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United States Coast Pilot 5
ATLANTIC COAST
Gulf of Mexico, Puerto Rico, and Virgin Islands
Sixth (April 29, 1967) Edition

Corrected through NM-17/67

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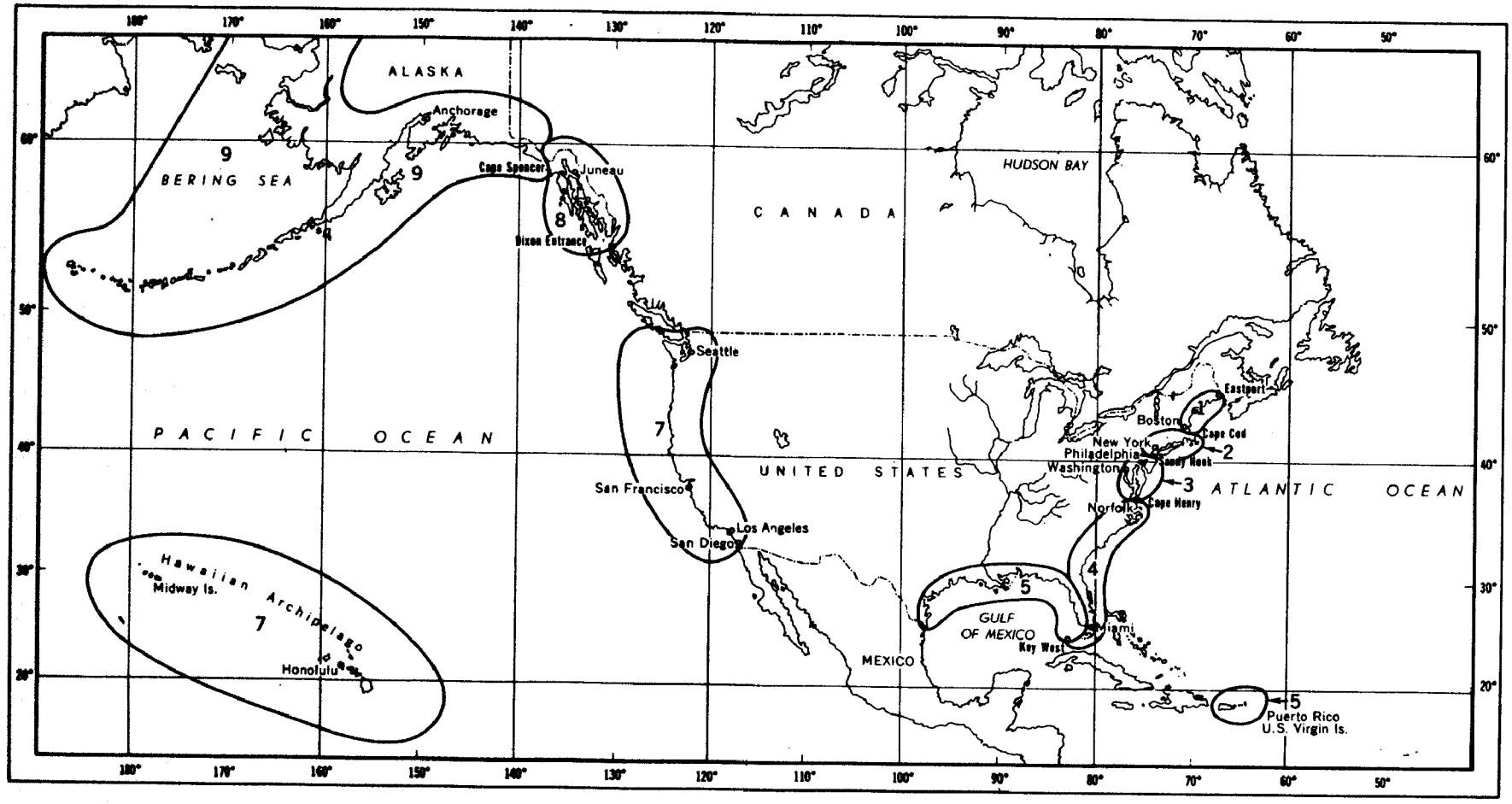
LIMITS OF UNITED STATES COAST PILOTS

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



Preface

United States Coast Pilot 5, Atlantic Coast—Gulf of Mexico, Puerto Rico, and Virgin Islands, Sixth (April 29, 1967) Edition, is based upon the work of the Coast and Geodetic Survey and includes the January–April 1965 field observations of Marine Information Specialist John A. O'Pray for the Gulf of Mexico and the January–March 1965 field observations of Marine Information Specialist Salvatore Bente for Puerto Rico and the Virgin Islands.

Area information also was obtained from the U.S. Coast Guard, the U.S. Army Engineers, local port authorities, and others. The preceding Fifth (1962) Edition is canceled.

Cumulative Supplements, containing revisions and new information reported since edition date of Coast Pilot, usually are issued early each year. Free copies of Supplements may be obtained by completing the coupons in the back of this book and mailing them to the Coast and Geodetic Survey.

All persons using the Coast Pilots are invited to send information or suggestions for increasing their usefulness to the Director, Coast and Geodetic Survey, Environmental Science Services Administration, Rockville, Maryland 20852.

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1. GENERAL INFORMATION

UNITED STATES COAST PILOTS.—The C&GS 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. A new edition of each Coast Pilot is published at intervals ranging from 4 to 10 years. Cumulative **Supplements,** containing changes reported since dates of editions, are published early each year and are distributed free.

Notice to Mariners.—Important matters affecting navigational safety are published in Notice to Mariners and urgent items are also broadcast by radio; see appendix. Notices provide information which the mariner should use to update the latest editions of charts, Coast Pilots, and other marine publications.

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

Bridges and cables.—Clearances of bridges and overhead cables are in feet above normal high water unless otherwise stated; clearances of drawbridges are for the closed position. They may be as-built, authorized, or reported, and are so identified on the charts. Also see charts for horizontal clearances of bridges; these are repeated in the Coast Pilots only when they are less than 50 feet and then only in terms of channel width or length of span.

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

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

Dept units.—Depths are in feet or fathoms below the low-water tidal datum of the charts unless otherwise stated.

Distances.—These are in nautical miles unless otherwise stated. A nautical mile is 1 minute of latitude, or approximately 2,000 yards, and is about 1.15 statute miles.

Elevations.—These are in feet above the plane of reference used for that purpose on the charts.

Light and fog-signal characteristics.—These are not described, and light sectors are seldom defined. See Coast Guard Light Lists.

Radio navigational aids.—These are seldom described. See Coast Guard Light Lists.

Ranges.—These are not fully described. **"A 339° range"** means that rear range structure bears 339° from front structure. See Coast Guard Light Lists.

Winds.—Directions are the true directions from which the winds blow. Velocities are in knots, which are nautical miles per hour.

The **COAST AND GEODETIC SURVEY** is required to provide charts and related information for the safe navigation of marine and air commerce, and to provide basic data for engineering and scientific purposes and for other commercial and industrial needs.

Field offices of the Coast and Geodetic Survey are located at some of the principal ports in the United States; see appendix. Files of charts, Coast Pilots, and other publications are maintained at these offices for the use of mariners who are invited to avail themselves of the facilities afforded.

Sales agents for Charts, Coast Pilots, Tide Tables, Tidal Current Tables, and Tidal Current Charts of the Coast and Geodetic Survey are located in many ports of the United States and in some foreign ports. Orders mailed to C&GS headquarters should be accompanied by check or money order, made payable to C&GS, Department of Commerce.

Special signals for surveying vessels.—Pilot Rules for Inland Waters, § 80.33, state that by day a surveying vessel of the Coast and Geodetic Survey, 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 Coast and Geodetic Survey 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 Coast and Geodetic Survey, underway and employed in hydrographic surveying, shall carry the regular lights prescribed by the rules of the road.

(d) A vessel of the Coast and Geodetic Survey, 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 Coast and Geodetic Survey 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.

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 Coast and Geodetic Survey basic field surveys, supplemented by data from other Government organizations.

Accuracy of a Nautical Chart.—The value of a C&GS 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 Coast and Geodetic Survey Headquarters. The chart represents 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.

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 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. Coast and Geodetic Survey 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, 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.

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. Up-to-date charts should be obtained at regular intervals.

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.—Most of the various types of echo sounder are calibrated for a velocity of sound in water of 800 fathoms per second, but the actual velocity may differ from the calibrated value 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. Variation in the line voltage can also cause errors of 10 percent or more in reading. Echoes can be obtained from schools of fish; in fact, trawlers are using the sounders for that purpose. The most serious error commonly occurs where the depth is greater than the scale range of the instrument; a 400-fathom scale indicates 15 fathoms visually and graphically when the depth is 415 fathoms. Where possible, wide variations from charted depths should be checked by wire soundings.

The **plane of reference** for depths on C&GS 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.

Compass roses on charts.—The annual change in variation gradually introduces an error in the magnetic compass roses on charts. The compass roses are replotted for every new edition of the chart if the error is appreciable; and the amount and date of the variation and the amount of annual change are stated for each compass rose. On some of the sailing and general charts the magnetic variation is shown by isogonic lines.

Deviation of the compass.—The magnetic effect of the ship itself combines with any instrumental error of the compass to cause the deviation, which varies with the heading of the ship and with the magnetic latitude. It is customary to counteract the deviation as far as possible with soft iron and permanent magnets, suitably placed in or on the binnacle.

Local magnetic disturbance.—The charts show areas where the compass is disturbed by magnetic masses external to the ship. Such disturbances are fairly common in shallow waters but are never encountered over oceanic depths. Magnetic force diminishes so rapidly with distance that a magnetic center on land would have to be of unprecedented intensity to affect the compass of a vessel 0.5 mile from shore.

Overhead cables are shown on the charts and described in the Coast Pilots; the clearances given are for the lowest wires at normal high water unless otherwise stated. Vessels with masts, stacks, booms, or aerials should allow sufficient clearance under power cables to avoid arcing.

Submarine cable areas are shown on the charts but are not described in the Coast Pilots. Special effort should be made to avoid anchoring or trawling in cable areas. If a vessel does foul a cable, extreme care should be used when attempting to clear. Should normal methods fail, the anchor or other gear should be slipped and abandoned rather than risk breaking or cutting the cable. The high voltages in certain cables could cause severe burn or loss of life.

Tide Tables are issued annually by the Coast and Geodetic Survey 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 for 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, land-locked 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 the Coast and Geodetic Survey 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 the Coast and Geodetic Survey 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.

The **COAST GUARD** has among its duties the enforcement of the laws of the United States on the high seas and in coastal and inland waters of the U.S. and its possessions; enforcement of navigation and neutrality laws and regulations; administration of the Oil Pollution Act of 1961; 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 ice breaking facilities.

Protection of navigable waters.—United States 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 log rafts 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. It is unlawful, except in emergency or by special permit, to discharge oil into coastal navigable waters from any vessel.

Light Lists.—Aids to navigation, consisting of lights, fog signals, buoys, lightships, daybeacons, and electronic aids, are described in the Light Lists, which 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.

Local Notices to Mariners.—Changes and deficiencies in aids to navigation maintained by or under the authority of the Coast Guard are published in Local Notices to Mariners issued by the District Commander of the area in which the aids are located.

Marine Broadcast Notices to Mariners are made by the Coast Guard through Coast Guard, Navy and some commercial radio stations to report deficiencies and changes in aids to navigation of importance; see appendix.

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 kc. 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 shown on the charts. The distances 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.

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. 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.

Arcs drawn on charts around a light show the bearings between which the variation of visibility or obscuration occurs and do not indicate the distance at which it can be seen. On some bearings the distance may be reduced or increased by land or other obstructions, depending on the distance from the light.

Lights should not be passed close aboard because in many cases rip-rap mounds are maintained to protect the structures against ice damage and scouring action.

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 with or without the effects of wind and, 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, and offshore light stations.—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 that 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, or stations on submarine sites on radio bearings, the risk of collision will be avoided by insuring that the radio bearing does not remain constant.

It should be borne in mind that most lightships 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 "PC" signifying "Lightship is not at anchor on her station".

Watch buoys are sometimes moored near lightships to mark the approximate station should the lightship be carried away or temporarily removed and to give the crew an indication of dragging. Since these buoys are always unlighted and, in some cases, moored as much as a mile from the lightship, the danger of a closely passing vessel colliding with them is always present—particularly so during darkness or periods of reduced visibility.

