula, Miss.; Pensacola, Fla.; Port St. Joe, Fla.

Customs station: Biloxi, Miss. (Supervised by Mobile port of entry)

New Orleans District: New Orleans, La.; Baton Rouge, La.; Morgan City, La.

Customs stations: Gramercy, La. (Supervised by New Orleans port of entry); Houma, La. (Supervised by Morgan City port of entry)

**Houston Region:**

Port Arthur District: Port Arthur, Tex.; Beaumont, Tex.; Lake Charles, La.; Orange, Tex.; Sabine, Tex.

Galveston District: Galveston, Tex.; Corpus Christi, Tex.; Freeport, Tex.; Port Lavaca-Point Comfort, Tex.

Houston District: Houston, Tex.

Laredo District: Brownsville, Tex.

**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.

Apalachicola, Fla.: 2nd floor, Postal Service Bldg., Commerce and Avenue D.

Baton Rouge, La.: Ryan Airport.

Brownsville, Tex.: Administration Bldg., Rio Grande Valley Airport.

Corpus Christi, Tex.: International Airport.

Fort Myers, Fla.: 215 Danley Drive, Page Park.

Galveston, Tex.: 515 Post Office Bldg.

Houston, Tex.: 1002 Federal Office Bldg.

Key West, Fla.: International Airport.

Lake Charles, La.: Municipal Airport.

Mobile, Ala.: Bates Field, Municipal Airport.

New Orleans, La.: 701 Loyola Avenue.

Pensacola, Fla.: Municipal Airport.

Port Arthur, Tex.: Jefferson County Airport.

San Juan, P.R.: Isla Verde International Airport.

Tampa, Fla.: International Airport.

**Radio Weather Broadcasts.**-Taped or direct broadcasts of forecasts and storm warnings are made by commercial and Coast Guard radio stations in the area covered by this Coast Pilot. These broadcasts are usually made several times a day. Transmission schedules are shown on the **Marine Weather Services Charts** for the following areas:

Savannah, Ga., to Apalachicola, Fla.

Apalachicola, Fla., to Morgan City, La.

Morgan City, La., to Brownsville, Tex.

Puerto Rico and the Virgin Islands.

These charts are for sale by the National Ocean Survey, Distribution Division (C44), 6501 Lafayette Avenue, Riverdale, Md. 20840, and its authorized sales agents.

The weather broadcasts schedules of Coast Guard radio stations are also listed in the description of Coast Guard marine services found elsewhere in this appendix.

**VHF-FM Weather Broadcasts.**-National Weather Service VHF-FM radio stations provide mariners with continuous FM broadcasts of weather warnings, forecasts, radar reports, and surface weather observations. These stations usually transmit on 162.55 or 162.40 MHz. Reception range is up to 40 miles from the antenna site, depending on the terrain, type of receiver, and antenna used. The following VHF-FM radio stations with location of antenna are in or near the area covered by this Coast Pilot:

KHB-32, Tampa, Fla. (27°58'N., 82°48'W.), 162.55 MHz.

KGG-67, Panama City, Fla. (30°09'N., 85°43'W.), 162.55 MHz.

KEC-86, Pensacola, Fla. (30°27'N., 87°14'W.), 162.40 MHz.

KEC-61, Mobile, Ala. (30°36'N., 88°11'W.), 162.55 MHz.

KHB-43, New Orleans, La. (29°57'N., 90°05'W.), 162.55 MHz.

KHB-46, Baton Rouge, La. (30°32'N., 91°09'W.), 162.45 MHz. (On the hour and at 10 minute intervals thereafter, 24 hours a day.)

KHB-42, Lake Charles, La. (30°06'N., 93°17'W.), 162.55 MHz.

KHB-40, Galveston, Tex. (29°18'N., 94°49'W.), 162.55 MHz.

KGG-68, Houston, Tex., (29°46'N., 95°22'W.) 162.40 MHz.

KHB-41, Corpus Christi, Tex. (27°48'N., 97°24'W.), 162.55 MHz.

KHB-33, Brownsville, Tex. (27°57'N., 97°23'W.), 162.55 MHz.

**Public Health Service Quarantine Stations.**-Stations where quarantine examinations are performed:

Brownsville, Tex.: U.S. Quarantine Station, P.O. Box 992, 78520.

Christiansted, St. Croix, V.I.: U.S. Quarantine Station, P.O. Box 857, 00820.

Galveston, Tex.: U.S. Quarantine Station, Room 214, U.S. Customhouse, 77550.

Houston, Tex.: U.S. Quarantine Station, 220 Appraisers Stores Bldg., 7300 Wingate Avenue 77011.

Mobile, Ala.: U.S. Quarantine Station, 157½ St. Louis Street 36602.

New Orleans, La.: U.S. Quarantine Station, P.O. Box 20046, New Orleans International Airport, 70141.

Port Arthur, Tex.: U.S. Quarantine Station, Room 230, Federal Bldg., 77640.

San Juan, P.R.: U.S. Quarantine Station, Box 3788, 00904.

Tampa, Fla.: U.S. Quarantine Station, Room 218, Post Office Bldg., 33602.

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.

**Public Health Service Hospitals**

Galveston, Tex.: 4400 Avenue N, 77550.

New Orleans, La.: 210 State Street 70118.

**Public Health Service Outpatient Clinics**

Charlotte Amalie, St. Thomas, V.I.: Knud-Hansen Memorial Hospital, 00801.

Houston, Tex.: 204 U.S. Customs Bldg., 701 San Jacinto Street 77002.

Mobile, Ala.: 125 Federal Bldg., 36602.

Port Arthur, Tex.: 209 Federal Office Bldg., Fifth and Austin Avenue 77640.

San Juan, P.R.: 8½ Fernandez Juncos Avenue 00904.
Tampa, Fla.: 601 Florida Avenue 33601.

**Public Health Service Contract Physician's Offices**

Abbeville, La.: 304-A North Hospital Drive; 2602 North Street.
Apalachicola, Fla.: 142 Avenue E.
Aransas Pass, Tex.: Medical Arts Clinic.
Baton Rouge, La.: 5625 Government Street.
Biloxi, Miss.: 423 Lameuse Street.
Brownsville, Tex.: 105 West Elizabeth Street; 47 West Elizabeth Street; 1301 Los Ebanos Boulevard; 44 East Levee.
Cameron, La.: Marshall Street.
Cedar Key, Fla.: P.O. Box 1025.
Chattahoochee, Fla.: 401 High Street.
Corpus Christi, Tex.: 2522 Morgan Avenue; 2731 Morgan Avenue; 1220 South Staples Street.
Demopolis, Ala.: 101 South Mont Drive.
Fort Myers Beach, Fla.: 6875 Estero Boulevard.
Freeport, Tex.: 21 Hospital Road, Suite 109.
Grand Isle, La.: P.O. Box 747.
Gulfport, Miss.: 203-204 Hewes Bldg.
Key West, Fla.: 422 Fleming Street.
Morgan City, La.: 1122 Eighth Street.
Niceville, Fla.: 119 John C. Sims Parkway.
Panama City, Fla.: 615 North Cove Boulevard; 900 East Fourth Street.
Pensacola, Fla.: 1003 North 12th Avenue; 1800 North Palafax Street.
Ponce, P.R.: P.O. Box 1231.
Port Isabel, Tex.: P.O. Box 578.
Port Lavaca, Tex.: 1200 North Virginia Street.
Port St. Joe, Fla.: 324 Williams Avenue
Sarasota, Fla.: 2085 Siesta Drive.
Venice, Fla.: 321 Nokomis Avenue, South.

**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: "DHMEDICO."

The following stations maintain a continuous guard on 500 kHz and are most accessible in point of radio connection with medical relief facilities of the U.S. Public Health Service in the area covered by this Coast Pilot:

NOY, KLC, Galveston, Tex.
NMA, Miami, Fla.
NMG, WNU, New Orleans, La.
WPA, Port Arthur, Tex.
NOF, St. Petersburg, Fla.
NMR, San Juan, P.R.
WPD, Tampa, Fla.

**Department of Agriculture Quarantine Offices.**-Maritime ports where agricultural quarantine inspectors are located and inspections conducted:

**Alabama:**
Mobile: Federal Bldg., Room 147, 36601.

**Florida:**
Key West: Federal Bldg., Room 226, 301 Simonton Street 33040.
Pensacola: U.S. Post Office, Room 312, 100 North Palafox Street 32502.
Tampa: Federal Office Bldg., Room 436, 500 Zack Street 33602.

**Louisiana:**
Baton Rouge: Federal Bldg. and U.S. Courthouse, Room 116, 707 Florida Boulevard 70821.
New Orleans: Customhouse Bldg., Room 207, 423 Canal Street 70130.

**Puerto Rico:**
Fajardo: Fajardo Port, 00740.
Mayaquez: Mayaquez Governmental Center, 50 Nenadich Street 00709.
Ponce: Santa Maria Commercial Center, 00731.
Ramey Air Force Base: Bldg. 405 (Hanger 5), MAC Terminal, 00604.
Roosevelt Roads Naval Air Station: Air Operations Bldg., 09551.
San Juan: Post Office Bldg., Room 4, Ground Floor, Comercio Street 00901.

**Texas:**
Brownsville: Border Services Bldg., Room 216, East Elizabeth and International Boulevard 78520.
Corpus Christi: 420 Taylor Street, Room 117, 118, and 119, 78403.
Galveston: U.S. Customhouse Bldg., Room 217A, 18th and Strand Streets 77550.
Houston: U.S. Appraisers Stores Bldg., Room 210, 7300 Wingate Street 77011.
Port Arthur: Federal Bldg., Room 201, Fifth Street and Austin Avenue 77640.

**Virgin Islands:**
Charlotte Amalie, St. Thomas: U.S. Post Office Bldg., Room 202, 00801.
Christiansted, St. Croix: Terminal Bldg., Alexander Hamilton Airport, 00820.

**Immigration and Naturalization Service Offices**

**Alabama:**
Mobile: Commerce Bldg., Room 504, 118 North Royal Street 36602.

**Florida:**
Key West: Post Office Bldg., Room 104, 33040.
Pensacola: Post Office Bldg., Room 312-C, 32502.
Tampa: 500 Zack Street, Room 537, 33602.

**Louisiana:**
Baton Rouge: Federal Bldg.-U.S. Courthouse, Room 147, 707 Florida Boulevard 70801.
Lake Charles: Federal Bldg., Room 2308A-B, 70601.
New Orleans: New Federal Bldg., 701 Loyola Avenue 70113.

**Mississippi:**
Gulfport: Paulk Bldg., 1022 32nd Avenue 39502.

**Puerto Rico:**
Ponce: U.S. Customhouse, Ponce Playa, 00731.
San Juan: Pan Am Bldg., 255 Ponce de Leon Avenue, Hato Rey, 00917.

**Texas:**
Brownsville: Gateway International Bridge, 78520.

Corpus Christi: U.S. Courthouse, 521 Starr Street 78401.
Galveston: Post Office Bldg., 77551.
Houston: Federal Bldg.-U.S. Courthouse, 515 Rusk Avenue 77061.
Port Arthur: Customhouse, Room 222, 77640.
Port Isabel: Rural Route 3, Los Fresnos, 78566.
**Virgin Islands:**
Charlotte Amalie, St. Thomas: Federal District Court Bldg., 00801.
Christiansted, St. Croix: Vitraco Mall, Golden Rock, 00820.

**Federal Communications Commission Offices**
**District Field Offices:**
Beaumont, Tex.: Federal Bldg., 300 Willow Street 77701.
Houston, Tex.: New Federal Office Bldg., Room 5636, 77002.
Mobile, Ala.: U.S. Court and Customhouse, 36602.
New Orleans, La.: Federal Office Bldg., 600 South Street 70130.
San Juan, P.R.: Federal Bldg., 00903.
Tampa, Fla.: Federal Office Bldg., 500 Zack Street 33602.

**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 Survey. Courses are located in the following places covered by this Coast Pilot:
South of Punta Vaca, Isla de Vieques, P.R. 25664 (940).
South of Rock and Sand Keys, near Key West, Fla. 11445 (854).
Lake Pontchartrain, La., W of entrance to the Inner Harbor Navigation Canal 11369 (1269).

CLIMATOLOGICAL TABLES

These tables were compiled from Environmental Data Service data. Sky cover is expressed in a range of 0 for no clouds to 10 for complete sky cover. The number of days is based on average cloudiness of 0 to 3, partly cloudy days on 4 to 7, and cloudy days on 8 to 10.

Heavy fog includes data referred to at various times in the past as "Dense" or "Thick". The upper visibility limit for heavy fog is 1/4 mile.

(a) means length of record in years.
(b) means climatological standard normals, 1931-1960.
* means less than one-half.
T means trace, an amount too small to measure.

KEY WEST, FLORIDA (International Airport) 24°33'N., 81°45'W. Elevation (ground) 4 feet. EDS-1971

| Month | Air temperature (°F.) Normal: Daily maximum | Normal: Daily minimum | Normal: Monthly | Extreme: Record highest | Extreme: Record lowest | Precipitation (inches): Normal total | Maximum 24 hrs. | Snow, sleet mean total | Humidity (percent): 7 a.m. (local time) | 7 p.m. (local time) | Wind (knots): Mean speed | Prevailing direction | Maximum speed and direction | Percent of possible sunshine | Mean sky cover sunrise to sunset | Mean number of days: Sunrise to sunset: Clear | Partly cloudy | Cloudy | Precipitation .01 inch or more | Snow, sleet 1.0 inch or more | Thunderstorms | Heavy fog |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (a) | (b) | (b) | (b) | 19 | 19 | (b) | 23 | 23 | 23 | 23 | 18 | 3 | 23 | 13 | 19 | 19 | 19 | 19 | 23 | 23 | 23 | 23 |
| Jan. | 73.7 | 65.4 | 69.6 | 85 | 46 | 1.53 | 4.43 | 0.0 | 83 | 77 | 12.2 | NE | 71N | 69 | 5.0 | 11 | 12 | 8 | 7 | 0 | 1 | * |
| Feb. | 74.6 | 66.1 | 70.4 | 85 | 47 | 1.98 | 2.54 | 0.0 | 81 | 75 | 12.3 | SE | 63WNW | 74 | 4.7 | 11 | 11 | 6 | 5 | 0 | 1 | * |
| Mar. | 76.5 | 68.4 | 72.5 | 87 | 53 | 1.77 | 3.10 | 0.0 | 79 | 73 | 12.6 | SE | 47SW | 78 | 4.7 | 13 | 12 | 6 | 5 | 0 | 2 | 0 |
| Apr. | 79.6 | 72.0 | 75.8 | 89 | 55 | 2.48 | 3.15 | 0.0 | 77 | 72 | 12.7 | ESE | 48NNW | 83 | 4.5 | 13 | 12 | 5 | 5 | 0 | 2 | 0 |
| May | 82.7 | 75.3 | 79.0 | 91 | 66 | 2.73 | 8.89 | 0.0 | 76 | 72 | 11.1 | ESE | 51E | 78 | 5.0 | 10 | 14 | 7 | 8 | 0 | 4 | 0 |
| June | 85.6 | 78.0 | 81.8 | 94 | 68 | 3.97 | 4.00 | 0.0 | 78 | 74 | 9.9 | SE | 60SE | 69 | 6.3 | 4 | 15 | 11 | 12 | 0 | 10 | 0 |
| July | 87.4 | 79.1 | 83.3 | 95 | 69 | 4.16 | 3.05 | 0.0 | 76 | 71 | 10.1 | ESE | 52ESE | 74 | 6.3 | 3 | 18 | 10 | 13 | 0 | 12 | 0 |
| Aug. | 88.0 | 79.1 | 83.6 | 95 | 68 | 4.33 | 3.23 | 0.0 | 77 | 73 | 9.4 | ESE | 56S | 74 | 6.2 | 3 | 18 | 10 | 15 | 0 | 13 | 0 |
| Sept. | 86.5 | 78.1 | 82.3 | 94 | 70 | 6.73 | 6.65 | 0.0 | 80 | 76 | 10.3 | ESE | 122NW | 66 | 6.7 | 2 | 17 | 11 | 16 | 0 | 10 | * |
| Oct. | 82.5 | 75.4 | 79.0 | 93 | 60 | 5.82 | 8.47 | 0.0 | 82 | 76 | 11.4 | ENE | 84SE | 64 | 5.9 | 8 | 12 | 11 | 13 | 0 | 5 | * |
| Nov. | 77.5 | 70.7 | 74.1 | 88 | 49 | 2.80 | 7.33 | 0.0 | 83 | 76 | 12.0 | ENE | 76NW | 70 | 4.8 | 11 | 12 | 7 | 7 | 0 | 1 | * |
| Dec. | 74.5 | 66.7 | 70.6 | 85 | 46 | 1.69 | 4.60 | 0.0 | 83 | 78 | 12.0 | NE | 47N | 72 | 5.0 | 11 | 12 | 8 | 7 | 0 | 1 | * |
| Year | 80.8 | 72.9 | 76.8 | 95 | 46 | 39.99 | 8.89 | 0.0 | 80 | 74 | 11.3 | ESE | 122NW | 73 | 5.4 | 100 | 165 | 100 | 112 | 0 | 61 | 1 |

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Highest temperature 97 in August 1956; lowest temperature 41 in January 1886; maximum monthly precipitation 23.56 in October 1933; maximum precipitation in 24 hours 19.88 in November 1954.