Buoys.—The navigator should check the position by shore bearings, soundings, or other means, and not rely entirely on a buoy being on its charted position and showing its proper characteristic. Buoys are liable to be carried away, shifted, capsized, or sunk as a result of storms, ice conditions, collision, or other accident. Lighted buoys may become extinguished or show improper characteristics, or sound buoys may not function because of storm, ice, or collision.

Buoys may not always properly mark shoals or other obstructions due to shifting shoals and storms. 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 because of local conditions, and since sunken wrecks are not always static, extreme caution should be exercised when operating in the vicinity 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 list and descriptive details of all marine radiobeacons are given in the Light Lists. 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. 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 is given in the appendix for the conversion of a radio bearing into a Mercator bearing. 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 list of radiobeacons in the Light List.

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

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

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

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

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

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 Naval Oceanographic Office. The Coast and Geodetic Survey shows Loran lines on general charts of the United States 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 position 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 two 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.

Numbering and recording of undocumented vessels.—Certain undocumented vessels are required to be numbered by the Federal Boating Act of 1958, effective April 1, 1960. They may be numbered either by the Coast Guard or by a state having an approved numbering system. Owners may obtain the necessary information from any Coast Guard District Commander.

Licensing of vessels.—Navigation laws pertaining to registry, enrollment, and licensing of vessels are administered by the **United States Coast Guard.** The Coast Guard's functions also include issuing of commissions to yachts, the assignment of visual signal letters, the admeasurement of vessels, the recording of sales, conveyances, and mortgages of and liens on documented vessels; the protection of steerage passengers, and the remission of fines, penalties, and forfeitures incurred under the laws governing these matters. Coast Guard districts and ports of documentation located within the area covered by this Coast Pilot are tabulated in the appendix.

Functions of the **Bureau of Customs** include the administration of tonnage duties and the collection of tolls, the regulation of vessels in the coasting and fishing trade, and limitation of the use of foreign vessels in waters under the jurisdiction of the United States.

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.

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 2 or 3 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 similarly 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 (1 prolonged blast followed by 2 short blasts).

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 under way (46 CFR 78.27-1(a)). The International Code Signal "ZO" 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 (46 CFR 78.23-1(a)).

Search and rescue operations.—The Coast Guard coordinates search and rescue operations in the cases of surface vessels or aircraft that are in distress or overdue. Search and rescue planes have special markings consisting of a wide band of fluorscent red orange around the after part of the fuselage or hull. The cooperation of vessel operators with search and rescue planes may mean the difference between life and death for some seaman or aviator.

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.

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.

Note.—The above procedures are taken from the Convention on International Civil Aviation.

Merchant vessel procedures for assisting an aircraft that must ditch.—The following are recommended procedures for assisting an aircraft that desires to ditch alongside:

By day: 1. Establish a radiotelephone watch on 2182 kc if equipped. Attempt to contact the aircraft on this frequency.

2. Maintain a radiotelegraphy watch on 500 kc. The Rescue Coordination Center controlling the case will try to contact the ship on this frequency via a shore radio station. Communications with the aircraft may have to be relayed in this manner.

3. Be prepared to send homing signals for the aircraft on 410 kc or 522 kc.

4. Provide black smoke if possible to aid aircraft in sighting the ship.

5. Post extra lookouts.

6. Prepare to stop vessel or proceed towards plane according to circumstances.

7. Have two lifeboats and lifeboat crews ready. Include in each lifeboat two ring buoys with buoyant heaving lines, and fire extinguishers.

8. Have medicine chest, stretchers, blankets, hot drinks and food ready.

9. Have ship's hospital prepared to receive injured persons.

10. Rig Jacobs ladders. Rig cargo net or rope mail sling on lee side amidships by cargo boom, to be used if necessary to heave up exhausted survivors. Injured persons should be left in the lifeboat to be hoisted aboard with it.

11. Be prepared to give aircraft information on weather and sea conditions. Aircraft will want to know wind direction and force; direction, height, and length of primary and secondary swell systems. If pilot selects ditch heading in sufficient time and conditions otherwise permit, lay foam path along ditching course.

12. When aircraft is in sight set course parallel to ditch heading that pilot has chosen. If not in communication with the aircraft by the time the plane is sighted and unable to obtain pilot's ditch heading, set course parallel to the main swell system and into the wind component, if any.

13. If on board, use a liferaft or buoyant apparatus in water as a landing platform at the Jacobs ladder.

14. Instruct coxswains to recover those survivors in the water or clinging to wreckage before recovering those in liferafts.

15. Keep the Rescue Coordination Center advised by radio, prior to, and subsequent to ditching.

By night.—In addition to procedures recommended for daytime, the following are also recommended if the emergency occurs at night:

1. Lay a string of not less than 6 ring buoys with water lights approximately 500 feet apart in a single line along the ditch heading received from the pilot. Take station two-thirds down the lighted lane off to one side. The

aircraft will attempt to land close to the lighted lane. Do not use carbide water lights because of the danger of gasoline on the water.

2. Light up the ship with all fixed deck lights and rig cargo lights on masts, king posts, top of decks, etc., if possible.

3. Use searchlights as visual beacons, shining one vertically and sweeping the sky at 15° off the horizon with the other. Do not shine lights toward the aircraft at any time, since this would blind the pilot.

Ships in distress.—Radio-equipped vessels requiring assistance may obtain the services of the Coast Guard by transmitting a request on the international distress and calling frequency 500 kc to "Any Coast Guard Unit" (radio call NCU), or to any shore radio station addressed to "COGARD." Shore radio stations will forward to the Coast Guard all information regarding vessels requiring assistance unless such information is contained in a message specifically addressed elsewhere.

If the following information is included in the original request for assistance it will place the responsible Coast Guard officer in a position to determine immediately the types and numbers of vessels and aircraft required to render adequate aid, thus greatly facilitating the work of the Coast Guard and avoiding any unnecessary delay in the dispatching of assistance:

1. Name, type, and nationality of vessel; color, size and shape.
2. Position, course, and speed (including drift).
3. Nature of trouble and condition of vessel, sea and wind. Action taken, if any.
4. Number of persons on board.
5. State whether or not Coast Guard assistance is required.

Small craft in distress.—Under the provision of the international regulations, which permits the use of any means available to a vessel or aircraft in distress to draw attention and obtain help, small commercial and private craft equipped with radiotelegraph or radiotelephone apparatus that cannot be operated on the international distress frequency of 500 kc (600 m.) may usually obtain Coast Guard assistance by transmitting the distress signal or call and the message on the 2182 kc frequency.

Submarine emergency identification signals.—The following flare signals, fired from a submerged signal ejector to 300 feet in the air, are made by United States submarines when in emergency:

Green or black indicates torpedo has been fired; will be used to stimulate torpedo firing on special exercises such as convoy exercises.

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. Naval 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 Naval authorities.

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

The **CORPS OF ENGINEERS,** U.S. Army, 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.

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.

Restricted areas in most places are defined and regulations governing them are established by the Corps of Engineers. The regulations are enforced by the U.S. Coast Guard, and the areas are shown on the large-scale charts of the Coast and Geodetic Survey. Copies of the regulations may be obtained at the District offices of the Corps of Engineers. The regulations also are copied into 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 safety of navigation.

Fish havens.—These are artificial fishing reefs established in United States coastal waters to simulate the legitimate reefs and wrecks that attract fish. The Corps of Engineers issues permits to various interests, usually sport fishermen, to dump assorted junk ranging from old trolley cars to scrap building material in specified areas which may be of very small extent or may stretch many miles along a depth contour; old automobile bodies appear to be the favorite material of the reef builders. These underwater junk piles may rise only a few feet or as much as 10 feet (according to permit) above natural bottom, but the reef-builder's adherence to permit specifi-

cations can only be checked with a wire drag. Navigators should be cautious about passing over these artificial obstructions or anchoring in their vicinity.

WEATHER BUREAU.—Forecasts and warnings of the approach of storms over land and ocean areas are among the services of the Weather Bureau 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, for summarization and publication of climatological data having general value and applicability, and for research basic to improvement of the national weather service.

Weather Bureau 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 Weather Bureau barometers and discuss weather information with bureau officials, are listed in the appendix. By international agreement, the Weather Bureau also shares in the operation of certain weather ships in the North Atlantic and North Pacific Oceans.

Marine meteorological service.—The collection of observations from ships at sea is conducted on a purely voluntary and cooperative basis. The Weather Bureau supplies shipmasters with blank forms, printed instructions, and such other materials as is 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. Storm warnings are prepared at regular district forecast centers and at special hurricane forecast centers. The warnings are distributed to the public through all neighboring Weather Bureau offices by radio, the press, and every other available means. During the West Indian hurricane season, June to November, inclusive, teletype circuits expedite the exchange of reports from the Atlantic and Gulf coasts; special reports are obtained from weather reconnaissance planes which fly near the storms and sometime into the storm centers.

Hurricane watch.—An announcement is issued by the Weather Bureau 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.

Storm warning displays.—The Weather Bureau employs the following system for displaying warning signals at stations along the United States coast, except Alaska, but including the Great Lakes and Puerto Rico, when winds dangerous to navigation are forecast.

Small-craft warning: One red pennant displayed by day and a red light above a white light at night to indicate that winds up to 33 knots and/or sea conditions dangerous to small craft operations are forecast for the area.

Gale warning: Two red pennants displayed by day and a white light above a red light at night to indicate that winds ranging from 34 to 47 knots are forecast for the area.

Whole gale warning: A single square red flag with black center displayed by day and two red lights at night to indicate that winds ranging from 48 to 63 knots are forecast for the area.

Hurricane warning: Two square red flags with black centers displayed by day and a white light between two red lights at night to indicate that winds of 64 knots and above are forecast for the area.

The **NAVAL OCEANOGRAPHIC OFFICE** is required to provide accurate nautical charts and related information for foreign waters. Publications include Sailing Directions (pilots), Light Lists, Table of Distances, Radio Navigational Aids, Radio Weather Aids, International Code of Signals, and the American Practical Navigator (Bowditch). The weekly Notice to Mariners, a joint arrangement with the Coast Guard and the Coast and Geodetic Survey, contains corrections to charts and publications for both foreign and domestic waters; see appendix for coverage.

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 are given in the appendix.

The **PUBLIC HEALTH SERVICE** administers hospitalization and outpatient treatment to legal beneficiaries of the Government; it also administers foreign and domestic quarantine laws and conducts medical examinations of aliens.

Quarantine.—A vessel arriving at a port under the control of the United States shall undergo quarantine inspec-

tion prior to entry unless exempted from such inspection by section 71.46 or 71.47 of Foreign Quarantine Regulations (42 CFR Part 71), and Supplemental Provisions, of the Public Health Service, Department of Health, Education, and Welfare.

Vessels subject to quarantine inspection shall upon arrival at ports under the control of the United States fly a yellow flag, and await inspection, as provided in section 71.62 of Foreign Quarantine Regulations. Only the pilot shall board or be permitted to board any vessel subject to quarantine inspection until after it has been inspected by the quarantine officer and granted pratique, except with the permission of the quarantine officer. A person boarding such vessel shall be subject to the same restrictions as those imposed on the persons on the vessel. No person shall leave or be permitted to leave any vessel subject to quarantine inspection until after it has been inspected by the quarantine officer and granted pratique, except with the permission of the quarantine officer.

Sanitary inspection.—Vessels arriving at a port under the control of the United States from a foreign port shall be subject to sanitary inspection to ascertain whether there exists rodent, insect, or other vermin infestation, contaminated food or water, or other insanitary condition requiring measures for the prevention of the introduction, transmission, or spread of communicable disease.

National quarantine regulations will be found at the stations of the Public Health Service and at United States consulates and will be furnished to vessels upon application to officers of the Service or to Chief, Foreign Quarantine Program, National Communicable Disease Center, Atlanta, Georgia 30333.

Medical service.—United States merchant seamen are entitled to medical relief obtainable through the Public Health Service. A United States 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 outpatient offices of the Public Health Service are located at the addresses given in the appendix. Free medical advice is furnished to seamen by radio.

RADIO.—The Federal Communications Commission controls 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 United States ports. 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.

Marine weather broadcasts.—Information on weather over North Atlantic and North Pacific waters is issued by the Weather Bureau for broadcast by commercial and Government radio stations. Marine bulletins for the western North Atlantic are broadcast by Navy station NSS, Washington, D.C.; those for the eastern North Pacific are transmitted by KPH, Bolinas, Calif., and KFS, San Francisco, Calif. A separate bulletin for Central Pacific waters is broadcast by KHK, Kahuku, Hawaii. The marine bulletins include storm advisories, forecasts, and coded weather-map analyses and reports. Station frequencies broadcast times and areas affected are stated in the radio publications; see appendix.

Advisories and forecasts also are broadcast by Navy stations NBA, Balboa, C.Z.; NPG, San Francisco, Calif.; NHB, Kodiak, Alaska; and NPM, Honolulu, Hawaii.

Local weather bulletins, containing coastal-area forecasts, storm advisories, and weather summaries for specific areas, are broadcast on regular schedules by many Government and commercial radio stations.

Emergency broadcasts by Navy radio stations.—Storm advisories and notices concerning the safety of navigation at sea are broadcast by Navy radio stations in accordance with the degree of urgency, as follows:

A. Notices of tidal waves, hurricanes, typhoons, and cyclones so imminent as to warrant immediate broadcasting: (1) One transmission immediately on receipt; (2) one transmission at the end of the first ensuing silent period; and (3) one transmission during the first ensuing on-watch period for ships with one operator, in case both previous transmissions were made during the off-watch period.

B. Storm warnings and notices of less urgency than those specified in (A) and other than those normally included in scheduled hydrographic broadcasts: (1) One transmission at the end of the first ensuing silent period; and (2) one transmission during the on-watch period for ships with one operator in case the previous transmission was made during an off-watch period.

These broadcasts are preceded by transmission of the Urgent Signal (XXX) or the Safety Signal (TTT) and a preliminary announcement on 500 kc of the message to follow on the station working frequency.

Emergency broadcasts by Coast Guard radio stations.—Storm and hurricane warnings, advisories and other urgent marine information are broadcast by Coast Guard radio stations. See appendix for details.

Radiotelephone broadcasts of weather information (United States).—Transmission by voice of weather information from the Weather Bureau is made through certain radio stations of the Coast Guard and of the commercial coastal radiotelephone service. These broadcasts are followed immediately by reports of dangerous obstructions and changes in aids to navigation.

This service gives to yachts, fishing craft, tugboats, and other vessels equipped with a radio receiving set having a band covering the frequency range of 2 to 3 megacycles, official weather information from the Weather Bureau in plain language and on regular schedules.

These radiotelephone broadcasts are made twice and, in some cases, four times daily at definite times and include marine forecasts, and storm warnings whenever they are issued, for coastal waters in or adjacent to the areas served by the radio stations.

Certain local radio stations in the standard broadcast band have microphones installed in nearby Weather Bu-

reau offices. From these stations forecasts, weather summaries, and warnings are broadcast on regular schedule. Stations in this area are listed in the annual Weather Bureau Coastal Warning Facilities Charts.

West Indies.—Coast Guard station NMR, San Juan, P.R., broadcasts twice daily by radiotelephone and radiotelegraph a weather bulletin consisting of marine forecasts and weather summary for the eastern Caribbean Sea area and small-craft, storm, and hurricane warnings when applicable. In addition, scheduled weather broadcasts covering the water around the Bahama Islands are transmitted by marine radio station in Nassau.

Mexico and Canada.—Scheduled broadcasts of weather information affecting the coasts of Mexico and Canada are made by designated stations of those countries on marine frequencies by both radiotelegraph and radiotelephone.

Reports from ships.—The master of every ship of the United States 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 the Weather Bureau in furnishing these special reports in order that warnings to shipping and coastal areas may be issued.

TIME SIGNALS.—The United States 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 beginnings of the dashes indicate 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.

The National Bureau of Standards broadcasts time signals from its radio station **WWV** at Fort Collins, Colorado, on radio frequencies of 2.5, 5, 10, 15, 20, and 25 megacycles, which are on the air at all times, day and night. This insures reliable coverage of the United States and extensive coverage of other parts of the world. The services include standard radio frequencies, time announcements, standard time intervals, standard audio frequencies, and radio-propagation disturbance-warning notices.

Time announcements.—The audio frequencies are interrupted at precisely 2 minutes before each hour. They are resumed precisely on the hour and each 5 minutes thereafter. The beginnings of the periods, when the audio frequencies are resumed, are in agreement with the basic service of the U.S. Naval Observatory, and accordingly they accurately mark the hour and successive 5-minute periods.

Greenwich Mean Time is announced in telegraphic code each 5 minutes. The zero- to 24-hour system is used. This announcement refers to the end of the announcement interval. A voice announcement of eastern standard time is given following each telegraphic code announcement.

Standard time intervals.—On each carrier frequency is a pulse which occurs at intervals of precisely 1 second. The pulse is omitted at the beginning of the last second of every minute. The 1-minute, 4-minute, and 5-minute intervals, synchronized with the second pulses, are marked by the beginning or ending of the periods when the audio frequencies are off.

A radio-propagation disturbance warning forecast is transmitted in Morse code twice each hour at 19½ and 49½ minutes past the hour. These warnings tell users of radio transmission paths over the North Atlantic, the condition of the ionosphere at the time of the announcement, and how good or bad communication conditions are expected to be for the next 12 hours. During a period of radio-propagation disturbance, direction-finder observations may be unreliable; the letters "N", "U", and "W" signify that radio propagation conditions are, respectively, normal, unsettled, or disturbed.

Radio station **WWVH,** on the island of Maui, Hawaii, broadcasts on 5, 10, and 15 megacycles. The schedule of broadcasts is the same as that of station WWV for standard time intervals, time announcements in code, standard audio frequencies, and accuracy. Simultaneous reception of WWV and WWVH does not interfere with ordinary use of the standard frequency and time signals.

The WWVH broadcast is interrupted for 4 minutes following each hour and half hour and for periods of 34 minutes each day beginning at 1900 GMT.

DESTRUCTIVE WAVES.—Unusual sudden changes in water level can be caused by seismic sea waves 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.

Seismic sea waves are set up 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.

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The speed of seismic sea waves 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 heighest 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 Coast and Geodetic Survey 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 waves.—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 seismic sea waves 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.

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 82, Boundary Lines of Inland Waters; Part 124, Control Over Movement of Vessels; Part 202, Anchorage Regulations; Part 203, Bridge Regulations; Part 204, Danger Zone Regulations; and Part 207, Navigation Regulations; and Part 209, Administrative Procedure.

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, to Miami Lighted Whistle Buoy 2; 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 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 Daybeacon 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 1; thence to Sabine Pass Lighted Whistle Buoy 1.

§ 82.106 Sabine Pass, Tex., to Galveston, Tex. A line drawn from Sabine Pass Lighted Whistle Buoy 1 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 Bell Buoy 1.

§ 82.116 Brazos River, Tex., to the Rio Grande, Tex. A line drawn from Freeport Entrance Lighted Bell Buoy 1 to point 4,350 yards, 118° true, from Matagorda Light; thence to Aransas Pass Lighted Whistle Buoy 1; thence to a position 10½ miles, 90° true, from the north end of Lopeno Island (27°00.1′ N. latitude, 97°15.5′ W. longitude); thence to Brazos Santigo 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 through Manchas Interiores Lighted Buoy 3; thence to Manchas Grandes Lighted Buoy 2; 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 Guayamilla. 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 Cabulion.

§ 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 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 re-

port 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 vesel'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.

(b) 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 shall be furnished.

§ 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 202—ANCHORAGE REGULATIONS:

§ 202.1 General. (a) The areas described in Subpart A of this part are designated as special anchorage areas pursuant to the authority contained in an act amending laws for preventing collisions of vessels approved April 22, 1940 (54 Stat. 150). Section 1 of the act amended Article 11 of the Navigation Rules for Harbors, Rivers, and Inland Waters Generally (33 U.S.C. 180), section 2 amended Rule 9 of the Navigation Rules for Great Lakes and Their Connecting and Tributary Waters (33 U.S.C. 258), and section 3 amended Rule 10 of the Navigation Rules for Red River of the North and Rivers Emptying into Gulf of Mexico and Tributaries (33 U.S.C. 319). 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 River and Harbor Act approved March 4, 1915 (38 Stat. 1053; 33 U.S.C. 471).

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

Subpart A—Special Anchorage Areas:

§ 202.75 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.

§ 202.189a 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.

§ 202.190 Tortugas Harbor, in 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.

§ 202.193 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.

(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.

§ 202.193a 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.

§ 202.194 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.

§ 202.194a 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.

§ 202.194b 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.

§ 202.195 Mississippi River below Baton Rouge, La., including South and Southwest Passes. (a) The anchorage grounds—(1) Pilottown anchorage. An area approximately 4.7 miles in length along the right descending bank or west side of the river, 800 feet wide, extending from a point directly opposite Pilottown Wingdam Light, about 1.7 miles upstream from Head of Passes, upstream to a point 1.0 mile downstream from Wilder Flats light. 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. An area approximately 2.1 miles in length along the right descending bank or southwest side of the river, 800 feet wide, extending from Cutoff Light upstream to the lower limits of the quarantine anchorage, approximately 0.7 mile downstream from the United States Quarantine Station Wharf. The area is marked by large signs, "General Anchorage," located on the right bank at the lower and upper limits. Vessels anchoring alongside of each other or in fleets are permitted, but during slack or low-water periods bow and stern anchors shall be provided.

(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. 682; 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 Engineer, U.S. Army Engineer District, New Orleans. Upon completion of the transfer of cargo, vessels shall move from this area.

(6) Temporary anchorages, Baton Rouge, New Orleans. Vessels awaiting berthing at riverside wharves between Mile 233 above Head of Passes and the upper limits of the Port of New Orleans, Mile 107 above Head of Passes, will anchor in a manner and area as prescribed by the District Engineer, U.S. Army Engineer District, New Orleans.

(7) Baton Rouge general anchorage. An area, 1,400 feet wide, between Mile 225 and Mile 226.5 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.

§ 202.196 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.

§ 202.240 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 anchor-

age 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.

§ 202.245 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 18°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.

§ 202.250 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 shoreline 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 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.

§ 202.255 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 203—BRIDGE REGULATIONS:

§ 203.1 General. Drawbridges across navigable waters of the United States will not be opened to navigation for certain periods determined to be in the interest of public safety by the proper civil defense authorities 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) notwithstanding any general or special regulations heretofore or hereafter prescribed for the operation of any such drawbridge or drawbridges.

§ 203.240 Navigable waters discharging into the Atlantic Ocean south of and including Chesapeake Bay 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 Engineer in charge of the locality the names of any vessels causing bridge openings considered to be in violation of this paragraph. The District Engineer 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 Engineer 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 Engineer, he may within 30 days after receipt of the request to perform necessary alterations appeal the decision to the District Engineer in writing. After receipt by the District Engineer, the appeal will be forwarded through channels to the Secretary of the Army. If the Secretary of the Army rules that an appurtenance is unessential to navigation, the District Engineer 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 District Engineer, 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 §§ 203.245 to 203.491, prescribed where local conditions require to govern the operation of certain bridges, supplement the general regulations contained in § 203.240.

§ 203.245 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 § 203.240 shall govern the operation 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.

(2) Orange River, Fla.; State Road Department of Florida bridge 0.9 mile above mouth and Seaboard Air Line Railway Company bridge 2.25 miles above mouth, near Fort Myers. At least 24 hours' advance notice required, except during a hurricane alert issued by the United States Weather Bureau affecting the area adjacent to Caloosahatchee and Orange Rivers when a draw tender shall be constantly on duty and the bridge opened at any time for the passage of vessels giving the usual signal.

(3) Myakka River, Fla.; railroad drawbridge near Charlotte Beach. At least 36 hours' advance notice required.

(3-a) Gasparilla Sound, Fla.: Seaboard Air Line Rail-

road 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.

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

(5) Pithlachascotee River, Fla.; State Road Department of Florida bridge 1.3 miles above mouth at New Port Richey. At least six hours' advance notice required, except during a hurricane alert issued by the United States Weather Bureau affecting the area when a draw tender shall be constantly on duty and the bridge opened promptly on signal.

(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.

(7) Flint River, Ga.; Seaboard Air Line Railway Company bridge and Atlantic Coast Line Railroad Company bridge at Bainbridge. At least 24 hours' advance notice required.

(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.