FORT MYERS, FLORIDA (Page Field) 26°35'N., 81°52'W. Elevation (ground) 15 feet. EDS-1971

| Month | Air temperature (°F.) Normal: Daily maximum | Normal: Daily minimum | Normal: Monthly | Extreme: Record highest | Extreme: Record lowest | Precipitation (inches): Normal total | Maximum 24 hrs. | Snow, sleet mean total | Humidity (percent): 7 a.m. (local time) | 7 p.m. (local time) | Wind (knots): Mean speed | Prevailing direction | Maximum speed and direction | Percent of possible sunshine | Mean sky cover sunrise to sunset | Mean number of days: Sunrise to sunset: Clear | Partly cloudy | Cloudy | Precipitation .01 inch or more | Snow, sleet 1.0 inch or more | Thunderstorms | Heavy fog |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (a) | (b) | (b) | (b) | 12 | 12 | (b) | 32 | 32 | 11 | 11 | 26 | 10 | 22 | | 23 | 30 | 30 | 30 | 31 | 31 | 27 | 28 |
| Jan. | 74.8 | 52.2 | 63.5 | 88 | 28 | 1.52 | 2.25 | 0.0 | 88 | 74 | 8.6 | E | 40WSW | | 4.9 | 11 | 11 | 9 | 5 | 0 | 1 | 5 |
| Feb. | 76.3 | 54.0 | 65.2 | 92 | 32 | 2.21 | 2.60 | 0.0 | 88 | 71 | 9.2 | E | 39WSW | | 4.9 | 11 | 10 | 7 | 6 | 0 | 1 | 3 |
| Mar. | 79.6 | 56.8 | 68.2 | 90 | 36 | 2.62 | 7.92 | 0.0 | 87 | 68 | 9.6 | SW | 46N | | 4.9 | 12 | 11 | 8 | 6 | 0 | 2 | 3 |
| Apr. | 84.1 | 61.4 | 72.8 | 93 | 44 | 2.64 | 3.82 | 0.0 | 89 | 66 | 8.9 | E | 39SSW | | 4.7 | 11 | 13 | 6 | 5 | 0 | 3 | 2 |
| May | 88.6 | 66.1 | 77.4 | 98 | 52 | 3.85 | 3.83 | 0.0 | 86 | 66 | 8.2 | E | 40SW | | 5.0 | 10 | 14 | 7 | 8 | 0 | 8 | 1 |
| June | 90.5 | 71.0 | 80.8 | 97 | 64 | 8.96 | 6.87 | 0.0 | 88 | 75 | 7.4 | E | 46ESE | | 6.1 | 5 | 15 | 10 | 15 | 0 | 16 | * |
| July | 91.0 | 73.3 | 82.2 | 97 | 70 | 9.08 | 4.06 | 0.0 | 87 | 74 | 6.9 | ESE | 45S | | 6.5 | 2 | 17 | 12 | 18 | 0 | 23 | * |
| Aug. | 91.6 | 73.8 | 82.7 | 96 | 70 | 7.38 | 6.73 | 0.0 | 88 | 76 | 6.9 | E | 39WSW | | 6.3 | 3 | 17 | 11 | 18 | 0 | 21 | * |
| Sept. | 89.7 | 72.9 | 81.3 | 95 | 68 | 8.50 | 9.34 | 0.0 | 90 | 78 | 7.9 | E | 92NE | | 6.3 | 4 | 14 | 12 | 16 | 0 | 14 | * |
| Oct. | 85.2 | 67.0 | 76.1 | 93 | 52 | 4.09 | 10.85 | 0.0 | 88 | 75 | 8.5 | NE | 45SW | | 5.2 | 11 | 12 | 8 | 9 | 0 | 4 | 1 |
| Nov. | 79.7 | 58.7 | 69.2 | 89 | 34 | 1.20 | 3.34 | 0.0 | 88 | 74 | 8.3 | NE | 31W | | 4.4 | 13 | 11 | 6 | 4 | 0 | 1 | 2 |
| Dec. | 76.0 | 54.0 | 65.0 | 87 | 26 | 1.29 | 3.00 | 0.0 | 89 | 75 | 8.3 | NE | 35NNW | | 4.7 | 12 | 12 | 7 | 5 | 0 | 1 | 4 |
| Year | 83.9 | 63.4 | 73.7 | 98 | 26 | 53.34 | 10.85 | 0.0 | 88 | 73 | 8.2 | E | 92NE | | 5.3 | 105 | 157 | 103 | 115 | 0 | 96 | 22 |

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Highest temperature 101 in July 1942; lowest temperature 24 in December 1894; maximum monthly precipitation 26.91 in June 1912; maximum precipitation in 24 hours 11.70 in June 1901. Maximum monthly snowfall T in February 1899; maximum snowfall in 24 hours T in February 1899.

TAMPA, FLORIDA (International Airport) 27°58'N., 82°32'W. Elevation (ground) 19 feet. EDS-1971

| Month | Air temperature (°F.) Normal: Daily maximum | Normal: Daily minimum | Normal: Monthly | Extreme: Record highest | Extreme: Record lowest | Precipitation (inches): Normal total | Maximum 24 hrs. | Snow, sleet mean total | Humidity (percent): 7 a.m. (local time) | 7 p.m. (local time) | Wind (knots): Mean speed | Prevailing direction | Maximum speed and direction | Percent of possible sunshine | Mean sky cover sunrise to sunset | Mean number of days: Sunrise to sunset: Clear | Partly cloudy | Cloudy | Precipitation .01 inch or more | Snow, sleet 1.0 inch or more | Thunderstorms | Heavy fog |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (a) | (b) | (b) | (b) | 8 | 8 | (b) | 25 | 25 | 8 | 8 | 25 | 14 | 19 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Jan. | 71.3 | 51.0 | 61.2 | 84 | 23 | 2.13 | 3.28 | T | 86 | 73 | 9.1 | N | 35WNW | 66 | 5.4 | 10 | 10 | 11 | 6 | 0 | 1 | 6 |
| Feb. | 72.8 | 52.6 | 62.7 | 88 | 27 | 2.84 | 3.25 | T | 85 | 69 | 9.7 | E | 50NW | 67 | 5.4 | 9 | 9 | 10 | 7 | 0 | 1 | 3 |
| Mar. | 76.0 | 56.0 | 66.0 | 87 | 35 | 3.75 | 5.20 | 0.0 | 86 | 67 | 10.0 | S | 43WNW | 70 | 5.5 | 10 | 10 | 11 | 7 | 0 | 2 | 3 |
| Apr. | 81.4 | 61.3 | 71.4 | 92 | 40 | 2.84 | 3.70 | 0.0 | 88 | 62 | 9.7 | ENE | 37WNW | 73 | 5.1 | 10 | 12 | 8 | 5 | 0 | 3 | 2 |
| May | 87.0 | 66.6 | 76.8 | 96 | 49 | 2.85 | 3.97 | 0.0 | 85 | 60 | 9.2 | E | 46N | 75 | 5.1 | 11 | 12 | 8 | 6 | 0 | 6 | 1 |
| June | 89.4 | 71.7 | 80.6 | 97 | 61 | 7.28 | 4.31 | 0.0 | 86 | 67 | 8.4 | E | 67NW | 66 | 6.2 | 5 | 14 | 11 | 12 | 0 | 14 | * |
| July | 89.7 | 73.4 | 81.6 | 97 | 63 | 8.62 | 12.11 | 0.0 | 87 | 72 | 7.6 | E | 58NW | 60 | 6.8 | 2 | 16 | 13 | 17 | 0 | 22 | * |
| Aug. | 90.3 | 73.7 | 82.0 | 97 | 68 | 8.24 | 5.37 | 0.0 | 90 | 75 | 7.4 | ENE | 38ESE | 59 | 6.7 | 3 | 15 | 13 | 17 | 0 | 21 | * |
| Sept. | 88.7 | 72.3 | 80.5 | 95 | 64 | 6.89 | 4.67 | 0.0 | 89 | 74 | 8.6 | ENE | 56NNW | 60 | 6.5 | 4 | 14 | 12 | 13 | 0 | 12 | * |
| Oct. | 83.8 | 65.6 | 74.7 | 93 | 40 | 2.78 | 2.54 | 0.0 | 88 | 73 | 9.1 | NNE | 38NNE | 63 | 5.3 | 11 | 10 | 10 | 8 | 0 | 3 | 1 |
| Nov. | 76.8 | 56.8 | 66.8 | 90 | 23 | 1.46 | 4.22 | 0.0 | 88 | 74 | 8.9 | NNE | 40WNW | 67 | 4.8 | 12 | 10 | 8 | 5 | 0 | 1 | 3 |
| Dec. | 72.5 | 52.1 | 62.3 | 83 | 27 | 1.89 | 3.28 | 0.0 | 88 | 74 | 8.9 | N | 45N | 64 | 5.3 | 11 | 9 | 11 | 6 | 0 | 1 | 5 |
| Year | 81.6 | 62.8 | 72.2 | 97 | 23 | 51.57 | 12.11 | T | 87 | 70 | 8.9 | E | 67NW | 66 | 5.7 | 98 | 141 | 126 | 108 | 0 | 87 | 24 |

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Highest temperature 98 in June 1952+; lowest temperature 18 in December 1962; maximum monthly snowfall 0.1 in February 1889; fastest mile wind 84 in September 1935.

APALACHICOLA, FLORIDA (Post Office Building) 29°44'N., 84°59'W. Elevation (ground) 13 feet. EDS-1971

| Month | Air temperature (°F.) Normal: Daily maximum | Normal: Daily minimum | Normal: Monthly | Extreme: Record highest | Extreme: Record lowest | Precipitation (inches): Normal total | Maximum 24 hrs. | Snow, sleet mean total | Humidity (percent): 7 a.m. (local time) | 7 p.m. (local time) | Wind (knots): Mean speed | Prevailing direction | Maximum speed and direction | Percent of possible sunshine | Mean sky cover sunrise to sunset | Mean number of days: Sunrise to sunset: Clear | Partly cloudy | Cloudy | Precipitation .01 inch or more | Snow, sleet 1.0 inch or more | Thunderstorms | Heavy fog |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (a) | (b) | (b) | (b) | 42 | 42 | (b) | 42 | 42 | 25 | 25 | 31 | 22 | 37 | 38 | 38 | 42 | 42 | 42 | 42 | 42 | 42 | 42 |
| Jan. | 62.3 | 47.9 | 55.1 | 79 | 14 | 3.14 | 3.77 | T | 87 | 80 | 8.4 | N | 48E | 58 | 5.5 | 11 | 7 | 13 | 9 | 0 | 1 | 6 |
| Feb. | 64.0 | 49.5 | 56.8 | 80 | 21 | 3.91 | 3.74 | T | 86 | 77 | 8.8 | N | 42E | 62 | 5.5 | 10 | 7 | 11 | 8 | * | 2 | 5 |
| Mar. | 68.0 | 54.0 | 61.0 | 82 | 26 | 4.52 | 8.17 | 0.0 | 85 | 76 | 9.1 | SE | 54E | 64 | 5.5 | 11 | 8 | 12 | 8 | 0 | 4 | 5 |
| Apr. | 74.3 | 60.7 | 67.5 | 90 | 37 | 4.30 | 7.76 | 0.0 | 85 | 74 | 8.8 | SE | 51SE | 73 | 4.8 | 12 | 9 | 9 | 6 | 0 | 3 | 2 |
| May | 81.7 | 67.9 | 74.8 | 96 | 50 | 2.88 | 7.07 | 0.0 | 83 | 72 | 7.9 | SE | 47SE | 77 | 4.4 | 13 | 11 | 7 | 5 | 0 | 5 | 1 |
| June | 86.7 | 73.7 | 80.2 | 101 | 58 | 5.30 | 5.34 | 0.0 | 84 | 74 | 7.3 | SW | 47NE | 71 | 5.1 | 10 | 12 | 8 | 10 | 0 | 10 | * |
| July | 87.6 | 75.4 | 81.5 | 102 | 65 | 7.93 | 5.86 | 0.0 | 85 | 76 | 6.6 | W | 63N | 62 | 6.1 | 6 | 13 | 12 | 15 | 0 | 16 | * |
| Aug. | 87.7 | 75.3 | 81.5 | 99 | 66 | 7.74 | 5.67 | 0.0 | 87 | 77 | 6.7 | SW | 59NE | 61 | 5.8 | 8 | 12 | 11 | 14 | 0 | 15 | * |
| Sept. | 84.8 | 73.0 | 78.9 | 96 | 50 | 8.53 | 11.71 | 0.0 | 88 | 78 | 8.3 | NE | 67E | 63 | 5.5 | 10 | 10 | 10 | 11 | 0 | 9 | * |
| Oct. | 78.5 | 63.8 | 71.2 | 93 | 39 | 2.44 | 6.32 | 0.0 | 86 | 75 | 8.3 | NE | 56NW | 73 | 3.9 | 17 | 7 | 7 | 5 | 0 | 2 | 1 |
| Nov. | 69.1 | 53.4 | 61.3 | 87 | 24 | 2.58 | 5.84 | 0.0 | 85 | 76 | 8.3 | N | 47SE | 68 | 4.3 | 14 | 8 | 8 | 6 | 0 | 1 | 2 |
| Dec. | 63.2 | 48.4 | 55.8 | 82 | 13 | 2.96 | 4.15 | T | 87 | 78 | 8.1 | N | 42SE | 56 | 5.6 | 10 | 8 | 13 | 8 | 0 | 1 | 4 |
| Year | 75.7 | 61.9 | 68.8 | 102 | 13 | 56.23 | 11.71 | T | 86 | 76 | 8.0 | N | 67E | 66 | 5.2 | 132 | 112 | 121 | 106 | * | 70 | 26 |

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Maximum monthly precipitation 27.73 in September 1924.

PENSACOLA, FLORIDA (Hagler Field) 30°28'N., 87°12'W. Elevation (ground) 112 feet. EDS-1971

| Month | Air temperature (°F.) Normal: Daily maximum | Normal: Daily minimum | Normal: Monthly | Extreme: Record highest | Extreme: Record lowest | Precipitation (inches): Normal total | Maximum 24 hrs. | Snow, sleet mean total | Humidity (percent): 6 a.m. (local time) | 6 p.m. (local time) | Wind (knots): Mean speed | Prevailing direction | Maximum speed and direction | Percent of possible sunshine | Mean sky cover sunrise to sunset | Mean number of days: Sunrise to sunset: Clear | Partly cloudy | Cloudy | Precipitation .01 inch or more | Snow, sleet 1.0 inch or more | Thunderstorms | Heavy fog |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (a) | (b) | (b) | (b) | 8 | 8 | (b) | 8 | 8 | 6 | 6 | 8 | | 6 | 5 | 5 | 5 | 5 | 5 | 8 | 8 | 2 | 2 |
| Jan. | 62.3 | 44.6 | 53.5 | 78 | 11 | 4.22 | 3.69 | T | 81 | 73 | 8.8 | | 48S | 48 | 6.9 | 6 | 6 | 19 | 11 | 0 | 1 | 6 |
| Feb. | 65.2 | 46.9 | 56.1 | 77 | 19 | 4.25 | 4.19 | T | 79 | 66 | 9.4 | | 41E | 53 | 5.7 | 9 | 7 | 12 | 11 | 0 | 5 | 5 |
| Mar. | 70.2 | 51.8 | 61.0 | 83 | 27 | 6.04 | 4.33 | 0.0 | 81 | 68 | 9.3 | | 45SE | 61 | 5.9 | 10 | 7 | 14 | 10 | 0 | 5 | 7 |
| Apr. | 76.5 | 59.3 | 67.9 | 87 | 37 | 5.25 | 7.51 | 0.0 | 86 | 69 | 9.1 | | 57SE | 63 | 6.1 | 8 | 8 | 14 | 7 | 0 | 3 | 4 |
| May | 84.0 | 66.9 | 75.5 | 96 | 51 | 4.56 | 4.74 | 0.0 | 85 | 65 | 8.3 | | 39E | 67 | 5.7 | 9 | 11 | 11 | 7 | 0 | 5 | 3 |
| June | 89.3 | 72.8 | 81.1 | 96 | 57 | 5.43 | 6.77 | 0.0 | 86 | 69 | 7.1 | | 51W | 67 | 5.3 | 8 | 15 | 7 | 10 | 0 | 14 | 0 |
| July | 89.2 | 74.1 | 81.7 | 98 | 61 | 8.02 | 3.50 | 0.0 | 88 | 71 | 6.6 | | 56E | 57 | 6.9 | 3 | 14 | 14 | 15 | 0 | 15 | 1 |
| Aug. | 89.2 | 73.8 | 81.5 | 96 | 63 | 6.97 | 3.05 | 0.0 | 90 | 75 | 6.6 | | 59SW | 58 | 6.8 | 4 | 12 | 15 | 15 | 0 | 16 | 1 |
| Sept. | 85.9 | 70.5 | 78.2 | 97 | 43 | 7.69 | 10.02 | 0.0 | 86 | 72 | 7.7 | | 47E | 60 | 5.7 | 8 | 10 | 12 | 8 | 0 | 8 | 1 |
| Oct. | 79.6 | 61.1 | 70.4 | 90 | 38 | 2.98 | 4.98 | 0.0 | 83 | 68 | 8.0 | | 54E | 71 | 4.9 | 12 | 9 | 10 | 5 | 0 | 4 | 2 |
| Nov. | 69.3 | 49.7 | 59.5 | 84 | 26 | 3.24 | 2.96 | 0.0 | 82 | 72 | 8.0 | | 43NW | 64 | 4.3 | 15 | 8 | 7 | 7 | 0 | 1 | 2 |
| Dec. | 63.2 | 45.3 | 54.3 | 80 | 24 | 4.22 | 4.52 | 0.0 | 83 | 78 | 8.8 | | 40N | 49 | 6.3 | 8 | 6 | 17 | 11 | 0 | 1 | 9 |
| Year | 77.0 | 59.7 | 68.4 | 98 | 11 | 62.87 | 10.02 | T | 84 | 71 | 8.1 | | 59SW | 60 | 5.9 | 100 | 113 | 152 | 118 | 0 | 74 | 38 |

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Highest temperature 103 in August 1947; lowest temperature 7 in February 1899; maximum monthly precipitation 21.43 in August 1935; maximum precipitation in 24 hours 17.07 in October 1934; maximum monthly snowfall 3.0 in February 1895; maximum snowfall in 24 hours 3.0 in Feburary 1895; fastest mile of wind 114 from East in September 1926.

MOBILE, ALABAMA (Bates Field) 30°41'N., 88°15'W. Elevation (ground) 211 feet. EDS-1971

| Month | Air temperature (°F.) Normal: Daily maximum | Normal: Daily minimum | Normal: Monthly | Extreme: Record highest | Extreme: Record lowest | Precipitation (inches): Normal total | Maximum 24 hrs. | Snow, sleet mean total | Humidity (percent): 6 a.m. (local time) | 6 p.m. (local time) | Wind (knots): Mean speed | Prevailing direction | Maximum speed and direction | Percent of possible sunshine | Mean sky cover sunrise to sunset | Mean number of days: Sunrise to sunset: Clear | Partly cloudy | Cloudy | Precipitation .01 inch or more | Snow, sleet 1.0 inch or more | Thunderstorms | Heavy fog |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (a) | (b) | (b) | (b) | 10 | 10 | (b) | 30 | 30 | 9 | 9 | 23 | 14 | 13 | | 23 | 23 | 23 | 23 | 30 | 30 | 30 | 30 |
| Jan. | 62.3 | 43.7 | 53.0 | 79 | 8 | 4.64 | 8.34 | 0.1 | 81 | 70 | 11.0 | N | 44S | | 6.6 | 7 | 7 | 17 | 10 | * | 2 | 6 |
| Feb. | 64.7 | 45.7 | 55.2 | 80 | 11 | 4.59 | 5.00 | 0.1 | 78 | 60 | 11.4 | N | 46SW | | 6.3 | 8 | 6 | 14 | 10 | * | 2 | 4 |
| Mar. | 70.3 | 50.3 | 60.3 | 89 | 11 | 7.23 | 6.52 | 0.1 | 82 | 62 | 11.5 | N | 40W | | 6.0 | 9 | 8 | 14 | 11 | * | 5 | 4 |
| Apr. | 77.5 | 57.6 | 67.6 | 91 | 38 | 6.36 | 13.36 | 0.0 | 87 | 65 | 10.8 | S | 44N | | 5.8 | 9 | 9 | 12 | 7 | 0 | 5 | 5 |
| May | 85.9 | 65.3 | 75.6 | 99 | 46 | 4.88 | 4.33 | 0.0 | 86 | 61 | 9.2 | S | 51NW | | 5.6 | 9 | 12 | 10 | 8 | 0 | 7 | 2 |
| June | 91.4 | 71.5 | 81.5 | 101 | 56 | 6.23 | 7.38 | 0.0 | 87 | 66 | 8.0 | S | 44NE | | 5.8 | 7 | 14 | 9 | 12 | 0 | 12 | 1 |
| July | 92.0 | 73.1 | 82.6 | 100 | 62 | 9.67 | 4.69 | 0.0 | 89 | 72 | 7.2 | S | 46S | | 6.7 | 3 | 15 | 13 | 17 | 0 | 19 | 1 |
| Aug. | 91.2 | 73.0 | 82.1 | 102 | 60 | 6.44 | 8.62 | 0.0 | 90 | 74 | 7.1 | NE | 63SE | | 6.0 | 6 | 15 | 10 | 14 | 0 | 14 | 1 |
| Sept. | 87.4 | 68.3 | 77.9 | 98 | 42 | 6.25 | 6.58 | 0.0 | 87 | 71 | 8.3 | NE | 36ESE | | 5.8 | 8 | 11 | 11 | 10 | 0 | 7 | 2 |
| Oct. | 80.3 | 59.5 | 69.9 | 93 | 38 | 3.03 | 4.30 | 0.0 | 84 | 67 | 8.6 | N | 46N | | 4.4 | 15 | 8 | 8 | 6 | 0 | 2 | 2 |
| Nov. | 69.6 | 48.2 | 58.9 | 87 | 24 | 3.35 | 3.11 | T | 85 | 70 | 9.7 | N | 37N | | 5.1 | 12 | 8 | 10 | 7 | 0 | 2 | 4 |
| Dec. | 63.9 | 44.3 | 54.1 | 81 | 10 | 5.46 | 5.50 | 0.1 | 83 | 73 | 10.5 | N | 38NW | | 6.2 | 9 | 6 | 16 | 11 | * | 2 | 5 |
| Year | 78.0 | 58.4 | 68.2 | 102 | 8 | 68.13 | 13.36 | 0.4 | 85 | 68 | 9.4 | N | 63SE | | 5.9 | 102 | 119 | 144 | 123 | * | 80 | 37 |

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Highest temperature 104 in July 1952; lowest temperature -1 in February 1899; maximum monthly snowfall 6.0 in February 1895.

NEW ORLEANS, LOUISIANA (New Orleans International Airport) 29°59'N., 90°15'W. Elevation (ground) 4 feet. EDS-1971

| Month | Air temperature (°F.) Normal: Daily maximum | Normal: Daily minimum | Normal: Monthly | Extreme: Record highest | Extreme: Record lowest | Precipitation (inches): Normal total | Maximum 24 hrs. | Snow, sleet mean total | Humidity (percent): 6 a.m. (local time) | 6 p.m. (local time) | Wind (knots): Mean speed | Prevailing direction | Maximum speed and direction | Percent of possible sunshine | Mean sky cover sunrise to sunset | Mean number of days: Sunrise to sunset: Clear | Partly cloudy | Cloudy | Precipitation .01 inch or more | Snow, sleet 1.0 inch or more | Thunderstorms | Heavy fog |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (a) | (b) | (b) | (b) | 25 | 25 | (b) | 25 | 25 | 23 | 23 | 23 | | 12 | | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 |
| Jan. | 64.4 | 44.8 | 54.6 | 83 | 14 | 3.84 | 4.77 | T | 86 | 73 | 9.6 | | 33W | | 6.7 | 7 | 8 | 16 | 9 | 0 | 1 | 7 |
| Feb. | 66.7 | 47.5 | 57.1 | 84 | 19 | 3.99 | 5.60 | 0.1 | 85 | 68 | 10.2 | | 43W | | 6.2 | 8 | 6 | 14 | 9 | * | 2 | 5 |
| Mar. | 71.2 | 51.6 | 61.4 | 87 | 26 | 5.34 | 7.87 | T | 84 | 64 | 10.2 | | 37S | | 6.1 | 8 | 9 | 14 | 9 | 0 | 3 | 4 |
| Apr. | 77.7 | 58.1 | 67.9 | 91 | 32 | 4.55 | 4.35 | 0.0 | 88 | 66 | 9.6 | | 35ENE | | 5.7 | 8 | 11 | 11 | 7 | 0 | 4 | 2 |
| May | 84.4 | 64.4 | 74.4 | 96 | 41 | 4.38 | 9.86 | 0.0 | 89 | 65 | 8.3 | | 31SW | | 5.1 | 11 | 11 | 9 | 8 | 0 | 6 | 1 |
| June | 89.6 | 70.5 | 80.1 | 100 | 55 | 4.43 | 4.19 | 0.0 | 90 | 67 | 6.9 | | 48NE | | 5.0 | 10 | 13 | 7 | 10 | 0 | 9 | * |
| July | 90.6 | 72.6 | 81.6 | 99 | 60 | 6.72 | 4.30 | 0.0 | 91 | 73 | 6.3 | | 32ENE | | 6.1 | 5 | 16 | 10 | 15 | 0 | 16 | * |
| Aug. | 90.7 | 73.0 | 81.9 | 100 | 60 | 5.34 | 3.06 | 0.0 | 91 | 73 | 6.2 | | 42NNW | | 5.5 | 9 | 13 | 9 | 13 | 0 | 13 | * |
| Sept. | 87.2 | 69.3 | 78.3 | 97 | 42 | 5.03 | 6.50 | 0.0 | 89 | 74 | 7.5 | | 69E | | 5.2 | 11 | 10 | 9 | 10 | 0 | 7 | * |
| Oct. | 80.3 | 60.5 | 70.4 | 92 | 35 | 2.84 | 2.58 | 0.0 | 87 | 72 | 7.7 | | 40S | | 4.1 | 16 | 7 | 8 | 6 | 0 | 2 | 2 |
| Nov. | 70.3 | 49.6 | 60.0 | 86 | 24 | 3.34 | 6.38 | T | 86 | 74 | 8.9 | | 30NW | | 4.9 | 12 | 8 | 10 | 6 | 0 | 1 | 4 |
| Dec. | 65.3 | 45.5 | 55.4 | 84 | 17 | 4.10 | 3.94 | 0.1 | 86 | 75 | 9.2 | | 32S | | 6.2 | 8 | 8 | 15 | 10 | * | 2 | 5 |
| Year | 78.2 | 59.0 | 68.6 | 100 | 14 | 53.90 | 9.86 | 0.2 | 88 | 70 | 8.4 | | 69E | | 5.6 | 113 | 120 | 132 | 112 | * | 68 | 31 |

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Highest temperature 102 in June 1954 and earlier (City Office); lowest temperature 7 in February 1899; maximum monthly precipitation 25.11 in October 1937; maximum precipitation in 24 hours 14.01 in April 1927; maximum monthly snowfall 8.2 in February 1895; maximum snowfall in 24 hours 8.2 in February 1895.

PORT ARTHUR, TEXAS (Jefferson County Airport) 29°57'N., 94°01'W. Elevation (ground) 16 feet. EDS-1971

| Month | Air temperature (°F.) Normal: Daily maximum | Normal: Daily minimum | Normal: Monthly | Extreme: Record highest | Extreme: Record lowest | Precipitation (inches): Normal total | Maximum 24 hrs. | Snow, sleet mean total | Humidity (percent): 6 a.m. (local time) | 6 p.m. (local time) | Wind (knots): Mean speed | Prevailing direction | Maximum speed and direction | Percent of possible sunshine | Mean sky cover sunrise to sunset | Mean number of days: Sunrise to sunset: Clear | Partly cloudy | Cloudy | Precipitation .01 inch or more | Snow, sleet 1.0 inch or more | Thunderstorms | Heavy fog |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (a) | (b) | (b) | (b) | 11 | 11 | (b) | 18 | 18 | 11 | 11 | 18 | 10 | 18 | 18 | 18 | 18 | 18 | 18 | 16 | 18 | 18 | 18 |
| Jan. | 63.5 | 43.7 | 53.6 | 80 | 14 | 4.23 | 4.92 | T | 89 | 77 | 11.4 | N | 50S | 42 | 7.0 | 6 | 7 | 18 | 9 | 0 | 2 | 8 |
| Feb. | 65.8 | 46.2 | 56.0 | 84 | 25 | 4.45 | 5.05 | 0.4 | 88 | 71 | 12.1 | S | 62SE | 51 | 6.3 | 8 | 6 | 14 | 9 | * | 3 | 6 |
| Mar. | 71.3 | 50.8 | 61.1 | 86 | 27 | 3.44 | 4.21 | 0.1 | 89 | 69 | 12.2 | S | 66SW | 53 | 6.4 | 7 | 9 | 15 | 8 | * | 2 | 6 |
| Apr. | 78.0 | 58.3 | 68.2 | 90 | 37 | 3.94 | 7.23 | 0.0 | 92 | 73 | 12.4 | S | 60NW | 52 | 6.8 | 6 | 8 | 16 | 7 | 0 | 4 | 3 |
| May | 83.8 | 65.6 | 74.7 | 92 | 47 | 4.94 | 7.18 | 0.0 | 91 | 71 | 10.8 | S | 74SW | 64 | 6.1 | 6 | 13 | 12 | 7 | 0 | 6 | 1 |
| June | 89.6 | 71.5 | 80.6 | 99 | 60 | 4.29 | 10.20 | 0.0 | 93 | 69 | 9.0 | S | 72NW | 69 | 5.4 | 8 | 15 | 7 | 7 | 0 | 7 | * |
| July | 91.0 | 72.7 | 81.9 | 103 | 61 | 6.00 | 4.87 | 0.0 | 93 | 70 | 8.1 | S | 66SW | 67 | 6.0 | 5 | 17 | 9 | 11 | 0 | 13 | * |
| Aug. | 91.2 | 73.3 | 82.3 | 107 | 62 | 5.49 | 8.45 | 0.0 | 93 | 72 | 7.6 | S | 73E | 65 | 5.8 | 7 | 15 | 9 | 12 | 0 | 11 | * |
| Sept. | 88.4 | 68.0 | 78.2 | 99 | 45 | 4.88 | 13.17 | 0.0 | 91 | 73 | 8.8 | NE | 56SW | 63 | 5.5 | 9 | 11 | 10 | 10 | 0 | 7 | 1 |
| Oct. | 81.7 | 58.8 | 70.3 | 95 | 37 | 2.88 | 8.06 | 0.0 | 89 | 71 | 9.1 | N | 65NW | 67 | 4.7 | 12 | 11 | 8 | 6 | 0 | 3 | 3 |
| Nov. | 70.7 | 48.6 | 59.7 | 87 | 27 | 3.46 | 7.26 | 0.0 | 88 | 74 | 10.5 | N | 60NE | 58 | 5.6 | 10 | 8 | 12 | 7 | 0 | 2 | 5 |
| Dec. | 64.9 | 44.6 | 54.8 | 82 | 17 | 5.09 | 6.24 | T | 90 | 79 | 10.9 | N | 69S | 46 | 6.4 | 8 | 7 | 16 | 10 | 0 | 2 | 7 |
| Year | 78.3 | 58.5 | 68.5 | 107 | 14 | 53.09 | 13.17 | 0.5 | 90 | 73 | 10.2 | S | 74SW | 59 | 6.0 | 92 | 127 | 146 | 103 | * | 62 | 42 |

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Lowest temperature 11 in January 1930; maximum monthly precipitation 24.25 inches in July 1943; maximum precipitation in 24 hours 17.76 in July 1943; fastest mile of wind 91 from Northeast in August 1940.

GALVESTON, TEXAS (Post Office Building) 29°18'N., 94°48'W. Elevation (ground) 7 feet. EDS-1971

| Month | Air temperature (°F.) Normal: Daily maximum | Normal: Daily minimum | Normal: Monthly | Extreme: Record highest | Extreme: Record lowest | Precipitation (inches): Normal total | Maximum 24 hrs. | Snow, sleet mean total | Humidity (percent): 6 a.m. (local time) | 6 p.m. (local time) | Wind (knots): Mean speed | Prevailing direction | Maximum speed and direction | Percent of possible sunshine | Mean sky cover sunrise to sunset | Mean number of days: Sunrise to sunset: Clear | Partly cloudy | Cloudy | Precipitation .01 inch or more | Snow, sleet 1.0 inch or more | Thunderstorms | Heavy fog |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (a) | (b) | (b) | (b) | 101 | 101 | (b) | 101 | 101 | 84 | 84 | 93 | | 100 | 81 | | | | | 100 | 100 | | |
| Jan. | 60.5 | 49.3 | 54.9 | 77 | 11 | 3.46 | 5.38 | T | 85 | 80 | 11.6 | | 53S | 49 | | | | | 10 | 0 | | |
| Feb. | 62.4 | 51.2 | 56.8 | 83 | 8 | 2.88 | 6.55 | 0.2 | 84 | 77 | 11.8 | | 60N | 50 | | | | | 9 | * | | |
| Mar. | 66.6 | 56.2 | 61.4 | 85 | 27 | 2.86 | 4.58 | T | 85 | 79 | 11.9 | | 50SE | 56 | | | | | 8 | 0 | | |
| Apr. | 73.0 | 64.0 | 68.5 | 92 | 38 | 2.59 | 9.23 | 0.0 | 86 | 80 | 12.1 | | 57NW | 61 | | | | | 6 | 0 | | |
| May | 80.1 | 71.5 | 75.8 | 93 | 52 | 2.79 | 6.13 | 0.0 | 84 | 77 | 11.5 | | 66W | 68 | | | | | 6 | 0 | | |
| June | 85.6 | 77.7 | 81.7 | 99 | 57 | 2.65 | 12.56 | 0.0 | 81 | 73 | 10.7 | | 62SE | 76 | | | | | 6 | 0 | | |
| July | 87.3 | 78.9 | 83.1 | 101 | 66 | 4.79 | 14.35 | 0.0 | 81 | 73 | 9.8 | | 68NW | 72 | | | | | 9 | 0 | | |
| Aug. | 87.5 | 79.0 | 83.3 | 100 | 67 | 4.39 | 9.05 | 0.0 | 81 | 73 | 9.4 | | 91E | 71 | | | | | 9 | 0 | | |
| Sept. | 84.6 | 75.5 | 80.1 | 96 | 52 | 5.09 | 11.65 | 0.0 | 81 | 75 | 10.1 | | 100NE | 69 | | | | | 9 | 0 | | |
| Oct. | 78.5 | 68.4 | 73.5 | 94 | 41 | 2.86 | 14.10 | 0.0 | 80 | 71 | 10.3 | | 66SE | 72 | | | | | 6 | 0 | | |
| Nov. | 68.6 | 57.4 | 63.0 | 85 | 26 | 3.56 | 9.01 | 0.0 | 84 | 77 | 11.2 | | 54N | 61 | | | | | 8 | 0 | | |
| Dec. | 62.7 | 51.6 | 57.2 | 80 | 18 | 3.89 | 5.43 | T | 86 | 80 | 11.3 | | 50NW | 49 | | | | | 10 | 0 | | |
| Year | 74.8 | 65.1 | 69.9 | 101 | 8 | 41.81 | 14.35 | 0.2 | 83 | 76 | 11.0 | | 100NE | 64 | | | | | 96 | * | | |

HOUSTON, TEXAS (Intercontinental Airport) 29°59'N., 95°22'W. Elevation (ground) 96 feet. EDS-1971

| Month | Air temperature (°F.) Normal: Daily maximum | Normal: Daily minimum | Normal: Monthly | Extreme: Record highest | Extreme: Record lowest | Precipitation (inches): Normal total | Maximum 24 hrs. | Snow, sleet mean total | Humidity (percent): 6 a.m. (local time) | 6 p.m. (local time) | Wind (knots): Mean speed | Prevailing direction | Maximum speed and direction | Percent of possible sunshine | Mean sky cover sunrise to sunset | Mean number of days: Sunrise to sunset: Clear | Partly cloudy | Cloudy | Precipitation .01 inch or more | Snow, sleet 1.0 inch or more | Thunderstorms | Heavy fog |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (a) | (b) | (b) | (b) | 2 | 2 | (b) | 2 | 37 | 2 | 2 | 2 | 15 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Jan. | 63.1 | 39.5 | 51.3 | 82 | 19 | 3.93 | 0.85 | 0.2 | 88 | 69 | 7.9 | NNW | 24N | 45 | 7.1 | 6 | 7 | 18 | 7 | 0 | 1 | 6 |
| Feb. | 65.2 | 42.4 | 53.8 | 80 | 25 | 3.65 | 1.30 | 0.2 | 82 | 57 | 8.9 | SSE | 29WNW | 54 | 5.9 | 8 | 7 | 13 | 8 | 0 | 4 | 3 |
| Mar. | 71.8 | 47.7 | 59.8 | 88 | 25 | 2.80 | 1.87 | T | 85 | 60 | 8.9 | SSE | 28NNW | 52 | 6.3 | 9 | 6 | 16 | 10 | 0 | 5 | 5 |
| Apr. | 78.5 | 56.4 | 67.5 | 88 | 32 | 3.34 | 2.08 | 0.0 | 89 | 61 | 8.8 | SSE | 29WNW | 56 | 6.7 | 7 | 6 | 17 | 6 | 0 | 2 | 4 |
| May | 86.6 | 63.8 | 75.2 | 90 | 46 | 4.28 | 4.69 | 0.0 | 94 | 65 | 8.1 | SSE | 23SE | 54 | 6.7 | 6 | 8 | 17 | 9 | 0 | 10 | 3 |
| June | 92.3 | 69.6 | 81.0 | 99 | 52 | 3.54 | 1.28 | 0.0 | 92 | 61 | 6.6 | SSE | 21S | 70 | 6.2 | 7 | 13 | 10 | 6 | 0 | 7 | 2 |
| July | 93.5 | 71.2 | 82.4 | 101 | 63 | 4.03 | 1.03 | 0.0 | 92 | 59 | 6.1 | S | 46E | 74 | 6.2 | 7 | 13 | 11 | 7 | 0 | 11 | 0 |
| Aug. | 94.3 | 70.7 | 82.5 | 101 | 62 | 4.01 | 2.59 | 0.0 | 93 | 65 | 4.6 | SSE | 28N | 67 | 5.9 | 7 | 14 | 10 | 9 | 0 | 10 | 1 |
| Sept. | 90.5 | 66.0 | 78.3 | 95 | 54 | 4.05 | 2.53 | 0.0 | 94 | 75 | 6.6 | SSE | 30E | 58 | 7.0 | 3 | 12 | 15 | 10 | 0 | 9 | 2 |
| Oct. | 83.2 | 56.6 | 69.9 | 91 | 39 | 3.73 | 4.06 | 0.0 | 94 | 77 | 5.7 | ESE | 26NW | 60 | 5.7 | 10 | 8 | 13 | 10 | 0 | 6 | 4 |
| Nov. | 71.3 | 46.3 | 58.8 | 88 | 25 | 3.90 | 2.13 | 0.0 | 88 | 72 | 6.9 | SSE | 23WSW | 63 | 4.9 | 13 | 7 | 10 | 5 | 0 | 1 | 4 |
| Dec. | 65.1 | 41.6 | 53.4 | 82 | 29 | 4.53 | 3.43 | T | 89 | 76 | 7.4 | SSE | 28W | 37 | 7.3 | 6 | 4 | 21 | 9 | 0 | 2 | 10 |
| Year | 79.6 | 56.0 | 67.8 | 101 | 19 | 45.79 | 4.69 | 0.4 | 90 | 66 | 7.2 | SSE | 46E | 59 | 6.3 | 89 | 105 | 171 | 94 | 0 | 65 | 42 |

**Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Highest temperature 108 in August 1909; lowest temperature 5 in January 1940 and earlier; maximum monthly precipitation 22.31 in October 1949; minimum monthly precipitation Trace in October 1952 and May 1937; maximum precipitation in 24 hours 15.65 in August 1945; maximum monthly snowfall 4.4 in February 1960; maximum snowfall in 24 hours 4.4 in February 1960; fastest mile of wind 84 from NW in March 1926.**

CORPUS CHRISTI, TEXAS (International Airport) 27°46'N., 97°30'W. Elevation (ground) 41 feet. EDS-1971

| Month | Air temperature (°F.) Normal: Daily maximum | Daily minimum | Monthly | Extreme: Record highest | Record lowest | Precipitation (inches): Normal total | Maximum 24 hrs. | Snow, sleet mean total | Humidity (percent): 6 a.m. (local time) | 6 p.m. (local time) | Wind (knots): Mean speed | Prevailing direction | Maximum speed and direction | Percent of possible sunshine | Mean sky cover sunrise to sunset | Mean number of days: Sunrise to sunset: Clear | Partly cloudy | Cloudy | Precipitation .01 inch or more | Snow, sleet 1.0 inch or more | Thunderstorms | Heavy fog |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (a) | (b) | (b) | (b) | 7 | 7 | (b) | 29 | 32 | 7 | 7 | 29 | 15 | 29 | 29 | 29 | 29 | 29 | 29 | 32 | 32 | 32 | 29 |
| Jan. | 67.4 | 47.4 | 57.4 | 91 | 25 | 1.63 | 6.38 | 0.1 | 89 | 72 | 11.9 | SSE | 59NE | 47 | 6.7 | 7 | 7 | 17 | 8 | * | 1 | 6 |
| Feb. | 69.8 | 50.9 | 60.4 | 86 | 28 | 1.70 | 2.99 | T | 88 | 67 | 12.9 | SSE | 52N | 51 | 6.5 | 7 | 6 | 15 | 7 | 0 | 1 | 5 |
| Mar. | 74.4 | 55.9 | 65.2 | 97 | 29 | 1.44 | 2.67 | T | 86 | 64 | 14.0 | SSE | 56S | 56 | 6.6 | 7 | 8 | 16 | 6 | 0 | 2 | 4 |
| Apr. | 80.4 | 63.0 | 71.7 | 97 | 39 | 2.14 | 7.19 | 0.0 | 90 | 71 | 14.3 | SE | 49SE | 57 | 6.8 | 5 | 10 | 15 | 5 | 0 | 3 | 3 |
| May | 85.9 | 69.1 | 77.5 | 98 | 47 | 2.99 | 4.65 | 0.0 | 91 | 72 | 13.1 | SE | 65NW | 61 | 6.3 | 6 | 12 | 13 | 6 | 0 | 5 | 1 |
| June | 90.5 | 74.0 | 82.3 | 97 | 59 | 2.39 | 4.72 | 0.0 | 92 | 69 | 12.1 | SE | 56SE | 73 | 5.2 | 9 | 14 | 7 | 5 | 0 | 3 | * |
| July | 93.5 | 74.6 | 84.1 | 101 | 64 | 2.32 | 3.73 | 0.0 | 93 | 63 | 11.7 | SSE | 40S | 83 | 4.8 | 11 | 15 | 5 | 4 | 0 | 3 | * |
| Aug. | 93.8 | 74.5 | 84.2 | 100 | 64 | 2.77 | 6.38 | 0.0 | 92 | 66 | 10.9 | SSE | 120SW | 78 | 4.8 | 12 | 12 | 7 | 5 | 0 | 4 | * |
| Sept. | 90.1 | 71.4 | 80.8 | 100 | 54 | 4.40 | 8.76 | 0.0 | 91 | 70 | 10.1 | SE | 72E | 68 | 5.2 | 10 | 12 | 8 | 9 | 0 | 5 | * |
| Oct. | 84.5 | 64.5 | 74.5 | 93 | 40 | 2.76 | 7.25 | 0.0 | 89 | 68 | 9.9 | SE | 46N | 69 | 4.6 | 13 | 10 | 8 | 7 | 0 | 3 | 1 |
| Nov. | 73.8 | 54.3 | 64.1 | 92 | 29 | 1.72 | 3.44 | T | 88 | 69 | 11.2 | SSE | 46N | 58 | 5.7 | 9 | 9 | 12 | 6 | 0 | 1 | 3 |
| Dec. | 68.8 | 49.5 | 59.2 | 89 | 28 | 2.08 | 3.86 | 0.0 | 87 | 73 | 11.1 | SSE | 47NW | 48 | 6.5 | 8 | 7 | 16 | 7 | 0 | 1 | 5 |
| Year | 81.1 | 62.4 | 71.8 | 101 | 25 | 28.34 | 8.76 | 0.1 | 90 | 69 | 11.9 | SSE | 120SW | 64 | 5.8 | 104 | 122 | 139 | 75 | * | 31 | 28 |

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Highest temperature 105 in July 1934; lowest temperature 11 in February 1899; maximum monthly snowfall 6.0 in January 1897; maximum snowfall in 24 hours 5.0 in January 1897.

BROWNSVILLE, TEXAS (Rio Grande Valley International Airport) 25°54'N., 97°26'W. Elevation (ground) 19 feet. EDS-1971

| Month | Air temperature (°F.) Normal: Daily maximum | Daily minimum | Monthly | Extreme: Record highest | Record lowest | Precipitation (inches): Normal total | Maximum 24 hrs. | Snow, sleet mean total | Humidity (percent): 6 a.m. (local time) | 6 p.m. (local time) | Wind (knots): Mean speed | Prevailing direction | Maximum speed and direction | Percent of possible sunshine | Mean sky cover sunrise to sunset | Mean number of days: Sunrise to sunset: Clear | Partly cloudy | Cloudy | Precipitation .01 inch or more | Snow, sleet 1.0 inch or more | Thunderstorms | Heavy fog |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (a) | (b) | (b) | (b) | 5 | 5 | (b) | 32 | 32 | 5 | 5 | 29 | 14 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 |
| Jan. | 70.5 | 52.2 | 61.4 | 93 | 30 | 1.35 | 2.95 | T | 86 | 74 | 11.8 | SSE | 46S | 45 | 6.7 | 7 | 7 | 17 | 7 | 0 | 1 | 5 |
| Feb. | 73.2 | 54.7 | 64.0 | 90 | 32 | 1.48 | 4.98 | T | 86 | 67 | 12.5 | SSE | 55NW | 49 | 6.5 | 7 | 6 | 15 | 6 | 0 | 1 | 5 |
| Mar. | 76.8 | 59.0 | 67.9 | 93 | 35 | 1.04 | 1.85 | T | 85 | 65 | 13.7 | SE | 47S | 51 | 6.6 | 6 | 9 | 16 | 4 | 0 | 1 | 3 |
| Apr. | 82.3 | 65.5 | 73.9 | 96 | 46 | 1.55 | 3.69 | 0.0 | 86 | 68 | 14.4 | SE | 52SE | 56 | 6.6 | 5 | 11 | 14 | 4 | 0 | 2 | 2 |
| May | 87.1 | 70.8 | 79.0 | 99 | 52 | 2.38 | 4.56 | 0.0 | 87 | 68 | 13.8 | SE | 66NW | 66 | 5.9 | 6 | 15 | 10 | 5 | 0 | 3 | 1 |
| June | 90.7 | 74.7 | 82.7 | 97 | 62 | 2.96 | 8.18 | 0.0 | 88 | 66 | 12.7 | SE | 52E | 72 | 5.3 | 8 | 16 | 6 | 5 | 0 | 2 | * |
| July | 92.5 | 75.5 | 84.0 | 99 | 70 | 1.88 | 3.62 | 0.0 | 89 | 61 | 11.8 | SE | 37E | 81 | 4.7 | 11 | 15 | 5 | 4 | 0 | 2 | * |
| Aug. | 92.8 | 75.3 | 84.1 | 100 | 63 | 2.77 | 4.39 | 0.0 | 89 | 63 | 10.8 | SE | 57NW | 76 | 4.9 | 11 | 14 | 6 | 7 | 0 | 4 | * |
| Sept. | 89.8 | 72.6 | 81.2 | 99 | 56 | 4.99 | 12.19 | 0.0 | 88 | 71 | 9.8 | SE | 69NE | 66 | 5.4 | 9 | 13 | 8 | 10 | 0 | 4 | * |
| Oct. | 85.1 | 66.6 | 75.9 | 92 | 49 | 3.53 | 6.67 | 0.0 | 87 | 71 | 9.8 | SE | 47NE | 66 | 4.8 | 11 | 13 | 7 | 6 | 0 | 2 | 1 |
| Nov. | 77.0 | 58.2 | 67.6 | 94 | 35 | 1.32 | 3.64 | 0.0 | 84 | 70 | 10.9 | SSE | 42NW | 52 | 5.8 | 9 | 9 | 12 | 6 | 0 | 1 | 3 |
| Dec. | 72.2 | 53.5 | 62.9 | 87 | 34 | 1.72 | 5.69 | T | 85 | 73 | 11.0 | NNW | 45NW | 46 | 6.5 | 7 | 8 | 16 | 6 | 0 | * | 6 |
| Year | 82.5 | 64.9 | 73.7 | 100 | 30 | 26.75 | 12.19 | T | 87 | 68 | 11.9 | SE | 69NE | 64 | 5.8 | 97 | 136 | 132 | 71 | 0 | 23 | 26 |

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Lowest temperature 12 in February 1899; maximum monthly precipitation 30.57 in September 1886; minimum monthly precipitation 0.00 in August 1920; fastest mile of wind 106 from Northwest in September 1933.

SAN JUAN, PUERTO RICO (Isla Verde International Airport) 18°26'N., 66°00'W. Elevation (ground) 13 feet. EDS-1971

| Month | Air temperature (°F.) | | | | | Precipitation (inches) | | | Humidity (percent) | | Wind (knots) | | | Percent of possible sunshine | Mean sky cover sunrise to sunset | Mean number of days | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Normal | | | Extreme | | | | | | | | | | | | Sunrise to sunset | | | | | | |
| | Daily maximum | Daily minimum | Monthly | Record highest | Record lowest | Normal total | Maximum 24 hrs. | Snow, sleet mean total | 8 a.m. (local time) | 8 p.m. (local time) | Mean speed | Prevailing direction | Maximum speed and direction | | | Clear | Partly cloudy | Cloudy | Precipitation .01 inch or more | Snow, sleet 1.0 inch or more | Thunderstorms | Heavy fog |
| (a) | (b) | (b) | (b) | 17 | 17 | (b) | 17 | 16 | 16 | 16 | 16 | 8 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| Jan. | 81.3 | 67.4 | 74.4 | 90 | 61 | 4.70 | 5.08 | 0.0 | 84 | 77 | 8.7 | ENE | 34NE | 65 | 5.2 | 8 | 18 | 5 | 17 | 0 | * | 0 |
| Feb. | 81.8 | 67.0 | 74.4 | 92 | 62 | 2.90 | 2.73 | 0.0 | 82 | 75 | 9.2 | ENE | 40E | 68 | 5.1 | 7 | 16 | 5 | 13 | 0 | * | 0 |
| Mar. | 83.1 | 67.5 | 75.3 | 93 | 60 | 2.20 | 3.91 | 0.0 | 79 | 74 | 9.5 | ENE | 37NE | 74 | 5.0 | 9 | 18 | 4 | 11 | 0 | * | 0 |
| Apr. | 84.0 | 69.2 | 76.6 | 93 | 64 | 3.72 | 3.15 | 0.0 | 78 | 75 | 9.1 | ENE | 35E | 69 | 5.6 | 6 | 17 | 7 | 14 | 0 | 1 | 0 |
| May | 85.8 | 71.5 | 78.7 | 93 | 66 | 7.12 | 3.08 | 0.0 | 80 | 78 | 8.6 | ENE | 34S | 60 | 6.8 | 2 | 16 | 13 | 19 | 0 | 4 | 0 |
| June | 87.1 | 72.9 | 80.0 | 94 | 69 | 5.66 | 3.55 | 0.0 | 81 | 78 | 8.8 | ENE | 38NE | 58 | 6.7 | 2 | 16 | 12 | 18 | 0 | 6 | 0 |
| July | 87.1 | 73.7 | 80.4 | 93 | 69 | 6.25 | 2.28 | 0.0 | 81 | 79 | 9.7 | ENE | 34SE | 66 | 6.3 | 3 | 18 | 10 | 21 | 0 | 5 | 0 |
| Aug. | 87.8 | 74.0 | 80.9 | 92 | 70 | 7.13 | 5.08 | 0.0 | 81 | 78 | 9.0 | ENE | 80NE | 68 | 6.2 | 4 | 18 | 9 | 19 | 0 | 6 | 0 |
| Sept. | 87.8 | 73.2 | 80.5 | 94 | 69 | 6.76 | 3.08 | 0.0 | 81 | 79 | 7.4 | ENE | 34E | 60 | 6.4 | 2 | 18 | 10 | 18 | 0 | 8 | 0 |
| Oct. | 87.1 | 72.8 | 80.0 | 95 | 67 | 5.83 | 5.00 | 0.0 | 82 | 80 | 6.6 | ENE | 36NE | 63 | 6.4 | 3 | 17 | 11 | 17 | 0 | 7 | 0 |
| Nov. | 85.0 | 71.4 | 78.2 | 92 | 66 | 6.49 | 3.72 | 0.0 | 83 | 79 | 7.4 | ENE | 35NE | 61 | 5.9 | 4 | 18 | 8 | 18 | 0 | 3 | 0 |
| Dec. | 82.7 | 69.6 | 76.2 | 90 | 63 | 5.45 | 3.54 | 0.0 | 83 | 77 | 8.5 | ENE | 46NE | 58 | 5.8 | 5 | 18 | 8 | 19 | 0 | * | 0 |
| Year | 85.0 | 70.9 | 78.0 | 95 | 60 | 64.21 | 5.08 | 0.0 | 81 | 77 | 8.5 | ENE | 80NE | 64 | 5.9 | 55 | 208 | 102 | 203 | 0 | 41 | 0 |

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Annual extremes have been exceeded at City Office locations as follows (1890 - 1964 record): Highest temperature 96 in October 1963 and earlier; maximum monthly precipitation 16.88 in May 1936; minimum monthly precipitation 0.05 in February 1941; maximum precipitation in 24 hours 10.55 in December 1910.

METEOROLOGICAL TABLE FOR COASTAL AREA OFF WEST COAST OF FLORIDA
Boundaries: Between 25°N., 84°W., and 27°N., 84°W., eastward to coast

| Weather Elements | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wind ≥ 34 knots (1) | 1.1 | 0.4 | 0.1 | 0 | 0.1 | 0.1 | 0 | 0 | 0.4 | 0.2 | 0.3 | 0.1 | 0.2 |
| Wave height ≥ 10 feet (1) | 4.9 | 3.2 | 5.1 | 1.4 | 0 | 0.6 | 0 | 0 | 0 | 2.0 | 3.0 | 1.9 | 1.8 |
| Visibility < 2 naut. mi. (1) | 0.4 | 0.5 | 0.3 | 0.8 | 0.3 | 0.5 | 0.2 | 0.5 | 0.3 | 0 | 0.4 | 0 | 0.5 |
| Precipitation (1) | 2.5 | 2.4 | 1.9 | 0.4 | 1.0 | 3.1 | 1.3 | 3.4 | 4.1 | 2.8 | 1.9 | 1.8 | 2.2 |
| Temperature ≥ 85°F (1) | 0.3 | 0.8 | 0.6 | 1.5 | 5.5 | 15.6 | 31.7 | 34.2 | 21.6 | 7.4 | 0.8 | 0 | 10.7 |
| Mean Temperature (°F) | 69.6 | 69.8 | 71.7 | 74.8 | 78.7 | 82.0 | 83.9 | 84.0 | 83.2 | 80.0 | 74.8 | 71.0 | 77.2 |
| Temperature ≤ 32°F (1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mean relative humidity (%) | 78 | 80 | 79 | 80 | 79 | 80 | 77 | 77 | 78 | 77 | 77 | 78 | 78 |
| Sky overcast or obscured (1) | 16.8 | 16.3 | 12.6 | 7.9 | 7.3 | 12.4 | 6.3 | 6.1 | 11.7 | 11.5 | 11.3 | 13.2 | 10.9 |
| Mean cloud cover (eighths) | 4.0 | 3.6 | 3.4 | 3.0 | 3.2 | 4.0 | 4.0 | 4.0 | 4.4 | 4.1 | 3.8 | 3.8 | 3.8 |
| Mean sea-level pressure (2) | 1019 | 1018 | 1018 | 1017 | 1016 | 1016 | 1017 | 1016 | 1014 | 1015 | 1018 | 1019 | 1017 |
| Extreme max. sea-level pressure (2) | 1031 | 1029 | 1030 | 1031 | 1026 | 1027 | 1027 | 1027 | 1021 | 1025 | 1027 | 1029 | 1031 |
| Extreme min. sea-level pressure (2) | 1006 | 1002 | 1005 | 1005 | 1006 | 1005 | 1007 | 1008 | 1004 | 999 | 1006 | 1006 | 999 |
| Prevailing wind direction | E | E | E | E | S | E | E | E | E | S | NE | E | E |
| Thunder and lightning (1) | 0.3 | 1.1 | 0.4 | 0.8 | 0.8 | 2.8 | 4.5 | 4.7 | 3.6 | 2.1 | 1.3 | 0.8 | 2.0 |