(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, Alabama; Louisville and Nashville Railroad Company bridge near Mobile. Between 12:00 midnight and 8:00 a.m., the draw will not be required to open except in an emergency for the passage of fire boats and patrol boats operated by the Maritime Administration for security of vessels within the Mobile Reserve Fleet Anchorage extending above and below the bridge: Provided, That during periods of severe storms or hurricanes from the time the United States Weather Bureau sounds an "Alert" for the area until the "all clear" is sounded or for such period as the Fleet Superintendent, Mobile Reserve Fleet, may request, draw tenders will be constantly on duty and the draw 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.

(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 draw 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, Alabama, Southern Railway Company bridge at Mobile. On Sundays, legal holidays, and between 4:00 p.m. and 8:00 a.m. on all other days, the draw need not be opened for the passage of vessels, except in the event of emergency. At all other times, and in all other respects the regulations contained in § 203.240 shall govern the operation of this bridge. Whenever in the event of an emergency, a vessel is required to pass through the drawspan on Sunday, legal holidays, or between 4:00 p.m. and 8:00 a.m., the draw shall be opened promptly upon receipt of notice by the drawtender, who is domiciled in the immediate vicinity of the bridge. The notice posted in accordance with paragraph (d) of this section shall state how the drawtender may be reached.

(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.

(24) Bayou Bienvenue, La.; Louisiana Department of Highways bridge near Clamette. At least 24 hours' advance notice required.

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

(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) English Bayou, La.; Louisiana Department of Highways bridge near Lake Charles. At least 48 hours' advance notice required.

(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.

(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 vessels, 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) Laguna Madre, Tex.; Padre Island Causeway (Nueces County) swing barge bridge across Humble Oil and Refining Company channel. Between 4:00 p.m. and 7:00 a.m., at least 1 hour advance notice required: Provided, That the regulations of this section may be temporarily suspended by the District Engineer, U.S. Army Engineer District, Galveston, Tex., for such periods as he may determine to be necessary upon notice to Nueces County.

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

§ 203.432a Matanzas Pass, Fla., Florida 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 drawspan between the hours of 4:30 p.m. and 6 p.m. except on the hour and half-hour when the draw shall be opened to allow all accumulated vessels to pass.

(b) The drawspan shall be opened at any time upon a signal of 4 short blasts of a whistle or horn or similar device to allow the passage of a tow or vessel in distress.

(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.

§ 203.462 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.

§ 203.463 Manatee River, Fla.; State Road Department of Florida bridge near Bradenton. (a) Between

7 a.m. and 9 a.m. and between 4 p.m. and 6 p.m., the draw need not be opened for the passage of vessels, except as provided in paragraph (b) of this section.

(b) The draw shall be opened promptly on signal for the passage of (1) Government owned or operated vessels, (2) any vessel during the existence of a hurricane alert issued by the United States Weather Bureau and affecting the area, and (3) any vessel in an emergency involving danger of life or property. An emergency shall be indicated by four blasts of a whistle, horn, or megaphone blown on the vessel.

(c) At times other than those specified in paragraph (a) of this section, and in all other respects the regulations contained in § 203.240 shall govern the operation of this bridge.

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

§ 203.465 Hillsborough River, Tampa, Florida. (a) City of Tampa highway bridges at Platt and Krause Streets and State Road Department of Florida highway bridge at Lafayette Street. (1) Except as otherwise provided in subparagraph (2) of this paragraph, the owners of or agencies controlling these bridges shall not be required to open the draws for the passage of vessels between 8:30 a.m. and 9:30 a.m. and between 5:00 p.m. and 6:15 p.m. on all days except Sundays.

(2) The draws shall be opened at any time to allow the passage of vessels owned or operated by the United States and vessels in distress. A vessel owned or operated by the United States or a vessel in distress desiring to pass either bridge shall so indicate by four blasts of a whistle or similar device.

(3) The owners of or agencies controlling the bridges shall keep a copy of the regulations in this paragraph conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can be easily read at any time.

(b) City of Tampa highway bridge at West Columbus Drive (Michigan Avenue). (1) The owner of or agency controlling the bridge will not be required to keep a draw tender in constant attendance between 10:00 p.m. and 6:00 a.m.

(2) Persons requiring the opening of the draw of the bridge between 10:00 p.m. and 6:00 a.m. shall, except in an emergency, give one hour's advance notice of the time at which such opening will be required. Such notice may be given in person, in writing, or by telephone to the authorized representative of the owner of or agency controlling the bridge. Upon receipt of such notice, the authorized representative shall cause a draw tender to be on duty at the bridge at the time specified in the notice, and the bridge shall at such time and for a reasonable period thereafter be prepared to open promptly for the passage of vessels.

(3) The owner of or agency controlling the bridge shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can be easily read at any time, a copy of the regulations in this paragraph, together with a notice stating exactly how the representative specified in subparagraph (2) of this paragraph may be reached.

(c) State Road Department of Florida highway bridge at West Hillsborough Avenue. (1) The owner of or agency controlling this bridge shall not be required to keep a draw tender in constant attendance between 10:00 p.m. and 6:00 a.m.

(2) Whenever, in the event of an emergency, a vessel, unable to pass under the closed bridge, is required to pass through the drawspan between 10:00 p.m. and 6:00 a.m., at least one hour's advance notice of the time the opening is required shall be given to the authorized representative of the owner of or agency controlling the bridge. Upon receipt of such notice, the authorized representative, 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.

(3) The owner of or agency controlling the bridge shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can be easily read at any time, a copy of the regulations in this paragraph, together with a notice stating exactly how the representative specified in subparagraph (2) of this paragraph may be reached.

(d) City of Tampa highway bridge at West Sligh Avenue. (1) The owner of or agency controlling this bridge shall not be required to keep a draw tender in constant attendance between 6:00 p.m. and 7:00 a.m.

(2) Whenever, in the event of an emergency a vessel, unable to pass under the closed bridge, is required to pass through the drawspan between 6:00 p.m. and 7:00 a.m., at least one hour's advance notice of the time the opening is required shall be given to the authorized representative of the owner of or agency controlling the bridge. Upon receipt of such notice, the authorized representative, 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.

(3) The owner of or agency controlling the bridge shall keep conspicuously posted on both the upstream and downstream sides thereof, in such manner that it can be easily read at any time, a copy of the regulations in this paragraph, together with a notice stating exactly how the representative specified in subparagraph (2) of this paragraph may be reached.

§ 203.466 Clearwater Harbor, Fla.; the City of Clearwater bridge (Memorial Causeway), Clearwater Fla. (a) Except as otherwise provided in paragraphs (b) and (c) of this section, the owner or agency controlling the bridge shall not be required to open the drawspan for the passage of vessels on Saturdays, Sundays, Memorial Day, Independence Day and Labor Day between the hours of 4:30 p.m. and 7:00 p.m., except that the drawspan shall be opened at 5:15 p.m., 6:00 p.m., and 6:45 p.m. 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.

§ 203.491 Mobile River and Chickasaw Creek, Ala.; 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.

§ 203.555 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. Draw cannot be opened immediately, or if open must be closed immediately: Four or more short and rapid blasts of a whistle, 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 Division Engineer of the United States Engineer Department in charge of the locality. 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 § 203.560, prescribed where local conditions require to govern the operation of certain bridges, supplement the general regulations contained in § 203.555.

§ 203.560 Mississippi River and its tributaries and outlets; bridges where constant attendance of draw tenders is not required. (a) The owners of or agencies controlling certin 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 204—DANGER ZONE REGULATIONS:

§ 204.86 Florida Bay northeast of Pine Islands, Fla., live firing area for strafing. (a) The danger zone. (1) Bounded on the north by latitude 24°51'08"; on the east by longitude 81°13'52"; on the south by latitude 24°48'-52"; and on the west by longitude 81°16'21".

(2) The hull of an ex-naval vessel (PE-19) is located in the center of the area and is used by the United States Fleet Aircraft for live strafing.

(b) The regulations. (1) The area is closed to all vessels at all times.

(2) This section shall be enforced by the Captain of the Port, Key West, Florida.

§ 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 lati-

tude 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 horizonal 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 in the case of regular passenger or cargo carrying vessels 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.

§ 204.113 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′47″, longitude 85°37′58″; thence to latitude 30°03′19″, longitude 85°37′-00″; 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 86°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 southeasterly 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 interesection 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 ordinarily of not more than one hour. Advance notice of such firings will be published in local newspapers and in such other manner 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 Gulf of Mexico, south of Pensacola Bay; firing range, U.S. Naval Air Station, Pensacola, Fla. (a) The danger zone. The U.S. Navy Rifle Range is located on Santa Rosa Island between Fort Pickens and the U.S. Coast Guard Lighthouse. The danger area for the firing range extends 2.6 nautical miles seaward from Santa Rosa Island within the following coordinates: Beginning at a point, latitude 30°18′55″, longitude 87°15′59″; thence to latitude 30°17′33″, longitude 87°13′25″; thence to latitude 30°16′28″, longitude 87°16′57″; thence to latitude 30°19′04″, longitude 87°16′51″.

(b) The regulations. (1) Scheduled firing will take place on Tuesday of each week between the hours of 8:00 a.m. and 3:30 p.m. Unscheduled firing may take place other week days between these hours except Saturdays, Sundays and holidays, on which days the Rifle Range will be closed to all firing.

(2) On days when firing is to be conducted, a large red flag will be displayed from a mast adjacent to the firing range on Santa Rosa Island and all watercraft will be restricted from the area.

(3) The regulations in this section will be enforced by the Commanding Officer, Naval Air Station, Pensacola, Fla., and such other agencies as he may designate.

§ 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 Commanding Officer, Bergstrom Air Force Base, Austin, Texas, 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 con-

ducted 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. The waters of the Atlantic Ocean and Vieques Sound within an area described as follows: Beginning at the northernmost extremity of Fungy Bowl; thence northeasterly approximately seven miles to latitude 18°26′30″, longitude 65°16′48″; thence approximately 107°30′ true to latitude 18°25′06″, longitude 65°12′06″; thence southwesterly approximately seven miles to Matojo Cay; thence southwesterly across Culebra Island to Scorpion Point; thence approximately 180° true to latitude 18°11′00″, longitude 65°18′42″; thence approximately 300° true to Hodgkins Shoal buoy; thence approximately 47° true to the point of beginning.

(b) The regulations. (1) The danger zone is subject to use as a target area for bombing and gunnery practice. Appropriate notices will be issued to the public in advance of this activity by the officer in charge of such activity.

(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 Waters of Vieques Passage in the vicinity of Point Cascajo, Puerto Rico; antiaircraft artillery and waterborne target range, United States Army Forces Antilles and Military District of Puerto Rico. (a) The danger zone. (1) All waters of Vieques Passage off the east coast of Puerto Rico, within the sector of a circle bounded by radii of 25,000 yards bearing 156°09′57″ and 226°48′46″, respectively, from latitude 18°12′24″, longitude 65°37′54″, and the included arc.

NOTE: All bearings are referred to true meridian.

(2) The outer boundaries of the danger zone will not be marked but signs will be posted at conspicuous places on the shore to warn against trespassing on the area. Aircraft and watercraft will be presumed to know the location of the danger zone by its principal landmark.

(b) The regulations. (1) The danger zone shall be open to navigation at all times except when antiaircraft artillery and water-borne target practice firing or both are being conducted. At such times, no vessel or other craft except those engaged in the patrol of the area or in antiaircraft artillery and water-borne target firing practice, shall enter or remain within the area.

(2) The fact that antiaircraft artillery and water-borne target firing practice or both are to take place over the designated area will be advertised to the public through the usual media for the dissemination of such information. Inasmuch as such practice is to be carried on throughout the year, without regard to season, such advertising will be repeated at intervals not exceeding three months, and at more frequent intervals when, in the opinion of the Commanding General responsible for the use of the area, such frequent repetition is advisable in the interest of the public safety.

(3) Prior to conducting each antiaircraft artillery or water-borne target firing practice, or both, the entire danger zone will be patrolled to insure that no watercraft are within the danger zone. Any watercraft found in the vicinity will be warned that such practice 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.

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

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—(1) General. As required by law, and general regulations to govern the operation of drawbridges crossing all navigable waterways of the United States discharging their waters into the Atlantic Ocean south of and including Chesapeake Bay and the Gulf of Mexico, excepting the Mississippi River and its tributaries, prescribed by the Secretary of War, all corporations or persons owning, operating and tending drawbridges 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 and other watercraft. The owner shall keep the operating machinery of the draw in serviceable condition, and shall have the draw opened and closed at intervals frequent enough to make certain that the machinery is kept in proper condition for satisfactory operation. Bridges and fender systems shall be constructed and maintained so as to afford at all times reasonably free, easy and unobstructed navigation of the draw opening or the drawspan. Any accident or damage to the bridge, the fenders or the operating mechanism, shall be promptly reported to the District Engineer, giving the cause and the probable period required for repairs. All bridges will be lighted in accordance with the rules and regulations of the United States Coast Guard. (See Part 68 of this title.)