METEOROLOGICAL TABLE FOR COASTAL AREA OFF WEST COAST OF FLORIDA
Boundaries: From 27°N., 86°W., north and eastward to coast

| Weather Elements | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wind ≥ 34 knots (1) | 1.2 | 2.0 | 1.2 | 0 | 0 | 0 | 0 | 0.1 | 2.1 | 0.2 | 1.4 | 0.7 | 0.7 |
| Wave height ≥ 10 feet (1) | 11.0 | 4.9 | 3.6 | 2.4 | 0 | 3.0 | 0 | 0 | 8.1 | 3.0 | 2.4 | 1.6 | 3.2 |
| Visibility < 2 naut. mi. (1) | 0.9 | 1.0 | 1.7 | 0.6 | 0.4 | 0 | 0.7 | 0.2 | 1.6 | 0 | 0.4 | 0.6 | 0.6 |
| Precipitation (1) | 3.3 | 3.7 | 2.6 | 2.3 | 2.0 | 2.6 | 3.3 | 3.2 | 6.2 | 2.3 | 0.9 | 2.0 | 2.9 |
| Temperature ≥ 85°F (1) | 0 | 0 | 0.2 | 0.6 | 2.6 | 13.1 | 29.2 | 33.5 | 17.8 | 3.5 | 0.4 | 0 | 9.4 |
| Mean Temperature (°F) | 64.9 | 65.7 | 68.1 | 72.4 | 77.2 | 81.3 | 83.6 | 83.7 | 82.2 | 77.6 | 71.9 | 67.1 | 75.2 |
| Temperature ≤ 32°F (1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mean relative humidity (%) | 77 | 76 | 78 | 78 | 79 | 79 | 77 | 78 | 78 | 76 | 75 | 76 | 77 |
| Sky overcast or obscured (1) | 21.7 | 24.9 | 18.9 | 13.9 | 8.1 | 13.4 | 7.5 | 10.6 | 18.5 | 13.5 | 13.6 | 18.5 | 14.9 |
| Mean cloud cover (eighths) | 4.4 | 4.5 | 4.1 | 3.3 | 3.2 | 3.9 | 4.0 | 4.2 | 4.8 | 4.0 | 3.8 | 4.4 | 4.0 |
| Mean sea-level pressure (2) | 1020 | 1019 | 1018 | 1018 | 1017 | 1016 | 1018 | 1016 | 1015 | 1016 | 1018 | 1021 | 1018 |
| Extreme max. sea-level pressure (2) | 1032 | 1031 | 1032 | 1027 | 1026 | 1036 | 1026 | 1027 | 1027 | 1028 | 1028 | 1031 | 1036 |
| Extreme min. sea-level pressure (2) | 1005 | 1001 | 1002 | 1004 | 1004 | 1007 | 1008 | 1005 | 1004 | 1004 | 1006 | 1006 | 1001 |
| Prevailing wind direction | W | E | E | E | E | E | E | E | SE | E | NE | E | E |
| Thunder and lightning (1) | 0.4 | 1.0 | 1.3 | 0.2 | 1.3 | 2.8 | 4.7 | 4.2 | 3.2 | 1.4 | 0.4 | 0.2 | 1.9 |

METEOROLOGICAL TABLE FOR COASTAL AREAS OFF FLORIDA, ALABAMA, AND MISSISSIPPI
Boundaries: Between 27°N., 86°W., and 27°N., 89°W., northward to coast

| Weather Elements | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wind ≥ 34 knots (1) | 1.2 | 1.4 | 0.4 | 0.3 | 0.1 | 0.1 | 0.1 | 0.1 | 0.8 | 0.7 | 0.8 | 0.7 | 0.5 |
| Wave height ≥ 10 feet (1) | 5.4 | 6.6 | 3.8 | 1.3 | 0.5 | 0.5 | 0.2 | 0.1 | 3.3 | 5.7 | 3.9 | 4.0 | 2.9 |
| Visibility < 2 naut. mi. (1) | 0.8 | 0.5 | 1.1 | 0.8 | 0.3 | 0.3 | 0.5 | 0.4 | 0.7 | 0.3 | 0.4 | 0.4 | 0.2 |
| Precipitation (1) | 4.2 | 4.4 | 3.2 | 2.9 | 2.5 | 2.4 | 3.3 | 3.2 | 4.7 | 3.4 | 2.5 | 3.8 | 3.4 |
| Temperature ≥ 85°F (1) | 0.1 | 0.3 | 0.2 | 0.8 | 4.6 | 15.0 | 30.2 | 31.8 | 15.5 | 3.7 | 0.5 | 0.2 | 9.3 |
| Mean Temperature (°F) | 65.6 | 66.1 | 68.2 | 72.3 | 77.5 | 81.7 | 83.5 | 83.6 | 81.7 | 77.2 | 71.4 | 67.1 | 75.1 |
| Temperature ≤ 32°F (1) | * | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | * |
| Mean relative humidity (%) | 75 | 76 | 77 | 78 | 78 | 78 | 77 | 77 | 78 | 73 | 74 | 74 | 76 |
| Sky overcast or obscured (1) | 25.1 | 25.3 | 20.3 | 15.3 | 10.5 | 9.8 | 10.5 | 10.3 | 16.4 | 11.6 | 15.6 | 22.9 | 15.7 |
| Mean cloud cover (eighths) | 4.7 | 4.6 | 4.2 | 3.7 | 3.4 | 3.7 | 4.0 | 4.0 | 4.5 | 3.8 | 4.0 | 4.7 | 4.1 |
| Mean sea-level pressure (2) | 1020 | 1018 | 1018 | 1017 | 1016 | 1016 | 1017 | 1016 | 1015 | 1016 | 1019 | 1020 | 1017 |
| Extreme max. sea-level pressure (2) | 1036 | 1035 | 1033 | 1032 | 1028 | 1027 | 1030 | 1031 | 1028 | 1032 | 1033 | 1037 | 1037 |
| Extreme min. sea-level pressure (2) | 1000 | 997 | 1000 | 1000 | 999 | 997 | 1001 | 1001 | 981 | 998 | 1001 | 998 | 981 |
| Prevailing wind direction | E | SE | SE | SE | E | E | SE | E | E | NE | NW | E | E |
| Thunder and lightning (1) | 0.7 | 0.9 | 0.9 | 1.3 | 1.3 | 2.0 | 3.3 | 2.6 | 1.8 | 0.7 | 0.5 | 0.8 | 1.4 |

(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.

METEOROLOGICAL TABLE FOR COASTAL AREAS OFF MISSISSIPPI AND LOUISIANA
Boundaries: Between 27°N., 89°W., and 27°N., 92°W., northward to coast

| Weather Elements | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wind ≧ 34 knots (1) | 1.1 | 1.0 | 1.0 | 0.4 | 0.1 | 0.1 | 0.1 | 0.1 | 1.1 | 0.7 | 0.9 | 0.7 | 0.6 |
| Wave height ≧ 10 feet (1) | 4.7 | 6.6 | 4.4 | 1.0 | 1.1 | 0.6 | 0.2 | 0.1 | 2.3 | 4.0 | 2.7 | 4.2 | 2.5 |
| Visibility < 2 naut. mi. (1) | 1.0 | 0.9 | 1.1 | 0.6 | 0.3 | 0.3 | 0.3 | 0.2 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 |
| Precipitation (1) | 2.9 | 4.3 | 2.6 | 1.7 | 1.5 | 1.8 | 2.7 | 3.2 | 3.9 | 2.7 | 3.0 | 3.5 | 2.8 |
| Temperature ≧ 85°F (1) | * | 0.1 | 0.2 | 0.9 | 4.8 | 19.3 | 38.7 | 38.4 | 19.9 | 4.3 | 0.6 | 0.1 | 11.4 |
| Mean Temperature (°F) | 65.3 | 66.1 | 68.0 | 72.6 | 77.8 | 82.1 | 84.1 | 84.0 | 82.2 | 77.4 | 71.5 | 67.5 | 75.2 |
| Temperature ≦ 32°F (1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mean relative humidity (%) | 77 | 78 | 79 | 80 | 80 | 78 | 76 | 77 | 78 | 74 | 75 | 77 | 77 |
| Sky overcast or obscured (1) | 26.4 | 26.8 | 22.5 | 16.8 | 9.7 | 7.3 | 8.4 | 9.1 | 13.7 | 11.4 | 19.0 | 23.6 | 15.9 |
| Mean cloud cover (eighths) | 4.6 | 4.6 | 4.3 | 3.8 | 3.3 | 3.4 | 3.9 | 3.9 | 4.2 | 3.7 | 4.2 | 4.7 | 4.0 |
| Mean sea-level pressure (2) | 1020 | 1018 | 1017 | 1017 | 1016 | 1016 | 1017 | 1016 | 1015 | 1017 | 1019 | 1020 | 1017 |
| Extreme max. sea-level pressure (2) | 1037 | 1041 | 1032 | 1032 | 1029 | 1031 | 1030 | 1031 | 1029 | 1035 | 1035 | 1037 | 1041 |
| Extreme min. sea-level pressure (2) | 997 | 995 | 998 | 980 | 990 | 978 | 999 | 999 | 994 | 1000 | 992 | 976 | 976 |
| Prevailing wind direction | NW | SE | SE | SE | SE | SE | SE | E | E | E | E | E | E |
| Thunder and lightning (1) | 0.5 | 0.8 | 1.1 | 0.8 | 0.9 | 1.5 | 2.4 | 2.1 | 1.5 | 0.9 | 0.7 | 0.5 | 1.2 |

METEOROLOGICAL TABLE FOR COASTAL AREAS OFF LOUISIANA AND TEXAS
Boundaries: Between 27°N., 92°W., and 27°N., 95°W., northward to coast

| Weather Elements | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wind ≧ 34 knots (1) | 1.1 | 1.1 | 0.6 | 0.3 | 0.1 | 0.2 | 0.1 | 0.1 | 1.3 | 0.4 | 1.0 | 0.8 | 0.6 |
| Wave height ≧ 10 feet (1) | 3.8 | 6.5 | 2.0 | 2.0 | 1.6 | 0.6 | 0.1 | 0.1 | 3.2 | 2.8 | 2.5 | 1.8 | 2.1 |
| Visibility < 2 naut. mi. (1) | 2.1 | 2.3 | 2.3 | 1.4 | 0.5 | 0.6 | 0.2 | 0.3 | 0.5 | 0.2 | 0.6 | 1.8 | 0.9 |
| Precipitation (1) | 3.2 | 4.3 | 1.8 | 1.6 | 1.5 | 1.7 | 2.3 | 2.3 | 3.2 | 2.1 | 2.8 | 3.9 | 2.5 |
| Temperature ≧ 85°F (1) | 0 | 0.1 | 0.1 | 0.5 | 2.9 | 19.0 | 39.4 | 40.8 | 20.9 | 4.1 | 0.2 | 0 | 11.7 |
| Mean Temperature (°F) | 62.2 | 63.1 | 65.8 | 71.0 | 77.0 | 82.0 | 84.2 | 84.2 | 82.1 | 76.4 | 69.6 | 65.0 | 74.1 |
| Temperature ≦ 32°F (1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mean relative humidity (%) | 79 | 80 | 80 | 82 | 82 | 79 | 77 | 77 | 77 | 74 | 77 | 78 | 78 |
| Sky overcast or obscured (1) | 31.7 | 31.2 | 27.9 | 22.2 | 11.2 | 7.0 | 8.7 | 9.0 | 14.3 | 13.3 | 21.1 | 30.0 | 18.2 |
| Mean cloud cover (eighths) | 4.7 | 4.6 | 4.6 | 4.2 | 3.5 | 3.3 | 3.8 | 3.8 | 4.0 | 3.5 | 4.1 | 4.7 | 4.0 |
| Mean sea-level pressure (2) | 1020 | 1018 | 1017 | 1016 | 1015 | 1015 | 1017 | 1016 | 1015 | 1017 | 1019 | 1020 | 1017 |
| Extreme max. sea-level pressure (2) | 1038 | 1041 | 1035 | 1031 | 1031 | 1029 | 1027 | 1028 | 1025 | 1037 | 1036 | 1040 | 1041 |
| Extreme min. sea-level pressure (2) | 996 | 994 | 998 | 993 | 1001 | 985 | 999 | 996 | 981 | 1000 | 999 | 1000 | 981 |
| Prevailing wind direction | SE | SE | SE | SE | SE | SE | SE | SE | E | E | NW | N | SE |
| Thunder and lightning (1) | 0.3 | 0.9 | 0.5 | 0.6 | 0.8 | 1.3 | 1.5 | 1.4 | 1.7 | 0.8 | 1.1 | 0.7 | 1.0 |

METEOROLOGICAL TABLE FOR COASTAL AREA OFF TEXAS
Boundaries: From 27°N., 95°W., northward and westward to coast

| Weather Elements | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wind ≧ 34 knots (1) | 1.4 | 1.6 | 0.9 | 0.5 | 0.4 | 0.2 | 0 | 0.1 | 0.6 | 0.9 | 1.5 | 1.7 | 0.8 |
| Wave height ≧ 10 feet (1) | 6.0 | 1.9 | 2.1 | 2.2 | 0.3 | 0.8 | 0 | 0 | 1.1 | 4.1 | 3.8 | 4.3 | 2.2 |
| Visibility < 2 naut. mi. (1) | 4.0 | 1.8 | 3.7 | 2.2 | 1.0 | 0.6 | 0.2 | 0.4 | 0.5 | 0.1 | 0.6 | 1.2 | 1.1 |
| Precipitation (1) | 5.0 | 2.8 | 2.3 | 1.4 | 1.0 | 2.1 | 0.5 | 3.6 | 2.7 | 2.0 | 2.9 | 6.5 | 2.7 |
| Temperature ≧ 85°F (1) | 0 | 0 | 0 | 0.1 | 2.2 | 17.5 | 32.7 | 37.8 | 21.6 | 5.5 | 0.7 | 0 | 10.5 |
| Mean Temperature (°F) | 63.6 | 64.8 | 67.2 | 72.1 | 77.4 | 82.2 | 83.9 | 83.9 | 82.6 | 77.6 | 71.7 | 66.6 | 74.8 |
| Temperature ≦ 32°F (1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mean relative humidity (%) | 80 | 80 | 82 | 82 | 82 | 81 | 79 | 79 | 77 | 73 | 77 | 79 | 79 |
| Sky overcast or obscured (1) | 42.5 | 30.8 | 32.8 | 26.2 | 14.3 | 6.1 | 6.1 | 8.9 | 10.6 | 11.2 | 24.6 | 36.3 | 20.2 |
| Mean cloud cover (eighths) | 5.4 | 4.7 | 4.9 | 4.7 | 4.1 | 3.6 | 3.5 | 3.8 | 3.7 | 3.6 | 4.6 | 5.3 | 4.3 |
| Mean sea-level pressure (2) | 1020 | 1018 | 1017 | 1015 | 1014 | 1014 | 1016 | 1015 | 1014 | 1017 | 1018 | 1019 | 1016 |
| Extreme max. sea-level pressure (2) | 1040 | 1041 | 1033 | 1031 | 1030 | 1023 | 1024 | 1023 | 1024 | 1033 | 1040 | 1038 | 1041 |
| Extreme min. sea-level pressure (2) | 999 | 998 | 996 | 995 | 1000 | 1001 | 1007 | 1001 | 992 | 1002 | 998 | 1000 | 992 |
| Prevailing wind direction | SE | SE | SE | SE | SE | SE | SE | SE | E | E | SE | SE | SE |
| Thunder and lightning (1) | 0.7 | 0.2 | 0.1 | 0.2 | 1.3 | 1.0 | 0.7 | 1.8 | 1.7 | 0.8 | 0.9 | 0.8 | 0.9 |

(1) Percentage frequency.
(2) Millibars.

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) $\sigma_{15}$ | (T) °C | (D) $\sigma_{15}$ | (T) °C | (D) $\sigma_{15}$ | (T) °C | (D) $\sigma_{15}$ | (T) °C | (D) $\sigma_{15}$ | (T) °C | (D) $\sigma_{15}$ | (T) °C | (D) $\sigma_{15}$ | (T) °C | (D) $\sigma_{15}$ | (T) °C | (D) $\sigma_{15}$ | (T) °C | (D) $\sigma_{15}$ | (T) °C | (D) $\sigma_{15}$ | (T) °C | (D) $\sigma_{15}$ | (T) °C | (D) $\sigma_{15}$ |
| Key West, Fla. 24°33.2'N., 81°48.5'W. | 41 | 21.7 | 26.8 | 22.2 | 26.9 | 23.7 | 27.1 | 25.8 | 27.3 | 27.9 | 27.5 | 29.6 | 27.2 | 30.4 | 27.3 | 30.6 | 27.3 | 29.7 | 26.9 | 27.6 | 26.6 | 24.4 | 27.0 | 22.3 | 26.9 | 26.3 | 27.1 |
| St. Petersburg, Fla. 27°46.0'N., 82°37.0'W. | 25 | 16.7 | 19.7 | 17.6 | 19.6 | 19.7 | 19.4 | 23.1 | 19.5 | 26.4 | 20.5 | 28.8 | 21.2 | 29.7 | 20.6 | 29.7 | 18.6 | 28.7 | 17.1 | 25.4 | 17.5 | 21.0 | 18.8 | 17.6 | 19.5 | 23.7 | 19.3 |
| Cedar Keys, Fla. 29°08.0'N., 83°01.9'W. | 31 | 14.4 | 19.9 | 15.7 | 19.1 | 18.4 | 18.1 | 22.9 | 18.1 | 26.4 | 19.1 | 29.1 | 20.2 | 29.8 | 19.9 | 29.8 | 19.0 | 28.3 | 18.8 | 24.2 | 19.2 | 19.0 | 20.2 | 15.4 | 20.1 | 22.8 | 19.3 |
| Pensacola, Fla. 30°24.2'N., 87°12.8'W. | 48 | 13.1 | 13.0 | 14.3 | 11.9 | 17.1 | 9.5 | 21.6 | 8.2 | 25.4 | 10.9 | 28.6 | 12.8 | 29.6 | 12.9 | 29.7 | 12.3 | 27.8 | 14.6 | 23.5 | 15.9 | 18.1 | 17.2 | 14.2 | 15.5 | 21.9 | 12.9 |
| Grand Isle, La. 29°10.0'N., 89°55.0'W. | 21 | 16.1 | 22.6 | 16.2 | 21.0 | 17.6 | 20.3 | 20.9 | 17.3 | 25.2 | 16.7 | 28.3 | 17.3 | 29.3 | 20.1 | 29.4 | 20.8 | 28.3 | 21.2 | 25.0 | 22.7 | 21.2 | 24.1 | 18.1 | 23.9 | 23.0 | 20.7 |
| Eugene Island, La. 29°22.4'N., 91°23.1'W. | 28 | 10.8 | 1.9 | 11.9 | 1.1 | 15.3 | 1.1 | 19.9 | 0.8 | 24.6 | 0.6 | 28.3 | 0.6 | 29.4 | 1.0 | 29.6 | 2.4 | 27.9 | 5.7 | 23.3 | 5.5 | 17.3 | 4.7 | 12.6 | 3.3 | 20.9 | 2.4 |
| Galveston, Tex. 29°18.6'N., 94°47.6'W. | 50 | 13.1 | 17.1 | 14.2 | 16.7 | 16.8 | 16.6 | 21.4 | 16.2 | 25.6 | 15.1 | 28.8 | 16.0 | 30.2 | 19.1 | 30.3 | 22.1 | 28.5 | 19.9 | 24.4 | 18.6 | 18.8 | 18.8 | 14.8 | 18.2 | 22.3 | 17.9 |
| Freeport Harbor, Tex. 28°56.8'N., 95°18.5'W. | 16 | 11.9 | 18.1 | 13.5 | 17.6 | 16.2 | 18.9 | 21.4 | 18.5 | 25.1 | 17.0 | 27.7 | 19.1 | 28.7 | 22.5 | 29.3 | 24.5 | 27.9 | 20.9 | 23.8 | 18.4 | 18.9 | 19.0 | 14.9 | 18.4 | 21.6 | 19.4 |
| Rockport, Tex. 28°01.4'N., 97°02.8'W. | 7 | 16.7 | 20.6 | 16.8 | 20.0 | 19.8 | 19.6 | 23.5 | 20.6 | 27.1 | 20.9 | 30.1 | 22.4 | 30.8 | 25.6 | 30.8 | 27.6 | 29.1 | 23.2 | 25.6 | 20.4 | 20.1 | 20.5 | 16.9 | 19.2 | 23.9 | 21.7 |
| Port Aransas, Tex. 27°49.6'N., 97°03.5'W. | 11 | 13.6 | 22.5 | 14.3 | 23.1 | 16.7 | 23.4 | 22.2 | 22.9 | 25.8 | 21.8 | 28.8 | 24.3 | 29.8 | 26.2 | 30.0 | 27.2 | 29.2 | 24.8 | 25.3 | 22.6 | 20.7 | 22.8 | 16.3 | 23.3 | 22.7 | 23.7 |
| Port Mansfield, Tex. 26°33.3'N., 97°25.8'W. | 9 | 14.6 | 25.8 | 16.1 | 26.0 | 18.6 | 26.2 | 23.8 | 26.3 | 26.1 | 24.9 | 28.3 | 24.7 | 29.2 | 27.1 | 29.2 | 30.1 | 28.3 | 29.7 | 24.6 | 28.0 | 20.7 | 28.8 | 16.7 | 27.6 | 23.0 | 27.1 |
| Brazos Santiago, Tex. 26°04.1'N., 97°09.1'W. | 14 | 14.6 | 24.2 | 15.3 | 24.6 | 17.4 | 25.1 | 21.3 | 25.3 | 24.7 | 25.3 | 26.3 | 26.7 | 25.9 | 27.2 | 26.7 | 27.5 | 28.2 | 26.6 | 25.8 | 25.2 | 21.7 | 25.5 | 17.6 | 24.6 | 22.1 | 25.7 |
| Port Isabel, Tex. 26°03.6'N., 97°12.9'W. | 24 | 16.0 | 24.8 | 17.3 | 25.0 | 19.8 | 24.7 | 23.6 | 25.3 | 26.8 | 25.4 | 29.0 | 26.4 | 29.6 | 27.5 | 29.6 | 27.6 | 29.1 | 25.7 | 25.9 | 24.3 | 21.4 | 25.1 | 17.5 | 25.3 | 23.8 | 25.6 |
| San Juan, P.R. 18°27.0'N., 66°05.4'W. | 10 | 26.6 | 25.4 | 26.4 | 26.0 | 26.9 | 26.1 | 27.4 | 26.2 | 27.3 | 25.3 | 28.1 | 25.5 | 28.3 | 25.6 | 28.4 | 25.1 | 28.8 | 24.4 | 28.6 | 24.0 | 28.2 | 24.1 | 27.1 | 24.5 | 27.7 | 25.2 |
| Isla Maguey, P.R. 17°58.3'N., 87°02.7'W. | 15 | 26.6 | 26.3 | 26.4 | 26.7 | 27.1 | 26.8 | 28.0 | 27.0 | 28.6 | 27.0 | 28.8 | 26.9 | 28.9 | 26.9 | 29.3 | 26.6 | 29.6 | 26.2 | 29.2 | 25.9 | 28.6 | 25.9 | 27.2 | 26.1 | 28.2 | 26.5 |

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 ( $\rho_{15}$ ) are expressed in terms of sigma-t ( $\sigma_t$ ) where t = 15°C and $\sigma_{15} = (\rho_{15} - 1)\,1000$. Thus, for $\rho_{15} = 1.0238$, $\sigma_{15} = 23.8$. Obtain the pamphlet, "Surface Water Temperature and Density, Atlantic Coast, North and South America, NOAA Publication 31-1", for greater detail; for sale by Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, price $1.00.

DETERMINATION OF WIND SPEED BY SEA CONDITION

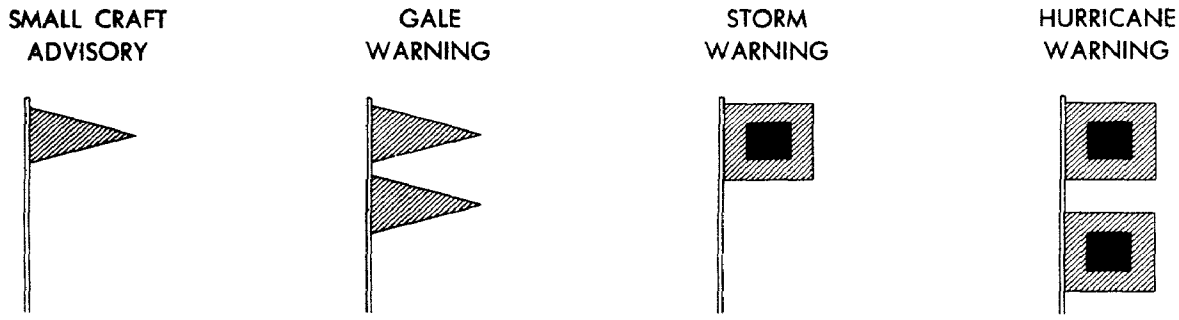
| Miles per hour | Knots | Descriptive | Sea Conditions | Wind force (Beaufort) | Probable wave height (in ft.) |
|---|---|---|---|---|---|
| 0-1 | 0-1 | Calm | Sea smooth and mirror-like. | 0 | - |
| 1-3 | 1-3 | Light air | Scale-like ripples without foam crests. | 1 | 1/4 |
| 4-7 | 4-6 | Light breeze | 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

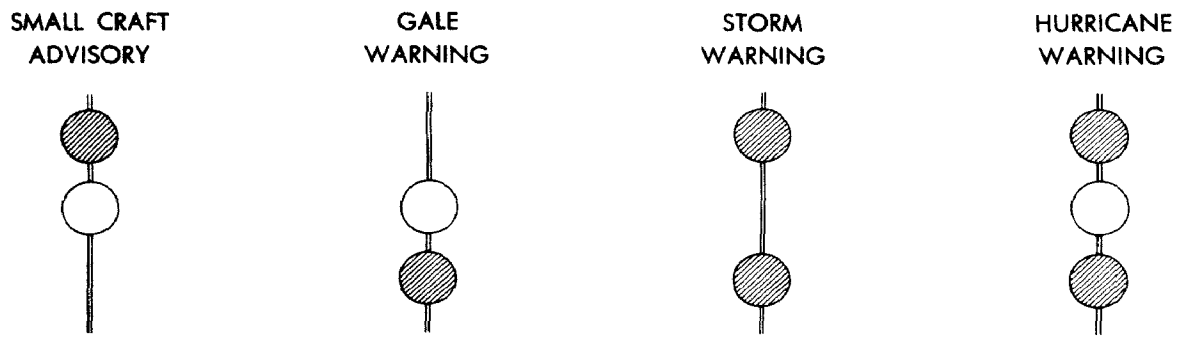
| Inches | Millibars | Inches | Millibars | Inches | Millibars |
|---|---|---|---|---|---|
| 28.44 | 963 | 29.32 | 993 | 30.21 | 1023 |
| 28.53 | 966 | 29.41 | 996 | 30.30 | 1026 |
| 28.62 | 969 | 29.50 | 999 | 30.39 | 1029 |
| 28.70 | 972 | 29.59 | 1002 | 30.48 | 1032 |
| 28.79 | 975 | 29.68 | 1005 | 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




Note: Shaded area represents the color RED on flags and lights.

### 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 FOR DEEP-DRAFT VESSELS MONTREAL, CANADA, TO PANAMA CANAL ZONE

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 * 45°30. 2'N., 73°33. 0'W | 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. 9'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°48. 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. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 681 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 717 | 120 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1276 | 595 | 484 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1318 | 637 | 526 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1311 | 630 | 519 | 203 | 163 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1534 | 853 | 742 | 426 | 386 | 223 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1682 | 1001 | 890 | 575 | 535 | 372 | 240 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1838 | 1157 | 1046 | 734 | 694 | 531 | 417 | 392 | | | | | | | | | | | | | | | | | | | | | | | |
| 1689 | 1008 | 896 | 584 | 544 | 381 | 267 | 242 | 150 | | | | | | | | | | | | | | | | | | | | | | |
| 1716 | 1035 | 923 | 611 | 571 | 408 | 294 | 269 | 173 | 27 | | | | | | | | | | | | | | | | | | | | | |
| 1729 | 1048 | 936 | 628 | 588 | 425 | 345 | 322 | 267 | 117 | 144 | | | | | | | | | | | | | | | | | | | | |
| 1948 | 1267 | 1155 | 847 | 807 | 644 | 564 | 541 | 486 | 336 | 363 | 219 | | | | | | | | | | | | | | | | | | | |
| 2014 | 1333 | 1221 | 913 | 873 | 710 | 630 | 607 | 552 | 402 | 429 | 285 | 151 | | | | | | | | | | | | | | | | | | |
| 2088 | 1407 | 1295 | 987 | 947 | 784 | 704 | 681 | 626 | 476 | 503 | 359 | 227 | 102 | | | | | | | | | | | | | | | | | |
| 2172 | 1491 | 1379 | 1071 | 1031 | 868 | 788 | 765 | 710 | 560 | 587 | 443 | 315 | 197 | 145 | | | | | | | | | | | | | | | | |
| 2479 | 1798 | 1690 | 1387 | 1347 | 1184 | 1109 | 1086 | 1031 | 881 | 908 | 764 | 667 | 572 | 543 | 462 | | | | | | | | | | | | | | | |
| 2540 | 1859 | 1751 | 1448 | 1408 | 1245 | 1170 | 1147 | 1092 | 942 | 969 | 825 | 728 | 633 | 604 | 523 | 73 | | | | | | | | | | | | | | |
| 2772 | 2091 | 1983 | 1680 | 1640 | 1477 | 1402 | 1379 | 1324 | 1174 | 1201 | 1057 | 960 | 865 | 836 | 755 | 305 | 232 | | | | | | | | | | | | | |
| 2971 | 2290 | 2182 | 1879 | 1839 | 1676 | 1601 | 1578 | 1523 | 1373 | 1400 | 1256 | 1159 | 1064 | 1035 | 954 | 504 | 431 | 331 | | | | | | | | | | | | |
| 3011 | 2330 | 2222 | 1919 | 1879 | 1716 | 1641 | 1618 | 1563 | 1413 | 1440 | 1296 | 1199 | 1104 | 1075 | 994 | 544 | 471 | 383 | 87 | | | | | | | | | | | |
| 3080 | 2399 | 2291 | 1988 | 1948 | 1785 | 1710 | 1687 | 1632 | 1482 | 1509 | 1365 | 1268 | 1173 | 1144 | 1063 | 613 | 540 | 497 | 270 | 261 | | | | | | | | | | |
| 3240 | 2559 | 2451 | 2148 | 2108 | 1945 | 1870 | 1847 | 1792 | 1642 | 1669 | 1525 | 1428 | 1333 | 1304 | 1223 | 773 | 700 | 691 | 465 | 456 | 430 | | | | | | | | | |
| 3242 | 2561 | 2453 | 2150 | 2110 | 1947 | 1872 | 1849 | 1794 | 1644 | 1671 | 1527 | 1430 | 1335 | 1306 | 1225 | 775 | 702 | 684 | 472 | 462 | 437 | 82 | | | | | | | | |
| 3347 | 2666 | 2558 | 2255 | 2215 | 2052 | 1977 | 1954 | 1899 | 1749 | 1776 | 1632 | 1535 | 1440 | 1411 | 1330 | 880 | 807 | 801 | 587 | 577 | 552 | 243 | 209 | | | | | | | |
| 2445 | 1764 | 1669 | 1531 | 1486 | 1334 | 1399 | 1395 | 1375 | 1225 | 1252 | 1114 | 1153 | 1138 | 1156 | 1121 | 966 | 1017 | 1249 | 1448 | 1488 | 1557 | 1717 | 1719 | 1824 | | | | | | |
| 2730 | 2049 | 1937 | 1629 | 1589 | 1426 | 1346 | 1323 | 1268 | 1118 | 1145 | 1001 | 904 | 809 | 780 | 699 | 251 | 192 | 404 | 531 | 558 | 587 | 691 | 696 | 769 | 1111 | | | | | |
| 3203 | 2522 | 2419 | 2189 | 2149 | 1986 | 1972 | 1955 | 1904 | 1754 | 1781 | 1637 | 1609 | 1563 | 1564 | 1513 | 1060 | 1001 | 1213 | 1340 | 1367 | 1396 | 1487 | 1493 | 1549 | 990 | 809 | | | | |
| 3249 | 2568 | 2465 | 2235 | 2195 | 2032 | 2018 | 2001 | 1950 | 1800 | 1827 | 1683 | 1655 | 1609 | 1610 | 1559 | 1106 | 1047 | 1259 | 1386 | 1413 | 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.

TRANS-GULF DISTANCES FOR DEEP-DRAFT VESSELS
KEY WEST, FLA., TO PORT BROWNSVILLE, TEX.

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: Tampa, Fla., is 816 nautical miles from Corpus Christi, Tex.