(2) Signals for drawbridges. The signals for vessels desiring to pass bridges shall be those prescribed in the general regulations referred to in subparagraph (1) of this paragraph.

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

(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 on 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 alowed 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 statment 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 Superintendent of Lighthouses at Norfolk, Virginia, if north of New River Inlet, North Carolina; to the Superintendent of Lighthouses at Charleston, South Carolina, if between New River Inlet, North Carolina, and St. Lucie Inlet, Florida; to the Superintendent of Lighthouses at Key West, Florida, if between St. Lucie Inlet and Suwannee River, Florida; and to the Superintendent of Lighthouses, New Orleans, Louisiana, if between Suwannee River and St. Marks, Florida.

(j) Tresspass 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 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 areas. (a) The areas. (1) All waters within one hundred yards of the U.S. Naval Station, beginning at a point one hundred yards due south of the south end of Whitehead Street and extending westerly and northerly around the U.S. Naval Station to the northern end of the U.S. Coast Guard Base.

(2) All waters within one hundred yards of the U.S. Naval Station Annex, the U.S. Naval Seaplane Base-Heliport, and the north and east shores of the Trumbo Point Navy Housing area.

(3) All waters within one hundred yards of Fleming Key.

(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, the U.S. Naval Seaplane Base-Heliport and the north and east shores of the Trumbo Point Navy Housing area to Garrison Bight.

(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.

(iii) A channel 100 feet in width, the eastern edge of which forms the western boundary of the restricted seaplane landing area east of Fleming Key.

(2) Stopping or landing in any of the restricted areas described in paragraph (a) of this section is prohibited.

(3) Vessels using the restricted channel areas described in subdivisions (i) and (ii) and (iii) of subparagraph (1) of this paragraph shall proceed at a slow speed.

(4) No object that might endanger seaplane operations shall be cut adrift or thrown overboard in the restricted areas described in subparagraphs (2) and (3) of paragraph (a) of this section.

(5) 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.

§ 207.175 St. Petersburg Harbor and Tampa Bay, Fla.; seaplane restricted and operating areas. (a) The areas—(1) The seaplane restricted area. The waters of St. Petersburg Harbor and Tampa Bay in the vicinity of the United States Coast Guard Air Station within an area described as follows: Beginning at the intersection of the easterly end of the concrete bulkhead along the northerly side of the Port of St. Petersburg with the northerly end of the steel bulkhead along the easterly side of the port; thence 242°30′, 450 feet; thence 152°30′, 600 feet; thence 180°00′, about 460 feet to the south edge of the entrance channel; thence 90°30′, 6,300 feet; thence 360°00′, 250 feet to the north edge of the entrance channel; thence 270°30′, 5,775 feet; thence 360°00′, 250 feet to the steel bulkhead along the easterly side of the port; thence along the steel bulkhead to the point of beginning.

NOTE: All bearings are referred to true meridian.

(2) The seaplane operating area. A circular area with a radius of one nautical mile having its center at latitude 27°45′33″, longitude 82°35′24″. The center of the circle will be marked by a yellow and black buoy which will be lighted and showing an occulting white characteristic.

(b) The regulations. (1) The restricted area shall not be used for fishing or mooring and shall be kept clear except for watercraft making transit to and from the St. Petersburg Harbor Turning Basin, Bayboro Harbor, or Salt Creek.

(2) Watercraft in the restricted area, shall give seaplanes the right-of-way. All watercraft shall promptly clear the restricted area when seaplanes are observed approaching or when warned by the siren of a crash boat, and shall remain clear of the restricted area while seaplanes are passing through the area.

(3) The enforcing agency will send out a crash boat to warn watercraft in or near the area of impending seaplane operations within the area.

(4) The enforcing agency will post at the intersection of the southerly end of the steel bulkhead along the easterly side of the Port of St. Petersburg with the westerly end of the steel bulkhead along the southerly boundary of the United States Coast Guard Air Station a large sign reading "DANGER! COAST GUARD PLANES HAVE RIGHT OF WAY IN THIS CHANNEL. CLEAR CHANNEL PROMPTLY WHEN PLANES ARE OBSERVED APPROACHING OR WHEN WARNED BY SIREN OF CRASH BOAT."

(5) Watercraft may navigate, anchor, or moor within the operating area. Fishing will be permitted.

(6) Watercraft utilizing the operating area during hours from sunset to sunrise, or during periods of low visibility, shall comply strictly with existing regulations of the rules of the road applicable to inland waters and motorboat regulations pertaining to required lighting while underway or at anchor.

(7) Watercraft within the operating area must recognize the fact that the maneuverability of aircraft on the surface is relatively limited as compared to that of vessels or vehicles specifically designed for surface operations, Therefore, it is essential that occupants of all watercraft shall, when in the seaplane operating area, exercise due vigilance and be alert for the presence of aircraft either taxiing on the surface or approaching for landings and takeoffs in the area.

(8) Seaplane landings and takeoffs will be covered by the presence of a crash boat whenever possible. Under unusual and infrequent circumstances seaplanes may be limited to a particular heading or position of the operating area and watercraft in that vicinity may be requested by the Coast Guard to yield right-of-way to the aircraft for the particular maneuver involved. Under such unusual conditions watercraft shall comply with the request made by the Coast Guard crash boat for the mutual safety of boats and aircraft.

(9) The regulations of this section shall be enforced by the Commanding Officer, United States Coast Guard Air Station, St. Petersburg, Florida, and such agencies as he may designate.

§ 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.

§ 207.176 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 and 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 United States which are tributary to or connected by other waterways with the Gulf of Mexico, except the Mississippi River, its tributaries, South and Southwest Passes and that part of the Atchafalaya River above its junction with the Morgan City-Port Allen alternate waterway, between St. Marks, Fla., and the Rio Grande, Tex., both inclusive, and the Intracoastal Waterway from Apalachee Bay, Fla., to Brownsville, Tex.

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

(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, United States Army, detailed in charge of the respective districts, and their authorized assistants. The cities in which these District Engineers are located, and the limits of their jurisdiction, are as follows:

(1) U.S. District Engineer, Mobile, Alabama. From St. Marks River, Florida, to Pearl River, Mississippi and Louisiana, both inclusive, and the Intracoastal Waterway from Apalachee Bay, Florida, to Lighted Buoy No. 41, Lake Borgne, Louisiana, mile 36.4 east of Harvey Lock.

(2) U.S. District Engineer, New Orleans Louisiana. From Pearl River, Mississippi and Louisiana, to Sabine River, Louisiana and Texas, both exclusive, and the Intracoastal Waterway from Lighted Buoy No. 41, Lake Borgne, Louisiana, mile 36.4 east of Harvey Lock, to Sabine River, mile 266 west of Harvey Lock.

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

(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, or clerks of vessels plying upon the waterways to which this section applies shall submit a report on such activities for statistical purposes which shall 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, cargo carrying capacity expressed in short tons.

(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 giving such statistical information on their activities as may be required by the District Engineer.

(3) Reports may be submitted on forms furnished free of charge by the District Engineer. They shall be presented to the lockmaster at any of the federally operated locks, the gatetender at any of the federally operated floodgates, or the bridgetender at any of the bridges operated by the War Department, for each trip made. Where no federally operated locks, floodgates, or bridges are 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.

(d) Locks and floodgates—(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 or lock area, whether navigating the lock or not. No one shall cause any movement of any vessel, boat, or other floating thing in the lock or approaches except by or under the direction of the lockmaster or his assistants.

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

(3) Visual signals. Signal lights will be displayed from sunset to sunrise as follows:

(i) One green light to indicate that the lock or floodgate is open to approaching navigation.

(ii) One red light to indicate that the lock or floodgate is not open to approaching navigation.

(iii) In addition, at certain locks where navigation over the dam is possible during high water, one purple light, visible both upstream and downstream, will also be displayed to indicate that navigation over the dam is possible. If no purple light is displayed, navigation over the dam is not possible.

(iv) During daylight hours large balls, similar in color and number to the light signals prescribed for use at night, will be displayed from a mast on the lock wall or other convenient location and at the site of the floodgates.

(4) Precedence at locks and floodgates. (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.

(5) Entrance to and exit from locks and passage through floodgates. No vessel or raft shall enter or leave locks or, while floodgates are in operation, attempt to pass through floodgates before being signalled to do so. While waiting their turn, vessel or rafts must not obstruct navigation and must remain at a safe distance from locks or floodgates. Before entering a lock they shall take position in the rear of any vessels or rafts that precede them, and there arrange the two for locking in sections if necessary. Masters and pilots of vessels or persons in charge of rafts shall cause no undue delay in entering or leaving locks or passing through floodgates receiving the proper signal, and shall take such action as will insure 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 locks or floodgates promptly without damage to the structures. Vessels or tows that fail to enter locks or pass through floodgates with reasonable promptness after being signalled to do so will lose their turn.

(6) Lockage and passage of vessels. (i) Vessels shall enter and leave locks and pass through floodgates under such control as to prevent any damage to the locks, gates, gate walls, or fenders. Vessels shall be provided with suitable lines and fenders, shall always use fenders to protect the walls and gates, and when locking at night shall be provided with suitable lights and use them as directed. Vessels shall not meet or pass each other anywhere between the gate walls or fender system at the approaches to locks or floodgates.

(ii) Vessels which do not have a draft of at least three inches less than the depth over sills or breast walls, or which have projections liable to damage gates, walls, or fenders, shall not enter the approaches to or pass through locks or floodgates.

(iii) No vessel having chains, lines, or drags either hanging over the sides or ends or dragging on the bottom for steering or other purposes will be permitted to pass locks or dams or through floodgates.

(iv) Power vessels shall accompany tows through 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 locks, floodgates, or approaches.

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

(viii) The lockmaster or gatetender may refuse to lock or pass vessels which, in his judgment, fail to comply with this section.

(7) 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 (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.

(8) Number of lockages. Tows or rafts locking in sections will generally be allowed only two consecutive lockages if individual 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 two or more tows or rafts are 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.

(9) Mooring. (i) Vessels and rafts when in a 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 the signal is given for the vessel or raft to leave. Tying 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, is prohibited.

(10) Operating 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 shall furnish ample help on the lock walls for handling lines under the direction of the lockmaster.

(e) 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) Anchoring or mooring in waterway. No vessels or rafts shall anchor or moor in any of the land cuts or other narrow parts of the waterway, except in 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 rafts. Stoppages shall be only for such periods as may be necessary.

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

(ii) When tied up individually, all vessels shall 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 will be as close together as possible. In narrow sections, no vessel or raft shall be tied abreast of another.

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

(iv) Whenever any vessel or tow is moored to the bank, as authorized above, 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) 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.

(vi) 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.

(3) Speed. Excessive speeding in narrow sections is prohibited. Official signs indicating limiting speeds through critical sections shall be strictly obeyed.

(i) When approaching and passing through a bridge, all vessels and rafts, regardless of size, shall control their speed so as to insure that no damage will be done to the bridge or its fenders.

(ii) A vessel shall reduce its speed sufficiently to prevent any damage when approaching another vessel in motion or tied up, a wharf or other structure, works under construction, plant engaged in river and harbor improvement, levees withstanding flood waters, buildings submerged or partially submerged by high waters, or any other manner of structure or improvements likely to be damaged by collision, suction, or wave action.

(4) Size, assembly, and handling of tows. On waterways 150 feet wide or less, tows will not be allowed which are longer than 1,150 feet including towing vessels, but excluding the length of the hawser, or wider than one-half the bottom width of the channel or 55 feet, whichever width is less, except on waterways exempted by the District Engineer or on other waterways by special permission of the District Engineer for each vessel movement.

A width of 78 feet will be allowed on the Gulf Intracoastal Waterway between Mile 6.2 E.H.L. (Inner Harbor Navigation Canal Lock) and Mobile Ship Channel, Mobile, Alabama. A width of 74 feet will be allowed on the Algiers Canal between the Mississippi River and Bayou Barataria, Louisiana. Tows in excess of 55 feet desiring to move over the Algiers Canal will obtain clearance from the lockmaster at Algiers Lock before entering the canal, will yield the maximum when passing other tows in the channel, report clearing the canal to Algiers Lock, 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.