| | YUCATAN CHANNEL 21°50.0'N., 85°03.0'W. | STRAITS OF FLORIDA 24°25.0'N., 83°00.0'W. | Key West, Fla. 24°33.7'N., 81°48.5'W. | Port Boca Grande, Fla. 26°43.2'N., 82°15.3'W. | St. Petersburg, Fla. 27°46.0'N., 82°37.0'W. | Port Tampa, Fla. 27°51.7'N., 82°33.3'W. | Tampa, Fla. 27°56.5'N., 82°26.7'W. | Port St. Joe, Fla. 29°49.1'N., 85°18.8'W. | Panama City, Fla. 30°08.2'N., 85°37.6'W. | Pensacola, Fla. 30°24.0'N., 87°13.0'W. | Mobile, Ala. 30°42.5'N., 88°02.5'W. | Pascagoula, Miss. 30°21.9'N., 88°33.8'W. | Gulfport, Miss. 30°21.5'N., 89°05.5'W. | New Orleans, La. (Gulf Outlet)* 29°57.0'N., 90°03.7'W. | New Orleans, La. (South Pass)* 29°57.0'N., 90°03.7'W. | NEW ORLEANS, LA. (SW. Pass)* 29°57.0'N., 90°03.7'W. | Morgan City, La. 29°41.5'N., 91°12.9'W. | Lake Charles, La. 30°13.1'N., 93°15.5'W. | Port Arthur, Tex. 29°49.5'N., 93°57.6'W. | Orange, Tex. 30°05.3'N., 93°44.0'W. | Beaumont, Tex. 30°04.7'N., 94°05.2'W. | Galveston, Tex. 29°19.0'N., 94°47.0'W. | Texas City, Tex. 29°22.7'N., 94°53.2'W. | Houston, Tex. 29°45.0'N., 95°17.3'W. | Freeport, Tex. 28°56.3'N., 95°20.4'W. | Point Comfort, Tex. 28°38.7'N., 96°33.3'W. (Lavaca Bay) | La Quinta, Tex. 27°52.6'N., 97°15.7'W. | Corpus Christi, Tex. 27°48.8'N., 97°24.0'W. | Port Isabel, Tex. 26°03.6'N., 97°12.8'W. | Port Brownsville, Tex. 25°57.1'N., 97°24.0'W. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YUCATAN CHANNEL 21°50.0'N., 85°03.0'W. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| STRAITS OF FLORIDA 24°25.0'N., 83°00.0'W. | 192 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Key West, Fla. 24°33.7'N., 81°48.5'W. | 251 | 73 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Port Boca Grande, Fla. 26°43.2'N., 82°15.3'W. | 332 | 150 | 223 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| St. Petersburg, Fla. 27°46.0'N., 82°37.0'W. | 389 | 219 | 292 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Port Tampa, Fla. 27°51.7'N., 82°33.3'W. | 399 | 228 | 301 | 109 | 8 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tampa, Fla. 27°56.5'N., 82°26.7'W. | 404 | 232 | 305 | 113 | 18 | 18 | | | | | | | | | | | | | | | | | | | | | | | | |
| Port St. Joe, Fla. 29°49.1'N., 85°18.8'W. | 495 | 369 | 442 | 281 | 240 | 248 | 252 | | | | | | | | | | | | | | | | | | | | | | | |
| Panama City, Fla. 30°08.2'N., 85°37.6'W. | 506 | 381 | 454 | 294 | 252 | 261 | 265 | 42 | | | | | | | | | | | | | | | | | | | | | | |
| Pensacola, Fla. 30°24.0'N., 87°13.0'W. | 533 | 437 | 510 | 372 | 334 | 343 | 347 | 154 | 139 | | | | | | | | | | | | | | | | | | | | | |
| Mobile, Ala. 30°42.5'N., 88°02.5'W. | 562 | 471 | 544 | 413 | 377 | 386 | 390 | 206 | 193 | 89 | | | | | | | | | | | | | | | | | | | | |
| Pascagoula, Miss. 30°21.9'N., 88°33.8'W. | 554 | 469 | 542 | 414 | 379 | 387 | 392 | 213 | 200 | 94 | 75 | | | | | | | | | | | | | | | | | | | |
| Gulfport, Miss. 30°21.5'N., 89°05.5'W. | 576 | 492 | 564 | 436 | 401 | 409 | 413 | 235 | 222 | 117 | 98 | 52 | | | | | | | | | | | | | | | | | | |
| New Orleans, La. (Gulf Outlet)* 29°57.0'N., 90°03.7'W. | 575 | 513 | 586 | 474 | 444 | 452 | 457 | 288 | 274 | 188 | 170 | 149 | 171 | | | | | | | | | | | | | | | | | |
| New Orleans, La. (South Pass)* 29°57.0'N., 90°03.7'W. | 579 | 524 | 597 | 489 | 459 | 467 | 472 | 308 | 295 | 253 | 236 | 216 | 238 | --- | | | | | | | | | | | | | | | | |
| NEW ORLEANS, LA. (SW. Pass)* 29°57.0'N., 90°03.7'W. | 587 | 540 | 613 | 512 | 488 | 498 | 502 | 346 | 333 | 288 | 269 | 250 | 271 | --- | --- | | | | | | | | | | | | | | | |
| Morgan City, La. 29°41.5'N., 91°12.9'W. | 602 | 581 | 653 | 564 | 539 | 548 | 552 | 397 | 385 | 339 | 324 | 304 | 330 | 304 | 298 | 278 | | | | | | | | | | | | | | |
| Lake Charles, La. 30°13.1'N., 93°15.5'W. | 705 | 715 | 789 | 717 | 697 | 706 | 710 | 568 | 558 | 517 | 504 | 484 | 506 | 479 | 472 | 454 | 182 | | | | | | | | | | | | | |
| Port Arthur, Tex. 29°49.5'N., 93°57.6'W. | 691 | 700 | 773 | 704 | 684 | 693 | 697 | 555 | 545 | 504 | 491 | 471 | 493 | 466 | 460 | 441 | 190 | 83 | | | | | | | | | | | | |
| Orange, Tex. 30°05.3'N., 93°44.0'W. | 713 | 722 | 795 | 726 | 707 | 715 | 719 | 577 | 567 | 526 | 513 | 493 | 515 | 488 | 482 | 463 | 212 | 105 | 22 | | | | | | | | | | | |
| Beaumont, Tex. 30°04.7'N., 94°05.2'W. | 717 | 726 | 799 | 730 | 710 | 719 | 723 | 581 | 571 | 530 | 517 | 497 | 519 | 492 | 486 | 467 | 216 | 109 | 26 | 27 | | | | | | | | | | |
| Galveston, Tex. 29°19.0'N., 94°47.0'W. | 696 | 702 | 775 | 709 | 690 | 699 | 703 | 562 | 550 | 509 | 496 | 476 | 498 | 471 | 465 | 446 | 235 | 128 | 89 | 111 | 115 | | | | | | | | | |
| Texas City, Tex. 29°22.7'N., 94°53.2'W. | 702 | 707 | 780 | 714 | 695 | 704 | 708 | 567 | 555 | 514 | 501 | 481 | 503 | 476 | 470 | 451 | 240 | 133 | 94 | 116 | 120 | 9 | | | | | | | | |
| Houston, Tex. 29°45.0'N., 95°17.3'W. | 740 | 746 | 819 | 752 | 733 | 742 | 746 | 605 | 594 | 553 | 539 | 519 | 542 | 514 | 508 | 490 | 278 | 172 | 132 | 154 | 158 | 47 | 52 | | | | | | | |
| Freeport, Tex. 28°56.3'N., 95°20.4'W. | 717 | 743 | 816 | 747 | 729 | 738 | 742 | 604 | 593 | 552 | 538 | 518 | 540 | 513 | 508 | 489 | 273 | 166 | 126 | 148 | 152 | 84 | 89 | 127 | | | | | | |
| Point Comfort, Tex. 28°38.7'N., 96°33.3'W. (Lavaca Bay) | 761 | 797 | 870 | 806 | 786 | 795 | 799 | 661 | 649 | 609 | 595 | 575 | 597 | 570 | 564 | 545 | 354 | 248 | 208 | 230 | 234 | 165 | 170 | 209 | 119 | | | | | |
| La Quinta, Tex. 27°52.6'N., 97°15.7'W. | 763 | 802 | 875 | 811 | 792 | 800 | 804 | 666 | 654 | 614 | 600 | 580 | 602 | 575 | 569 | 550 | 390 | 283 | 244 | 266 | 270 | 201 | 206 | 244 | 154 | 112 | | | | |
| Corpus Christi, Tex. 27°48.8'N., 97°24.0'W. | 769 | 807 | 880 | 816 | 797 | 805 | 810 | 671 | 659 | 618 | 605 | 585 | 607 | 580 | 574 | 555 | 395 | 289 | 249 | 271 | 275 | 207 | 212 | 250 | 160 | 117 | 15 | | | |
| Port Isabel, Tex. 26°03.6'N., 97°12.8'W. | 718 | 782 | 855 | 814 | 802 | 810 | 815 | 684 | 673 | 632 | 618 | 598 | 621 | 593 | 588 | 569 | 415 | 376 | 336 | 358 | 362 | 293 | 298 | 337 | 247 | 204 | 137 | 142 | | |
| Port Brownsville, Tex. 25°57.1'N., 97°24.0'W. | 729 | 793 | 866 | 825 | 813 | 822 | 826 | 695 | 684 | 643 | 629 | 609 | 632 | 604 | 599 | 580 | 426 | 387 | 347 | 369 | 373 | 304 | 309 | 348 | 258 | 215 | 148 | 154 | 13 | |

*Baton Rouge, La. (30°27.0'N., 91°11.7'W.) ADD 115 miles.

Entrance buoy (24°27.7'N., 81°48.1'W.) to Key West, 6.3 miles.
Entrance buoy (27°35.8'N., 82°55.6'W.) to Tampa, 38 miles.
Entrance buoy (30°16.3'N., 87°17.5'W.) to Pensacola, 11.5 miles.
Entrance buoy (30°08.1'N., 88°04.0'W.) to Mobile, 35 miles.
Mississippi River-Gulf Outlet Approach Lighted Whistle Buoy NO (29°26.4'N., 88°56.9'W.) to New Orleans, 73 miles.
South Pass entrance buoy (28°58.7'N., 89°06.6'W.) to New Orleans, 96 miles.
Southwest Pass entrance buoy (28°52.6'N., 89°25.9'W.) to New Orleans, 102 miles.
Calcasieu Channel buoy "CC" (29°27.3'N., 93°13.4'W.) to Lake Charles, 50 miles.
Sabine Pass buoy 17 (29°36.9'N., 93°48.3'W.) to Port Arthur, 16.6 miles.
Galveston Bay entrance buoy (29°18.6'N., 94°38.1'W.) to: Galveston, 9.3 miles; Texas City, 14.3 miles; Houston, 53 miles.
Aransas Pass entrance buoy (27°47.6'N., 96°57.4'W.) to Corpus Christi, 25 miles.
Brazos Santiago entrance buoy (26°04.0'N., 97°06.6'W.) to Port Brownsville, 17.5 miles.

All tabular distances are via STRAITS OF FLORIDA, 24°25.0'N., 83°00.0'W., and through the Shipping Safety Fairways. For distances from Key West to west Florida ports via Rebecca Shoal Channel, 24°24.4'N., 82°42.0'W., SUBTRACT 24 miles from Port Boca Grande distance, 17 miles from Tampa Bay distances, 9 miles from Port St. Joe and Panama City distances, and 5 miles from Pensacola distance.

## COASTWISE AND INSIDE-ROUTE DISTANCES KEY WEST, FLA., TO APALACHICOLA, FLA.

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: Flamingo is 225 nautical miles from Clearwater.

| | Key West, Fla. 24°33.7'N., 81°48.5'W. | Marathon 24°42.2'N., 81°06.7'W. | Matecumbe Harbor 24°51.1'N., 80°44.5'W. | Flamingo 25°08.5'N., 80°55.4'W. | Cape Sable 25°09.0'N., 81°11.0'W. | Everglades 25°52.0'N., 81°23.1'W. | Naples 26°08.0'N., 81°47.6'W. | Fort Myers 26°38.9'N., 81°52.3'W. | Port Boca Grande 26°43.2'N., 82°15.3'W. | Venice 27°06.7'N., 82°27.8'W. | Sarasota 27°20.0'N., 82°32.9'W. | Bradenton 27°30.0'N., 82°34.4'W. | St. Petersburg 27°46.0'N., 82°37.0'W. | Tampa 27°56.5'N., 82°26.7'W. | Clearwater 27°58.5'N., 82°49.6'W. | Tarpon Springs 28°09.4'N., 82°45.8'W. | Cedar Key 29°08.0'N., 83°01.9'W. | St. Marks 30°09.2'N., 84°12.2'W. | Carrabelle 29°51.0'N., 84°40.0'W. | Apalachicola, Fla. 29°43.5'N., 84°58.8'W. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Marathon | 42 | | | | | | | | | | | | | | | | | | | |
| Matecumbe Harbor | 65 | 29 | | | | | | | | | | | | | | | | | | |
| Flamingo | 70 | 37 | 35 | | | | | | | | | | | | | | | | | |
| Cape Sable | 57 | 31 | 32 | 17 | | | | | | | | | | | | | | | | |
| Everglades | 88 | 80 | 81 | 66 | 49 | | | | | | | | | | | | | | | |
| Naples | 98 | 100 | 103 | 88 | 71 | 38 | | | | | | | | | | | | | | |
| Fort Myers | 134 | 136 | 139 | 124 | 107 | 79 | 44 | | | | | | | | | | | | | |
| Port Boca Grande | 144 | 146 | 149 | 134 | 117 | 88 | 54 | 35 | | | | | | | | | | | | |
| Venice | 172 | 174 | 177 | 162 | 145 | 116 | 82 | 63 | 28 | | | | | | | | | | | |
| Sarasota | 186 | 189 | 191 | 176 | 159 | 131 | 96 | 78 | 43 | 15 | | | | | | | | | | |
| Bradenton | 210 | 213 | 215 | 200 | 183 | 155 | 120 | 102 | 67 | 39 | 25 | | | | | | | | | |
| St. Petersburg | 218 | 221 | 224 | 209 | 192 | 163 | 129 | 110 | 75 | 47 | 33 | 22 | | | | | | | | |
| Tampa | 232 | 235 | 237 | 222 | 205 | 177 | 143 | 124 | 89 | 61 | 42 | 36 | 18 | | | | | | | |
| Clearwater | 234 | 237 | 240 | 225 | 208 | 179 | 145 | 126 | 91 | 63 | 49 | 38 | 31 | 47 | | | | | | |
| Tarpon Springs | 250 | 253 | 255 | 240 | 223 | 195 | 160 | 142 | 107 | 79 | 65 | 54 | 47 | 63 | 18 | | | | | |
| Cedar Key | 310 | 313 | 316 | 301 | 284 | 255 | 221 | 202 | 167 | 139 | 125 | 114 | 107 | 123 | 79 | 68 | | | | |
| St. Marks | 387 | 389 | 392 | 377 | 360 | 332 | 297 | 278 | 244 | 216 | 202 | 191 | 184 | 200 | 155 | 145 | 91 | | | |
| Carrabelle | 389 | 391 | 394 | 379 | 362 | 334 | 299 | 280 | 245 | 218 | 204 | 193 | 186 | 202 | 157 | 147 | 101 | 52 | | |
| Apalachicola, Fla. | 406 | 408 | 411 | 396 | 379 | 350 | 316 | 297 | 262 | 234 | 221 | 209 | 202 | 218 | 174 | 164 | 118 | 69 | 25 | |

Routes used in table: Hawk Channel between Marathon and Key West; Northwest Channel (Key West) and outside to places between Cape Sable and San Carlos Bay; thence inside to Anclote Keys; and thence outside to St. George Sound. Distances from Everglades northward are inside via Big Marco River and Gordon Pass.

# DISTANCES BY GULF INTRACOASTAL WATERWAY
## APALACHICOLA, FLA., TO PORT BROWNSVILLE, TEX.

Figure at intersection of columns opposite ports in question is the nautical/statute mileage between the two. Example: Mobile, Ala., is 398 nautical miles (458 statute miles) from Beaumont, Tex.

Nautical Miles / Statute Miles

| | Apalachicola, Fla. 29°43.5'N., 84°58.8'W. | Port St. Joe, Fla. 29°49.1'N., 85°18.8'W. | Panama City, Fla. 30°08.2'N., 85°37.6'W. | Fort Walton Beach, Fla. 30°24.0'N., 86°36.7'W. | Pensacola, Fla. 30°24.0'N., 87°13.0'W. | Mobile, Ala. 30°41.5'N., 88°02.2'W. | Pascagoula, Miss. 30°21.9'N., 88°33.8'W. | Biloxi, Miss. 30°23.5'N., 88°52.0'W. | Gulfport, Miss. 30°21.4'N., 89°05.6'W. | NEW ORLEANS, LA. 29°57.0'N., 90°03.7'W. | Houma, La. 29°35.9'N., 90°42.6'W. | Morgan City, La. 29°41.3'N., 91°12.7'W. | Lake Charles, La. 30°13.1'N., 93°15.5'W. | Orange, Tex. 30°04.0'N., 93°43.3'W. | Beaumont, Tex. 30°04.6'N., 94°05.2'W. | Port Arthur, Tex. 29°49.5'N., 93°57.6'W. | Galveston, Tex. 29°18.5'N., 94°48.1'W. | Houston, Tex. 29°45.0'N., 95°17.4'W. | Texas City, Tex. 29°22.7'N., 94°53.2'W. | Freeport, Tex. 28°56.3'N., 95°20.4'W. | Port O'Connor, Tex. 28°26.5'N., 96°24.4'W. | Rockport, Tex. 28°01.1'N., 97°02.9'W. | Aransas Pass, Tex. 27°53.9'N., 97°08.0'W. | La Quinta, Tex. 27°52.6'N., 97°15.7'W. | Corpus Christi, Tex. 27°48.8'N., 97°24.0'W. | Port Mansfield, Tex. 26°33.4'N., 97°25.6'W. | Port Isabel, Tex. 26°03.6'N., 97°12.8'W. | Port Brownsville, Tex. 25°57.1'N., 97°24.0'W. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Port St. Joe, Fla. 29°49.1'N., 85°18.8'W. | 27 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Panama City, Fla. 30°08.2'N., 85°37.6'W. | 51 | 36 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fort Walton Beach, Fla. 30°24.0'N., 86°36.7'W. | 112 | 98 | 62 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pensacola, Fla. 30°24.0'N., 87°13.0'W. | 150 | 135 | 99 | 37 | | | | | | | | | | | | | | | | | | | | | | | | |
| Mobile, Ala. 30°41.5'N., 88°02.2'W. | 214 | 200 | 164 | 102 | 73 | | | | | | | | | | | | | | | | | | | | | | | |
| Pascagoula, Miss. 30°21.9'N., 88°33.8'W. | 222 | 208 | 171 | 110 | 81 | 58 | | | | | | | | | | | | | | | | | | | | | | |
| Biloxi, Miss. 30°23.5'N., 88°52.0'W. | 238 | 224 | 188 | 126 | 97 | 74 | 32 | | | | | | | | | | | | | | | | | | | | | |
| Gulfport, Miss. 30°21.4'N., 89°05.6'W. | 248 | 233 | 197 | 136 | 106 | 84 | 41 | 28 | | | | | | | | | | | | | | | | | | | | |
| NEW ORLEANS, LA. 29°57.0'N., 90°03.7'W. | 302 | 288 | 252 | 190 | 161 | 138 | 96 | 83 | 66 | | | | | | | | | | | | | | | | | | | |
| Houma, La. 29°35.9'N., 90°42.6'W. | 356 | 341 | 305 | 243 | 214 | 191 | 149 | 136 | 120 | 53 | | | | | | | | | | | | | | | | | | |
| Morgan City, La. 29°41.3'N., 91°12.7'W. | 388 | 374 | 338 | 276 | 247 | 224 | 182 | 169 | 152 | 86 | 33 | | | | | | | | | | | | | | | | | |
| Lake Charles, La. 30°13.1'N., 93°15.5'W. | 525 | 510 | 474 | 412 | 383 | 361 | 318 | 305 | 289 | 222 | 169 | 136 | | | | | | | | | | | | | | | | |
| Orange, Tex. 30°04.0'N., 93°43.3'W. | 537 | 523 | 487 | 425 | 396 | 373 | 331 | 318 | 302 | 235 | 182 | 149 | 32 | | | | | | | | | | | | | | | |
| Beaumont, Tex. 30°04.6'N., 94°05.2'W. | 562 | 547 | 511 | 450 | 421 | 398 | 355 | 342 | 326 | 260 | 206 | 174 | 57 | 26 | | | | | | | | | | | | | | |
| Port Arthur, Tex. 29°49.5'N., 93°57.6'W. | 556 | 542 | 506 | 444 | 415 | 392 | 350 | 337 | 320 | 254 | 201 | 168 | 51 | 21 | 26 | | | | | | | | | | | | | |
| Galveston, Tex. 29°18.5'N., 94°48.1'W. | 614 | 599 | 563 | 502 | 473 | 450 | 407 | 394 | 378 | 312 | 258 | 226 | 109 | 78 | 84 | 58 | | | | | | | | | | | | |
| Houston, Tex. 29°45.0'N., 95°17.4'W. | 653 | 638 | 602 | 541 | 512 | 489 | 446 | 433 | 417 | 351 | 297 | 265 | 148 | 117 | 123 | 97 | 48 | | | | | | | | | | | |
| Texas City, Tex. 29°22.7'N., 94°53.2'W. | 615 | 600 | 564 | 503 | 474 | 451 | 408 | 396 | 379 | 313 | 260 | 227 | 110 | 80 | 85 | 59 | 10 | 48 | | | | | | | | | | |
| Freeport, Tex. 28°56.3'N., 95°20.4'W. | 651 | 636 | 600 | 539 | 510 | 487 | 444 | 431 | 415 | 349 | 295 | 263 | 146 | 115 | 121 | 95 | 40 | 84 | 44 | | | | | | | | | |
| Port O'Connor, Tex. 28°26.5'N., 96°24.4'W. | 717 | 703 | 666 | 605 | 576 | 553 | 510 | 498 | 481 | 415 | 362 | 329 | 212 | 182 | 187 | 161 | 106 | 150 | 111 | 70 | | | | | | | | |
| Rockport, Tex. 28°01.1'N., 97°02.9'W. | 762 | 748 | 712 | 650 | 621 | 598 | 556 | 543 | 526 | 460 | 407 | 374 | 257 | 227 | 232 | 206 | 151 | 195 | 156 | 115 | 45 | | | | | | | |
| Aransas Pass, Tex. 27°53.9'N., 97°08.0'W. | 769 | 754 | 718 | 656 | 627 | 605 | 562 | 549 | 533 | 466 | 413 | 380 | 264 | 233 | 238 | 212 | 158 | 202 | 162 | 122 | 52 | 9 | | | | | | |
| La Quinta, Tex. 27°52.6'N., 97°15.7'W. | 780 | 766 | 730 | 668 | 639 | 616 | 574 | 561 | 544 | 478 | 425 | 392 | 275 | 245 | 250 | 224 | 169 | 213 | 174 | 133 | 63 | 20 | 12 | | | | | |
| Corpus Christi, Tex. 27°48.8'N., 97°24.0'W. | 786 | 771 | 735 | 673 | 644 | 622 | 579 | 566 | 550 | 483 | 430 | 397 | 280 | 250 | 255 | 229 | 174 | 219 | 179 | 139 | 68 | 26 | 17 | 15 | | | | |
| Port Mansfield, Tex. 26°33.4'N., 97°25.6'W. | 856 | 841 | 805 | 743 | 714 | 692 | 649 | 636 | 620 | 553 | 500 | 467 | 351 | 320 | 326 | 300 | 244 | 289 | 249 | 209 | 138 | 96 | 87 | 85 | 89 | | | |
| Port Isabel, Tex. 26°03.6'N., 97°12.8'W. | 887 | 872 | 836 | 775 | 746 | 723 | 680 | 668 | 651 | 585 | 532 | 499 | 382 | 352 | 357 | 331 | 276 | 320 | 281 | 240 | 170 | 127 | 118 | 116 | 120 | 33 | | |
| Port Brownsville, Tex. 25°57.1'N., 97°24.0'W. | 900 | 885 | 849 | 788 | 758 | 736 | 693 | 680 | 664 | 598 | 544 | 512 | 395 | 364 | 370 | 344 | 289 | 333 | 294 | 253 | 183 | 140 | 131 | 129 | 133 | 46 | 13 | |

## PUERTO RICO AND VIRGIN ISLANDS DISTANCES

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: San Juan, Puerto Rico, is 80 nautical miles from Charlotte Amalie, St. Thomas.

| | San Juan, P. R. 18°27.6'N., 66°06.6'W. | Fajardo, P. R. 18°20.2'N., 65°37.8'W. | Ensenada Honda, P. R. 18°13.8'N., 65°37.4'W. | Humacao, P. R. 18°09.9'N., 65°44.6'W. | Bahia de Jobos, P. R. 17°57.0'N., 66°13.3'W. | Ponce, P. R. 17°58.2'N., 66°37.3'W. | Bahia de Tallaboa, P. R. 17°58.9'N., 66°44.6'W. | Bahia de Guayanilla, P. R. 17°59.5'N., 66°46.4'W. | Bahia de Guanica, P. R. 17°57.5'N., 66°54.5'W. | Mayaguez, P. R. 18°13.2'N., 67°09.7'W. | Bahia de Aguadilla, P. R. 18°26.0'N., 67°09.6'W. | Puerto Arecibo, P. R. 18°28.9'N., 66°42.1'W. | Ensenada Honda, Culebra 18°18.0'N., 65°17.0'W. | Isabel Segunda, Vieques 18°09.2'N., 65°26.7'W. | Charlotte Amalie, St. Thomas, V.I. 18°20.0'N., 64°55.5'W. | Cruz Bay, St. John, V.I. 18°20.0'N., 64°47.8'W. | Road Town, Tortola, B.V.I. 18°25.3'N., 64°37.1'W. | Christiansted, St. Croix, V.I. 17°45.0'N., 64°42.0'W. | Frederiksted, St. Croix, V.I. 17°42.9'N., 64°53.4'W. | Krause Lagoon, St. Croix, V.I. 17°42.5'N., 64°46.3'W. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | | | | | | | | | | | | | | | | | | | | |
| 52 | 14 | | | | | | | | | | | | | | | | | | | |
| 59 | 21 | 11 | | | | | | | | | | | | | | | | | | |
| 103 | 65 | 56 | 48 | | | | | | | | | | | | | | | | | |
| 152* | 83 | 74 | 65 | 31 | | | | | | | | | | | | | | | | |
| 145* | 88 | 79 | 71 | 36 | 13 | | | | | | | | | | | | | | | |
| 145* | 89 | 80 | 72 | 37 | 14 | 5 | | | | | | | | | | | | | | |
| 138* | 99 | 90 | 82 | 47 | 22 | 16 | 15 | | | | | | | | | | | | | |
| 92 | 121 | 133 | 131 | 96 | 74 | 67 | 67 | 60 | | | | | | | | | | | | |
| 74 | 103 | 115 | 123 | 105 | 83 | 76 | 77 | 70 | 23 | | | | | | | | | | | |
| 43 | 72 | 84 | 92 | 140 | 118 | 112 | 112 | 105 | 58 | 40 | | | | | | | | | | |
| 59 | 25 | 25 | 31 | 76 | 93 | 98 | 99 | 109 | 141 | 123 | 92 | | | | | | | | | |
| 55 | 18 | 12 | 17 | 62 | 79 | 85 | 86 | 96 | 136 | 118 | 87 | 15 | | | | | | | | |
| 80 | 46 | 44 | 50 | 93 | 110 | 116 | 117 | 126 | 161 | 144 | 112 | 24 | 33 | | | | | | | |
| 82 | 53 | 51 | 57 | 99 | 116 | 121 | 122 | 132 | 164 | 146 | 115 | 31 | 40 | 11 | | | | | | |
| 94 | 66 | 65 | 71 | 113 | 131 | 136 | 137 | 147 | 175 | 157 | 126 | 47 | 55 | 24 | 15 | | | | | |
| 103 | 68 | 69 | 68 | 101 | 119 | 124 | 125 | 135 | 184 | 166 | 135 | 48 | 54 | 38 | 37 | 42 | | | | |
| 96 | 61 | 60 | 58 | 89 | 106 | 111 | 112 | 122 | 171 | 159 | 128 | 42 | 46 | 38 | 39 | 46 | 19 | | | |
| 112 | 77 | 72 | 70 | 101 | 117 | 122 | 123 | 133 | 182 | 176 | 144 | 59 | 62 | 54 | 55 | 62 | 35 | 18 | | |

* Via Mona Passage
Limetree Bay, St. Croix, V.I., 1 mi. E of Krause Lagoon

# 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 equals 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 |
|---|---|---|---|---|---|---|---|
| 0 00 | N | 90 00 | E | 180 00 | S | 270 00 | W |
| 2 49 | | 92 49 | | 182 49 | | 272 49 | |
| 5 38 | N ½ E | 95 38 | E ½ S | 185 38 | S ½ W | 275 38 | W ½ N |
| 8 26 | | 98 26 | | 188 26 | | 278 26 | |
| 11 15 | N x E | 101 15 | E x S | 191 15 | S x W | 281 15 | W x N |
| 14 04 | | 104 04 | | 194 04 | | 284 04 | |
| 16 53 | N x E ½ E | 106 53 | ESE ½ E | 196 53 | S x W ½ W | 286 53 | WNW ½ W |
| 19 41 | | 109 41 | | 199 41 | | 289 41 | |
| 22 30 | NNE | 112 30 | ESE | 202 30 | SSW | 292 30 | WNW |
| 25 19 | | 115 19 | | 205 19 | | 295 19 | |
| 28 08 | NNE ½ E | 118 08 | SE x E ½ E | 208 08 | SSW ½ W | 298 08 | NW x W ½ W |
| 30 56 | | 120 56 | | 210 56 | | 300 56 | |
| 33 45 | NE x N | 123 45 | SE x E | 213 45 | SW x S | 303 45 | NW x W |
| 36 34 | | 126 34 | | 216 34 | | 306 34 | |
| 39 23 | NE ½ N | 129 23 | SE ½ E | 219 23 | SW ½ S | 309 23 | NW ½ W |
| 42 11 | | 132 11 | | 222 11 | | 312 11 | |
| 45 00 | NE | 135 00 | SE | 225 00 | SW | 315 00 | NW |
| 47 49 | | 137 49 | | 227 49 | | 317 49 | |
| 50 38 | NE ½ E | 140 38 | SE ½ S | 230 38 | SW ½ W | 320 38 | NW ½ N |
| 53 26 | | 143 26 | | 233 26 | | 323 26 | |
| 56 15 | NE x E | 146 15 | SE x S | 236 15 | SW x W | 326 15 | NW x N |
| 59 04 | | 149 04 | | 239 04 | | 329 04 | |
| 61 53 | NE x E ½ E | 151 53 | SSE ½ E | 241 53 | SW x W ½ W | 331 53 | NNW ½ W |
| 64 41 | | 154 41 | | 244 41 | | 334 41 | |
| 67 30 | ENE | 157 30 | SSE | 247 30 | WSW | 337 30 | NNW |
| 70 19 | | 160 19 | | 250 19 | | 340 19 | |
| 73 08 | ENE ½ E | 163 08 | S x E ½ E | 253 08 | WSW ½ W | 343 08 | N x W ½ W |
| 75 56 | | 165 56 | | 255 56 | | 345 56 | |
| 78 45 | E x N | 168 45 | S x E | 258 45 | W x S | 348 45 | N x W |
| 81 34 | | 171 34 | | 261 34 | | 351 34 | |
| 84 23 | E ½ N | 174 23 | S ½ E | 264 23 | W ½ S | 354 23 | N ½ W |
| 87 11 | | 177 11 | | 267 11 | | 357 11 | |

# CONVERSION TABLE FOR NAUTICAL AND STATUTE MILES

1 nautical mile=6,076.11549 . . . feet

1 statute mile=5,280 feet

| Nautical miles to statute miles | | | | Statute miles to nautical miles | | | |
|---|---|---|---|---|---|---|---|
| Nautical miles | Statute miles | Nautical miles | Statute miles | Statute miles | Nautical miles | Statute miles | Nautical miles |
| 1 | 1. 151 | 51 | 58. 690 | 1 | 0. 869 | 51 | 44. 318 |
| 2 | 2. 302 | 52 | 59. 840 | 2 | 1. 738 | 52 | 45 187 |
| 3 | 3. 452 | 53 | 60. 991 | 3 | 2. 607 | 53 | 46. 056 |
| 4 | 4. 603 | 54 | 62. 142 | 4 | 3. 476 | 54 | 46 925 |
| 5 | 5. 754 | 55 | 63. 293 | 5 | 4. 345 | 55 | 47. 794 |
| 6 | 6. 905 | 56 | 64. 444 | 6 | 5. 214 | 56 | 48 663 |
| 7 | 8. 055 | 57 | 65. 594 | 7 | 6. 083 | 57 | 49. 532 |
| 8 | 9. 206 | 58 | 66. 745 | 8 | 6. 952 | 58 | 50 401 |
| 9 | 10. 357 | 59 | 67. 896 | 9 | 7. 821 | 59 | 51. 270 |
| 10 | 11. 508 | 60 | 69. 047 | 10 | 8. 690 | 60 | 52. 139 |
| 11 | 12. 659 | 61 | 70. 197 | 11 | 9. 559 | 61 | 53. 008 |
| 12 | 13. 809 | 62 | 71. 348 | 12 | 10. 428 | 62 | 53. 877 |
| 13 | 14. 960 | 63 | 72. 499 | 13 | 11. 297 | 63 | 54. 746 |
| 14 | 16. 111 | 64 | 73. 650 | 14 | 12. 166 | 64 | 55. 615 |
| 15 | 17. 262 | 65 | 74. 801 | 15 | 13. 035 | 65 | 56. 484 |
| 16 | 18. 412 | 66 | 75. 951 | 16 | 13. 904 | 66 | 57 353 |
| 17 | 19. 563 | 67 | 77. 102 | 17 | 14. 773 | 67 | 58. 222 |
| 18 | 20. 714 | 68 | 78. 253 | 18 | 15. 642 | 68 | 59. 091 |
| 19 | 21. 865 | 69 | 79. 404 | 19 | 16. 511 | 69 | 59. 959 |
| 20 | 23. 016 | 70 | 80. 554 | 20 | 17. 380 | 70 | 60. 828 |
| 21 | 24. 166 | 71 | 81. 705 | 21 | 18. 249 | 71 | 61. 697 |
| 22 | 25. 317 | 72 | 82. 856 | 22 | 19. 118 | 72 | 62. 566 |
| 23 | 26. 468 | 73 | 84. 007 | 23 | 19. 986 | 73 | 63. 435 |
| 24 | 27. 619 | 74 | 85. 158 | 24 | 20. 855 | 74 | 64. 304 |
| 25 | 28. 769 | 75 | 86. 308 | 25 | 21. 724 | 75 | 65. 173 |
| 26 | 29. 920 | 76 | 87. 459 | 26 | 22. 593 | 76 | 66. 042 |
| 27 | 31. 071 | 77 | 88. 610 | 27 | 23. 462 | 77 | 66. 911 |
| 28 | 32. 222 | 78 | 89. 761 | 28 | 24. 331 | 78 | 67. 780 |
| 29 | 33. 373 | 79 | 90. 911 | 29 | 25. 200 | 79 | 68. 649 |
| 30 | 34. 523 | 80 | 92. 062 | 30 | 26. 069 | 80 | 69. 518 |
| 31 | 35. 674 | 81 | 93. 213 | 31 | 26. 938 | 81 | 70. 387 |
| 32 | 36. 825 | 82 | 94. 364 | 32 | 27. 807 | 82 | 71. 256 |
| 33 | 37. 976 | 83 | 95. 515 | 33 | 28. 676 | 83 | 72. 125 |
| 34 | 39. 126 | 84 | 96. 665 | 34 | 29. 545 | 84 | 72. 994 |
| 35 | 40. 277 | 85 | 97. 816 | 35 | 30. 414 | 85 | 73. 863 |
| 36 | 41. 428 | 86 | 98. 967 | 36 | 31. 283 | 86 | 74. 732 |
| 37 | 42. 579 | 87 | 100. 118 | 37 | 32. 152 | 87 | 75. 601 |
| 38 | 43. 730 | 88 | 101. 268 | 38 | 33. 021 | 88 | 76. 470 |
| 39 | 44. 880 | 89 | 102. 419 | 39 | 33. 890 | 89 | 77. 339 |
| 40 | 46. 031 | 90 | 103. 570 | 40 | 34. 759 | 90 | 78. 208 |
| 41 | 47. 182 | 91 | 104. 721 | 41 | 35. 628 | 91 | 79. 077 |
| 42 | 48. 333 | 92 | 105. 871 | 42 | 36. 497 | 92 | 79. 946 |
| 43 | 49. 483 | 93 | 107. 022 | 43 | 37. 366 | 93 | 80. 815 |
| 44 | 50. 634 | 94 | 108. 173 | 44 | 38. 235 | 94 | 81. 684 |
| 45 | 51. 785 | 95 | 109. 324 | 45 | 39. 104 | 95 | 82. 553 |
| 46 | 52. 936 | 96 | 110. 475 | 46 | 39. 973 | 96 | 83. 422 |
| 47 | 54. 087 | 97 | 111. 625 | 47 | 40. 842 | 97 | 84. 291 |
| 48 | 55. 237 | 98 | 112. 776 | 48 | 41. 711 | 98 | 85. 160 |
| 49 | 56. 388 | 99 | 113. 927 | 49 | 42. 580 | 99 | 86. 029 |
| 50 | 57. 539 | 100 | 115. 078 | 50 | 43. 449 | 100 | 86. 898 |

To convert Nautical miles to Statute miles, multiply Nautical miles by 1.15.
To convert Statute miles to Nautical miles, multiply Statute miles by 0.87.

# 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 | 11-3 | 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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NOAA FORM 77-6
(10-72)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

# COAST PILOT REPORT

**PLEASE MAIL TO:**

Director
National Ocean Survey
National Oceanic and Atmospheric Administration
ATTENTION: C324
Rockville, Maryland 20852

This record of your experience and observations when coasting, entering port, and/or following inside channels will be used to correct, amplify, or confirm the description now given in the Coast Pilot.

Please use additional sheets if more space is needed.

Additional report forms will be provided upon receipt of each report.

| GEOGRAPHIC LOCATION | | | |
|---|---|---|---|
| LATITUDE | LONGITUDE | CHART NUMBER | COAST PILOT NUMBER |
| VESSEL | | MASTER/COMMANDING OFFICER | |
| DATE OF OBSERVATION | | OBSERVER | |

**I. LANDMARKS:** Mention those visible from seaward and useful for navigation (day and/or night); include natural ranges and indicate the pair of marks forming a range. Photographs of landmarks difficult to describe are solicited; each view should be labeled with the distance off and the direction towards which the camera was pointed.

| TYPE | CHARTED | | LATITUDE | LONGITUDE | DESCRIPTIVE INFORMATION HELPFUL IN IDENTIFICATION |
|---|---|---|---|---|---|
| | YES | NO | *(Approximate)* | | |
| | | | | | |
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| | | | | | |
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**II. RADAR:** List best radar targets and, if known, give maximum useful radar range at which the object can be positively identified and used. Mention under remarks places you have observed radar returns to be misleading.

| NAME OR TYPE OF FEATURE *(Include approximate latitude and longitude if necessary to identify on chart)* | MAXIMUM USEFUL RANGE |
|---|---|
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**III. ROUTES:** Where entrance and inside routes are not marked by aids to navigation, show recommended directions for Coast Pilot (latitude and longitude of entrance point, and distances and true courses made good); include natural steering ranges if available.

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**IV. DANGERS:** Mention those of concern to the navigator where special caution should be indicated in the Coast Pilot.

**V. CURRENTS:** Indicate places you have experienced conditions of current where special caution should be mentioned in the Coast Pilot.

**VI. ANCHORAGES:** Mention best anchorage in the area and other secure anchorages having good holding ground.

LOCATION *(Include anchorage bearings and natural ranges if available)*

TYPE OF BOTTOM OBSERVED:

| | EXCEL | GOOD | FAIR | POOR | COMMENT |
|---|---|---|---|---|---|
| HOLDING QUALITY | | | | | |
| PROTECTION OFFERED | | | | | |
| ACCESSABILITY | | | | | |

RECOMMENDED FOR VESSELS:

| LENGTH | DRAFT |
|---|---|
| ____ TO ____ FT. | ____ TO ____ FT. |

**VII. REMARKS:**

**VIII. OTHER COAST PILOT CHANGES**

U.S. COAST PILOT

| NUMBER | EDITION | PAGE | LINE(S) |
|---|---|---|---|
| | | | |

**NOTE:** Any chart(s) submitted with your report to show conditions will be replaced free of charge.

READ: STRIKE OUT: INSERT AFTER: *(Circle one)*