(i) All vessels drawing tows not equipped with rudders in restricted channels and land cuts shall use two towlines, or a bridle on one towline, shortened to the greatest possible extent 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 is permissible provided that adequate power is employed to keep the tow under full control at all times.

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

(iii) No vessel or tow shall navigate through a drawbridge until the movable span is fully opened.

(5) Projections from vessels. No vessel 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 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 pass at a speed sufficiently slow to insure safe navigation. Vessels approaching an intersection or bend where the view is obstructed must exercise due caution. At certain intersections where strong currents may be encountered, sailing directions may be issued from time to time through navigation bulletins or signs posted on each side of the intersections which must be observed.

(f) Rafts. Rafts will be permitted to navigate a waterway only if properly and securely assembled. The passage of "bag" or "sack" rafts, "dog" rafts, or loose logs over any portion of a waterway is prohibited. Each section of a raft shall be so secured within itself 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 purpose.

(1) 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.

(2) Frequent inspections shall 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 shall take steps immediately to remove it from the waterway.

(3) The regulations prescribed in paragraph (e) (4) of this section governing the length and width of tows shall apply also to rafts.

(4) 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 shall, 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 or under authority of the United States.

(5) When rafts are left for any reason with no one in attendance, they shall 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. From sunset to sunrise, rafts moored to the bank shall have lights at 200-foot intervals along their entire length. Rafts shall not be moored at prominent projections of the bank or at critical sections.

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

(7) 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.

(g) Damage. This section shall not affect the liability of the owners and operators of vessels for any damage caused by their operations to canal revetments, lock piers and walls, floodgates and appurtenances, bridges, and bridge fenders, or for displacing or damaging buoys, stakes, spars, range lights, or other aids to navigation. Should any part of a revetment, lock, floodgate, or bridge be damaged, the master shall report that fact, and furnish a clear statement of how the damage occurred, to the nearest Government lockmaster, gatetender, or bridgetender, and by mail to the District Engineer in charge of the section of the waterway in which the damage occurred. Should any aid to navigation be damaged, the master shall report that fact immediately to the District Coast Guard Officer, New Orleans, Louisiana.

(h) Marine accidents. Masters, mates, pilots, owners, or other persons using the waterways to which the regulations in this section apply shall report to the District Engineer or his authorized representative by the most expeditious means available all marine accidents, such as fire, collision, sinking, or stranding, where there is possible obstruction of the channel or interference with navigation, 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 a sunken vessel shall take immediate steps to mark the wreck properly.

(i) Trespass on United States property. Trespass on waterway property or injury to the banks, locks, floodgates, 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, lock walls, floodgates, or bridges.

§ 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. Signs located on the approaches three-fourth mile from the floodgates and locks indicate traffic is unlimited, tows are limited to one barge, or the floodgates or locks are closed to navigation. Pertinent information concerning current velocities or head differentials is posted on these signs.

(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, and Memphis, Tennessee, and the President, 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 downsteam 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.

§ 207.240 Atchafalaya River, La.; special regulations to govern navigation through the reach of the Lower Atchafalaya River (Berwick Bay) in the vicinity of the Southern Pacific Railroad Bridge at Morgan City, La. (a) Whenever the velocity of flow, either southward or northward, through the reach of the Lower Atchafalaya River (Berwick Bay) at Morgan City, La., reaches or exceeds a critical velocity as determined by the District Engineer, United States Army Engineer District, New Orleans, or whenever the District Engineer finds it necessary for the protection of life and property, the movement of vessels and the composition of tows passing through the Southern Pacific Railroad Bridge shall be governed by the regulations in this section. Day and night visual signals will be displayed at the center of the drawspan above the operator's house on top of the bridge structure when the regulations are in effect. During periods of foggy or inclement weather, or when for any other reason the visual signals cannot readily be seen, notice that the signals are being displayed will be given by blasts of a fog horn located on the bridge. To indicate that signals are being displayed to govern traffic moving through the bridge, one blast of 6 seconds' duration each minute will be sounded on air horn.

(b) By day the visual signals will consist of two red balls 2 feet in diameter displayed, one above the other not less than 4 feet nor more than 6 feet apart, from a pole, to indicate that vessels and tows moving through the bridge shall be governed by the regulations in this section.

(c) At night the visual signal will consist of two focused, flashing, white lights visible 360 degrees, of such character as to be visible on a dark night with a clear atmosphere for a distance of at least two (2) miles; displayed vertically one above the other, not less than four (4) feet nor more than six (6) feet apart, on the highest part of the swing span.

(d) When the signals described in paragraphs (b) and (c) of this section are displayed, unless otherwise directed by the District Engineer, tows made up of a barge with rakes on both ends or any other type vessel (except as described below), moving south through the bridge shall not exceed one barge with the towing vessel lashed securely in the rear or alongside of the barge.

(e) When the signals described in paragraphs (b) and (c) of this section are displayed, unless otherwise directed by the District Engineer, tows made up of barges with rakes on both ends, or other type vessel (except as described below), moving north through the bridge shall not exceed two (2) barges arranged in tandem with the towing vessel in the rear pushing the tow with its bow made up to the stern of the rear barge or lashed securely alongside and near the stern of the rear barge.

(f) Integrated tows consisting of bow section, middle box sections and stern section, with the push boats made up rigidly astern, may proceed in either direction through the bridge opening with a maximum of four sections. Regardless of the direction of the flow, the tow shall move through the navigation opening of the bridge at a minimum speed required to maintain steerageway.

(g) The regulations of paragraphs (d), (e), and (f) of this section shall not apply to tows with two (2) towing vessels of sufficient power, one ahead and one astern of the tow.

(h) Vessels and tows proceeding with the current shall have the right of way over vessels and tows proceeding against the current. When two vessels or tows are about to enter the navigation opening through the bridge from opposite directions at the same time, the vessel or tow proceeding against the current shall stop short of the opening until the vessel or tow having the right of way shall have passed through.

(i) Vessels and tows desiring to pass through the navigation opening of the bridge shall approach the opening along the axis of the channel and shall proceed with due regard for direction and velocity of the current and for any tendency to drift either to the right or to the left so as to pass through without danger of striking the bridge or the fenders. No vessel or tow shall attempt passage through the navigation opening until the bridge is fully open.

§ 207.310 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) 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) This section shall be enforced by the Commandant, Tenth Naval District, San Juan, Puerto Rico, 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.

§ 207.900 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) Hudson River Reserve Fleet, Jones Point, New York.

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

(3) Wilmington Reserve Fleet, Brunswick River near Wilmington, North Carolina.

(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) Astoria Reserve Fleet, Cathlamet Bay near John Day Point, Oregon.

(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 areas designated as fairways, since structures located therein would constitute obstructions to navigation. Within an area designated as an anchorage area, not more than four (4) structures will be permitted at any time. Structures shall be not less than three (3) nautical miles apart and shall be not less than one and one-half (1½) nautical miles from the sea buoy at any harbor entrance.

(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 1117 and 1288.

(2) Brazos Santiago Anchorages. See charts 1117 and 1288.

(3) Port Mansfield Safety Fairway. See chart 1117.

(4) Port Mansfield Anchorages. See chart 1117.

(5) Aransas Pass Safety Fairway. See charts 1117, 1285, and 1286.

(6) Aransas Pass Anchorages. See charts 1117, 1285, and 1286.

(7) Matagorda Safety Fairway. See charts 1117 and 1284.

(8) Matagorda Anchorages. See charts 1117 and 1284.

(9) Freeport Safety Fairways. See charts 1117 and 1283.

(10) Freeport Anchorages. See charts 1117 and 1283.

(11) Galveston Safety Fairways. See charts 1116 and 1282.

(12) Galveston Anchorages. See charts 1116 and 1282.

(13) Sabine Safety Fairways. See charts 1116 and 1279.

(14) Sabine Anchorages. See charts 1116 and 1279.

(15) Coastwise Safety Fairways. (i) Brazos Santiago to Aransas Pass. See charts 1117, 1288, 1286.

(ii) Aransas Pass to Calcasieu Pass. See charts 1117, 1116, 1285, 1284, 1283, 1282, 1280, and 1279.

(16) Calcasieu Pass Safety Fairway. See charts 1116, 1278, and 1279.

(17) Calcasieu Pass Anchorages. See charts 1116, 1278 and 1279.

(18) Mermentau Pass Safety Fairway. See charts 1116 and 1278.

(19) Southwest Pass Safety Fairway. See charts 1116 and 1277.

(20) Atchafalaya Pass Safety Fairway. See charts 1116 and 1276.

(21) Bayou Grand Caillou Safety Fairway. See charts 1116 and 1275.

(22) Caillou Pass Safety Fairway. See charts 1116 and 1274.

(23) Belle Pass Safety Fairway. See charts 1116 and 1274.

(24) Barataria Pass Safety Fairway. See charts 1116 and 1273.

(25) Grand Bayou Pass Safety Fairway. See charts 1116 and 1273.

(26) Empire to the Gulf Safety Fairway. See charts 1116 and 1273.

(27) Southwest Pass (Mississippi River) Safety Fairway. See charts 1115 and 1116.

(28) South Pass (Mississippi River) Safety Fairway. See charts 1116 and 1272.

(29) Mississippi River—Gulf Outlet Safety Fairway. See charts 1115, 1270, 1271, and 1272.

(30) Mississippi River—Gulf Outlet Anchorage. See charts 1115 and 1270.

(31) Gulfport Safety Fairway. See charts 1115 and 1267.

(32) Biloxi Safety Fairway. See charts 1115 and 1267.

(33) Pascagoula Safety Fairway. See charts 1115 and 1267.

(34) Panama City Safety Fairway. See charts 1115 and 1266.

(35) Port St. Joe Safety Fairway. See charts 1115 and 1263.

(36) Mobile Safety Fairway. See charts 1115 and 1266.

(37) Pensacola Safety Fairway. See charts 1115 and 1265.

(38) Tampa Safety Fairways. (i) An area 2 nautical miles in width centered on the alinement of Egmont Channel and extending from a point abreast of Egmont Key light for a distance of approximately 8.9 nautical miles to a point abreast of the Whistle Buoy. The north and south boundary line would have an azimuth of 84° true. From a point abreast of the Whistle Buoy the fairway is flared, the northerly line having an azimuth of 114° true and the southerly line an azimuth of 54° true, both lines extending to the 60-foot contour in the Gulf of Mexico.

(ii) An area 2 nautical miles in width covering southwest channel, the northerly limit line extending on a line with an azimuth of 45° true from Egmont Light and the southerly line being parallel to and 2 nautical miles southeasterly of the northerly limit line. Both limit lines

would extend to the 40-foot contour in the Gulf of Mexico. The inner end of the northerly line terminates at the 18-foot contour from which point a straight line is drawn to the southern tip of Egmont Key. The inner end of the southerly limit line terminates at the 18-foot contour abreast of Egmont Key.

Note: These safety fairways are partially shown on charts 1113 and 1255.

(39) Charlotte Safety Fairway. See charts 1113 and 1255.

3. GULF OF MEXICO

The **Gulf of Mexico** coast of the United States is low and mostly sandy, presenting no marked natural features to the mariner approaching from seaward. The principal points and harbor entrances are marked by lights, which are the chief guides for approaching or standing along the coast.

From the south shore of the Florida mainland, the **Florida Keys** and **Florida Reefs** extend for about 134 miles in a southwesterly curve to Sand Key Light, and about 58 miles in a westerly 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 northern boundary of the **Straits of Florida.** Toward the western end are several openings between the keys offering passage from the straits into the Gulf.

The southwestern 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. North 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 western 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.

Westward 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 west 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 east end of Petit Bois Island, through Grande Batture Islands. Pearl River, from its most eastern 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 **chênières** because of the oak groves usually found growing on them, are former barrier beaches; good examples are Grand Chênière and Pecan Island. In addition to the chênière, 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.

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.

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 chart references and/or limits of the fairways, and the regulations governing them.

Channels.—Federal project depth is the dredging depth of a channel as authorized by an Act of Congress upon recommendation of the Chief of Engineers, U.S. Army. **Controlling depth** in a channel is its least depth; it restricts use of the channel to drafts less than that depth.

Where deepwater channels are maintained by the Corps of Engineers and the controlling depths are printed on the charts in tabular form, the Coast Pilot usually gives only the project depths. Owing to constant shoaling in places, depths may vary considerably between maintenance dredgings; consult the Notice to Mariners for channel depths subsequent to charted information.

Where secondary channels are maintained regularly by the Corps of Engineers, the Coast Pilot gives the controlling depths together with the dates of the latest surveys.

In the case of other channels, the controlling depths printed in the Coast Pilot are from the latest available reports which may, however, be several years old.

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 chart references and/or limits of the anchorages, and regulations governing them. Other anchorage areas have been established along the Gulf Coast, bays, sound, and rivers; see **202,** chapter 2, for limits and regulations.

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 southerly gales the sea breaks on some of the bars.

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.—Numerous oil-well structures and appurtenances are located offshore between the Mississippi River Delta and Galveston Bay, extending as far out as the 35-fathom curve. Between the Mississippi River and Galveston Bay entrances, the structures are as much as 70 miles offshore.

In general, oil well structures in the Gulf of Mexico outside the 5-fathom curve show at night quick flashing white lights visible from all directions; more than one light may be displayed. Associated structures within 100 yards of the main structure are not lighted, but are generally equipped with reflective material. When visibility is less than 5 miles, fog signals are sounded from the structures.

Structures between the 2-fathom and 5-fathom curves show similar quick flashing lights and fog signals, except that the range of lights is 3 miles.

Structures along the coast in less than 2 fathoms and within the bays and sounds show similar quick flashing lights but of lesser range, and are not normally equipped with fog signals. Lights may be either red or white.

Structures on or adjacent to navigable channels and fairways, regardless of location, may be required to display lights and fog signals.

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 fog horn may also be used as a substitute.

Note: Mariners transiting these areas are advised to have the latest charts, and to obtain the latest Coast Guard Local Notices to Mariners.

Danger zones and **restricted areas** are located throughout the Gulf of Mexico from Key West to the Rio Grande, extending as much as 100 miles offshore; see **Parts 204** and **207,** chapter 2, for limits and regulations.

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 west 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 northern 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.

More detailed information on tides in the Gulf of Mexico is included in the Tide Tables.

Currents.—Under normal conditions, at all seasons of the year, the great volume of water passing northward through Yucatan Channel into the Gulf of Mexico spreads out in various directions. Surface flows set—westward across Campeche Bank, the Gulf of Campeche, and the Sigsbee Deep; northwestward toward Galveston and Port Arthur; north-northwestward toward the Mississippi Passes; and eastward 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. West of this line the drift is generally northward or westward, while east of it the drift is eastward or southeastward toward the Straits of Florida.

There are northward flows along the west side of the Gulf between Tampico and Corpus Christi in the vicinity of the 100-fathom and 1,000-fathom curves, north of the Sigsbee Deep between the 2,000-fathom and the 100-fathom curves, and along the west 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. More detailed information is included in the Tidal Current Tables.

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 the Straits of Florida, its waters are characterized by a deep blue color, high salinity, great clearness, high temperature in the upper stratum, and absence of phosphorescence. The eye can penetrate it to considerable depths. At its junction with ordinary sea water the edges may frequently be recognized in moderate weather by the ripples which occur 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 to the eye. In addition, in the lower latitudes, the stream carries with it a quantity of gulf weed, which is olive brown, branched seaweed with berrylike air vessels. Surface debris such as logs and other material with small depth tend to drift toward the eastern edge of the stream.

The region where the Gulf of Mexico narrows to form the channel between Florida Keys and Cuba may be regarded as the head of the Gulf Stream. From this region the stream sets eastward and northward through the Straits of Florida, and after passing Little Bahama Bank it continues northward and then northeastward, following the general direction of the 100-fathom curve as far as Cape Hatteras. The flow in the Straits 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 northwesterly along the open ocean side of the West Indies before uniting with the water which has passed through the straits. The Antilles Current, like the Gulf Stream, carries warm, highly saline water of clear indigo blue. The union of the two currents give rise to a broad current possessing about the same characteristics as the Gulf Stream within the straits except that the velocity is much reduced. Beyond Cape Hatteras the combined current turns more and more eastward under the combined effects of the deflecting force of the earth's rotation and the eastwardly trending coastline, until the region of the Grand Banks of Newfoundland is reached.

Eastward of the Grand Banks the whole surface is slowly driven eastward and northeastward by the prevailing westerly 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 western 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 north of Cape Hatteras but extends, more or less defined, from the straits to the Grand Banks. In the vicinity of the Banks of Newfoundland 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 and 43 and meridians 51 and 52, and flows easterly, parallel to the Gulf Stream.

Off Cape Hatteras the wide-spreading current separates into numerous bands which are indicated by the juxtaposition of warm and cold bands of water of varying widths. This feature, though not so marked, is also noticed below Cape Hatteras.

Throughout the whole stretch of 400 miles in the Straits of Florida, the stream flows with considerable velocity. Abreast of Habana, the average surface velocity in the axis of the stream is about 2.5 knots. As the cross-sec-

tional area of the stream decreases, the velocity increases gradually, until abreast of Cape Florida, it becomes about 3.5 knots. From this point within the narrows of the straits, the velocity along the axis gradually decreases to about 2 knots off St. Augustine, and 1 knot off Cape Hatteras. These values are for the axis of the stream where the current is a maximum, the velocity of the stream decreasing gradually from the axis as the edges of the stream are approached. The velocity of the stream, furthermore, is subject to fluctuations brought about by variations in winds and barometric pressure.

Crossing the Gulf Stream at Jupiter or Fowey Rocks, an average allowance of 2.5 knots in a northerly 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 east-northeasterly 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 northeasterly direction for a distance of 40 miles from the 100-fathom curve.

From within the straits, the axis of the Gulf Stream runs approximately parallel to the 100-fathom curve as far as Cape Hatteras. Since this stretch of coastline sweeps northward, then eastward, in a sharper bend than does the 100-fathom curve, the stream lies at varying distances from the shore.

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 current, nor is it to be assumed that the northerly 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 when the stream flows into the Atlantic Ocean the eastern boundary becomes somewhat vague. On the western 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 east, 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 Coast and Geodetic 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. The Gulf Stream, however, shifts somewhat with the seasons, and is considerably influenced by the winds which cause fluctuations in its position, direction, and velocity; consequently, any limits which are assigned refer to mean or average positions. A further cause of fluctuation is found in the variations of the current which feed it or which, like the Labrador Current, come in conflict with it.

At the western 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 is deflected westward and lies very close to the shoreline.

Along the Florida Reefs between Alligator Reef and Dry Tortugas the distance of the northerly edge of the Gulf Stream from the edge of the reefs gradually increases toward the westward. Off Alligator Reef it is quite close inshore, while off Rebecca Shoal and Dry Tortugas it is possibly 15 to 20 miles south of the 100-fathom curve. Between the reefs and the northern 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 northern 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 Coast and Geodetic Survey charts: No. 1002, Straits of Florida; No. 1007, South Carolina to Cuba; No. 1112, Cape Canaveral to Key West; No. 1113, Alligator Reef to Habana. Chart No. 1001 shows the axis and the position of the inner edge of the Gulf Stream from Cape Hatteras to Straits of Florida. See also section on the Gulf Stream in Tidal Current Tables, Atlantic Coast of North America.

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.

Local wind-current information is not available for the Gulf of Mexico. However, the information on "Wind-driven Currents" in the Tidal Current Tables, Atlantic Coast of North America, should be useful in estimating wind currents in the Gulf.

WEATHER.—The Appendix lists Weather Bureau offices and radio stations that transmit weather information; it also includes a table of fog-signal operation and climatological tables for several Gulf Coast ports. The following description of general weather conditions in the Gulf of Mexico was prepared by the Office of Climatology, U.S. Weather Bureau.

Climate.—The Gulf Coast of the United States arcs northwestward 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 southwestern arc extending to the Mexican border a short distance south 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 northern 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 northward 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 western 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 southeast to northwest 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 east-west axis over the Gulf.

Average pressures continue to be higher over North America through the winter, but by spring the western 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 northwestern portion of the Gulf, on the whole, blow slightly more from a southerly direction throughout the year than over the eastern portions. In combination with the change in direction of the coastline, this leads to more persistent onshore winds throughout the year over the western portion of the Gulf. As a result both thunderstorms and fog are more evenly distributed throughout the year on the northwest coast than they are farther east.

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 northerly 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 extratropical 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 raifall 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 66.9° 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 southerly winds and dissipates during northerly 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.

HURRICANES.—Severe tropical cyclones of the North Atlantic Ocean are usually called West Indian Hurricanes, but actually many of these storms form, move and die far out from the mainland and hundreds of miles from the West Indies. The storm field advances in a straight or curved track, sometimes with considerable speed, at other times at a much slower rate. The areas of the individual storms vary from less than 100 to more than 500 miles in width, with a comparatively calm center. Centers ranging from 4 to 22 miles across have been observed. This center is a region of lowest atmospheric pressure around which winds blow in a more or less circular course, spiraling inward in a counterclockwise direction. The wind at the outer edge of the storm area is light to moderate and gusty, and it often increases toward the center to speeds too high for instrument recording. Although the air movement inside the center or eye 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 shifting violent winds which surround it. Furthermore, after the center has passed a vessel, she may expect a sharp renewal of the gales, but blowing now from a different and more or less opposite direction. The fully developed tropical cyclone, encompassing many tens of thousands of square miles, is perhaps the most destructive of all storms.

Tropical cyclones occur over all the tropical oceans except the South Atlantic. They form in or near the region of doldrums, or light to calm wind movements near the Equator. In the North Atlantic, hurricanes form over a wide range of ocean between the Cape Verde Islands and the Windward Islands, over the western part of the Caribbean Sea, and over the Gulf of Mexico. While some may move northward in the beginning, especially those that form southeast of Bermuda, the majority take a westerly to northwesterly course. Of these, some curve gradually northward, either east of or above the larger islands of the West Indies, then turn northeastward or eastward near to or at some distance from the Atlantic Coast of the United States. Others pass over or to the south of the greater islands and enter the Gulf of Mexico, then curve northward or northeastward and strike some part of the east Gulf Coast, or else continue westward and strike the west Gulf Coast. The most common path is curved, the young storms moving generally in a westward direction at first, turning later to the northwestward and then to the northeastward. A considerable number of hurricanes, however, remain in low latitudes and do not turn appreciably to the northward. Freak movements are not uncommon, and there have been storms describing loops, hairpin-curved paths, and other irregular patterns. Movement toward the southeast is rare in the West Indian region, and when it does occur it is of short duration. The entire Caribbean area, the Gulf of Mexico, the coastal regions bordering these bodies of water, and the Atlantic Coast are in danger of disturbances during the hurricane season.

The hurricane season generally begins in June and closes with November. The months of greatest frequency are August, September, and October. Hurricanes are most likely to be severe during August, September, and October. During all the months of the season, however, the chance of encountering an intense storm is great enough to warrant a careful watch of the weather elements in these waters. The June hurricanes which form in the West Indian region usually move in a direction between west and north while they are south of 25° North Latitude. In late September, October, and November, hurricanes of this region are more likely to move in a direction between north and east, passing through the Yucatan Channel, or over Cuba, Florida, or the Bahamas. Of the hurricanes that come from the Atlantic into the West Indies, the majority occur in August and September, and move on a west-northwesterly course in low latitudes, reaching the coast before curving toward the north and northeast. Late in the season, October or November, the movement of hurricanes that form east of the West Indies is often toward the north in the open Atlantic.

The average speed of movement of West Indian hurricanes is about 10 to 13 knots. This speed, however, varies considerably according to the location of the storm, its development and surrounding meteorological conditions. The highest rates of progression usually occur when the storm is moving northward or northeastward in the middle or higher latitudes.

Signs of approach.—One of the earliest signs of a hur-

ricane is the appearance of high cirrus clouds which converage toward a point on the horizon that indicates the direction of the center of the storm. The snow-white fibrous mares' tails appear when the center is about 300 or 400 miles distant. Another usual early indication is a long, heavy swell propagated to a considerable distance, sometimes 2 or 3 days in advance, when there is no intervening land to interrupt it. This swell comes from the general direction in which the storm is approaching. There is usually a slight rise of the barometer at the outset, followed by a continuous fall. In front of the storm, if it is advancing in some westerly direction toward the observer, the winds blow from a northerly point (northeast, north, northwest); if in some northerly direction toward the observer, they will blow from an easterly point (southeast, east, or northeast). A further indication is a rough, increasing sea. If one or more of these signs be wanting, there is little cause for anticipating a hurricane.

As the storm center approaches, the barometer continues to fall. The wind increases in speed and blows in heavy squalls and the changes in its direction become more rapid. The wind, in general, will back to the left during this time if the center is moving toward the observer's left, or veer to the right if toward his right as he faces into the wind. Rain in showers accompanies the squalls, and when the center comes closer the rain is usually continuous and is attended by furious gusts of wind. The air is thick with rain and spume drift. Objects at a short distance are often hardly visible. If a vessel is on the line of the hurricane's advance, the wind will remain from the same direction, or nearly so, until the center is close to the vessel, or upon her.

Distance of hurricane center.—The distance from the center of a hurricane can be estimated from a consideration of the height of the barometer and the rapidity of its fall, and the velocity of the wind and the rapidity of its changes in direction. If the barometer falls slowly and the wind increases gradually, it may reasonably be supposed that the center is distant. With a rapidly falling barometer and increasing winds, it may reasonably be supposed that the center is approaching dangerously near, the more so if the winds blow closely from the direction of the increasing swell.

Bearings of center.—Facing the wind, the storm center will be 8 to 12 points to the right; when the storm is distant it will be from 10 to 12 points, and when the barometer has fallen 5 or 6 tenths of an inch it will be about 8 points.

A line drawn through the center of a hurricane in the direction in which it is moving is called the storm track, or axis of progression. The semicircle on either side of the axis is called, respectively, the right-hand or dangerous semicircle and the left-hand or navigable semicircle.

If the wind shifts to the right, the vessel will be in the right-hand or dangerous semicircle with regard to the direction in which the storm is traveling. In such case the vessel should be kept on the starboard tack and increase her distance from the center.

If the wind shifts to the left, the vessel will be in the left or navigable semicircle. The helm should be put up and the vessel run with the wind on the starboard quarter, preserving the compass course, if possible, until the barometer rises, when the vessel may be hove to on the port tack. If there is not sea room to run, the vessel can be put on the port tack at once.

Should the wind remain steady and the barometer continue to fall, the vessel is in the path of the storm and should run with the wind on the starboard quarter into the navigable semicircle.

In all cases act so as to increase as soon as possible the distance from the center, bearing in mind that the whole storm field is advancing. In receding from the center of a hurricane the barometer will rise and the wind and sea will subside.

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 following rules:

When there are indications of the near approach of a hurricane, sailing vessels may heave to on the starboard tack. The safety of the vessel often depends on heaving to in time. Steamers may remain stationary. Both should carefully observe and record changes in wind, barometer and swell so as to find the bearing of the center, and to ascertain by the shift of the wind in which semicircle the vessel is situated.

ROUTES.—On the eastern side of the Gulf of Mexico, for a distance of possibly 100 miles outside the 100-fathom curve, southeasterly 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 westward 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 westward of Rebecca Shoal from northward, a number of vessels have stranded on New Ground, indicating an easterly 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 south-southwestward of Dry Tortugas Light.

From the Straits of Florida to Cape Hatteras vessels fol-

low the Gulf Stream, pass about 14 miles southward 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 northward of the 295° course from Dry Tortugas to Heald Bank lighted whistle buoy, but go southward 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 southeastward current of about 0.5 knot may be expected. For the next 100 miles the current generally sets eastward with a velocity of 0.5 knot. For the next 200 miles the set is about north-northeast and the velocity is 0.2 knot. For nearly 200 miles before reaching Galveston the set is approximately west-northwest and the velocity 0.2 knot.

Winds and storms frequently modify normal conditions, and their effects must be taken into account.

Pilotage.—In the area covered by this Coast Pilot, pilotage, with a few unimportant exceptions, is compulsory for all vessels, both domestic and foreign, engaged in the foreign trade, but not for vessels in the domestic trade.

Pilots cruise off the entrance to some of the major ports, but at other places they either maintain a lookout or meet ships by previous arrangements. Information for the more important ports is given in the description of the localities.

Towboats are available at most of the ports; arrangements for their use should be made in advance. For further information refer to the description of the port.

Harbormasters where appointed are mentioned in the text. They usually have charge of the anchorage and berthing of vessels.

Supplies.—All kinds of supplies are available at Tampa, Key West, Pensacola, Mobile, New Orleans, Port Arthur, Galveston, Houston, Corpus Christi, and Brownsville. Limited quantities can be obtained at the other ports.

Repairs—salvage—wrecking.—Hulls and machinery of medium to large vessels can be repaired at Tampa, Mobile, New Orleans, Beaumont, Galveston, and Houston. Smaller vessels can be hauled out at Pensacola, Orange, and Port Arthur. Extensive above-waterline hull and machinery repairs can be made at Pensacola, Pascagoula, Baton Rouge, and Lake Charles. Minor repairs can be made at Freeport, Corpus Christi, Port Isabel, and Brownsville. Marine railways are available and repairs to small 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. Emergency equipment is available at Pensacola, Orange, Port Isabel, and Brownsville.

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.

Standard time.—Port St. Joe, Florida, and the areas eastward of it use eastern standard time, which is 5 hours slow of Greenwich mean time. The areas from Port St. Joe to the Rio Grande use central standard time, which is 6 hours slow of Greenwich mean time. Example: when it is 10 a.m. at Greenwich, it is 5 a.m. at Tampa, Fla., and 4 a.m. at Corpus Christi, Texas.

Legal Holidays.—The following are the legal holidays in the area covered by this Coast Pilot:

Jan. 1, New Year's Day.—All States, Puerto Rico, and Virgin Islands.
Jan. 6, Three Kings' Day (Epiphany)—Puerto Rico.
Jan. 8, Battle of New Orleans—Louisiana.
Jan. 11, De Hostos' Birthday—Puerto Rico.
Arbor Day—Florida (3d Friday in January).
Jan. 19, Robert E. Lee's Birthday—All Gulf coast States.
Jan. 30, Franklin D. Roosevelt Day—Virgin Islands.
Feb. 12, Lincoln's Birthday—Virgin Islands.
Mardi Gras (Shrove Tuesday)—Alabama, Florida, and Louisiana.
Feb. 22, George Washington's Birthday—All States, Puerto Rico, and Virgin Islands.
Mar. 2, Texas Independence Day—Texas.
Mar. 22, Emancipation Day—Puerto Rico.
Mar. 31, Transfer Day—Virgin Islands.
Holy Thursday—Virgin Islands.
Good Friday—Florida, Louisiana, Puerto Rico, and Virgin Islands.
Easter Monday—Virgin Islands.
Apr. 2, Pascua Florida Day—Florida.
Apr. 13, Thomas Jefferson's Birthday—Alabama.
Apr. 16, Jose de Diego's Birthday—Puerto Rico.
Apr. 21, San Jacinto Day—Texas.
Apr. 26, Confederate Memorial Day—Alabama, Florida, and Mississippi.
Whit Monday—Virgin Islands.
May 30, Memorial Day—Louisiana, Puerto Rico, and Virgin Islands.

June 3, Jefferson Davis' Birthday—Gulf coast States.
June 22, Organic Act Day—Virgin Islands.
July 4, Independence Day—All States, Puerto Rico, and Virgin Islands.
July 17, Munoz Rivera's Birthday—Puerto Rico. 5
July 25, Constitution Day—Puerto Rico, and Virgin Islands.
July 27, Barbosa's Birthday—Puerto Rico.
Aug. 30, Huey P. Long's Birthday—Louisiana.
Labor Day—All States, Puerto Rico and Virgin Islands. 10
Oct. 12, Columbus Day—Alabama, Florida, Louisiana, Texas, and Puerto Rico.
Nov. 1, All Saints Day—Louisiana and Virgin Islands.
Nov. 11, Veterans Day—All States, Puerto Rico and Virgin Islands.
Nov. 19, Discovery Day—Puerto Rico.
Thanksgiving Day—All States, Puerto Rico, and Virgin Islands.
Dec. 25, Christmas Day—All States, Puerto Rico, and Virgin Islands.

4. KEY WEST TO TAMPA BAY

Chart 1113.—The **Florida Keys** comprise a chain of low islands along the southwest coast of the Florida Peninsula extending westward 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.

Boundary lines of inland waters.—The lines established for the Key West area are described in **82.55,** and **82.60,** chapter 2.

Charts 576, 584, 854.—Key West Harbor is 145 miles southwestward of Miami Harbor. The harbor proper lies in front of the city of Key West, protected on the eastern 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 five principal channels with depths of 13 to 34 feet, and several minor channels.

Key West, on the island of the same name near the western 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, but commerce is mostly in crude and refined oils.

Prominent features.—Easy to identify when standing along the keys at a distance of about 6 miles are the three 300-foot radio towers north 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 the powerplant on Stock Island, three white radar domes on Boca Chica Key at the Naval Air Station, a white radar dome at the Key West International Airport, and five radio towers about 1.2 miles east of Fort Taylor.

Key West Light (24°33.0′ N., 81°48.1′ W.), 91 feet above the water, is shown from an 86-foot buff conical tower near the western end of the island. The light structure is not conspicuous.

Sand Key Light (24°27.2′ N., 81°52.7′ W.), 100 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, located on **Sand Key,** which is on the seaward side of the reefs about 7 miles southwestward of Key West Light.

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 and in the naval station basin, thence 30 feet to the turning basin at the head of the project. See Notice to Mariners and latest editions of charts for controlling depths. The channel is marked by a lighted whistle buoy about 0.5 mile south of the entrance, lighted ranges, and other aids. Spoil areas are westward of the entrance channel.

Northwest Channel is a medium-draft passage between Key West Harbor and the Gulf of Mexico. In January 1965, the controlling depth was reported to be 13 feet. Vessels drawing up to 13 feet 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 westward.

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 east 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. A good landmark for the Gulf entrance is the abandoned gray two-story lighthouse standing on piles 0.3 mile southwest of the west jetty.

Smith Shoal (chart 1252), 4.5 miles northward of the north entrance to Northwest Channel, is covered 11 feet and marked by a light, which also marks the northern approach to the channel. A coral head covered 11 feet is about 3.2 miles west-southwestward of the light.

Southeast Channel is marked by buoys and by the easterly edge of a red sector in Key West Light. Depths over the coral heads in the channel are 14 to 18 feet, and it is not recommended for drafts greater than 13 feet. The course through the channel is **321°** for Key West Light.

Southwest Channel, a convenient approach to Key West from southwestward, has a depth of 23 feet, and is marked

by buoys. A general course along the southerly edge of a red sector in Key West Light, leads to the outer anchorage and Main Ship Channel. Strangers should not attempt passage by night.

West Channel, a passage leading westward 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 northward from Man of War Harbor to the open waters of the Gulf. The channel is narrow and crooked, but is marked by daybeacons and a light at the northerly end. The controlling midchannel depth is about 5 feet. The channel should be used only with local knowledge and during good visibility.

Garrison Bight Channel, formerly known as Barque Channel, leads around the north end of Fleming Key, thence southward off the east side of the key to Garrison Bight. Federal project depth is 8 feet from Man of War Harbor to a turning basin and two anchorage basins of the same depth in Garrison Bight. In 1965, project depths were available. The channel is marked by lights, lighted buoys, and daybeacons. An unmarked channel with a reported depth of 6 feet leads along the north shore of Key West from Man of War Harbor to a junction with the Garrison Bight Channel off Trumbo Point. A highway bridge crossing the channel between Key West and Fleming Key has a 42-foot fixed span with a clearance of 18 feet.

The Intracoastal Waterway from Miami to Key West joins Garrison Bight Channel off the north end of Fleming Key.

Measured course.—South of Sand Key is a measured course 6,510 feet long on bearing **089°38′.** The westerly front range marker is 140 yards north of Sand Key Light, and the easterly front marker is 50 yards north of Rock Key. The rear markers are about 600 yards north of the front markers. All are slattered white daymarks with vertical black trim.

Anchorages.—The best anchorage is north of the city in **Man of War Harbor** where depths are 19 to 26 feet. This, the usual quarantine anchorage, is protected against heavy seas by Frankfort and Pearl Banks, coral banks, on the west and **Fleming Key** on the east. Small craft usually anchor in **Key West Bight** or **Garrison Bight** on the north side of the city.

Vessels can anchor west of the city in depths of 14 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, southwest of **Fort Taylor,** 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 south of Chesapeake Bay.

A **naval explosives anchorage area** has been established about 3.1 miles southwestward of Key West Light; see **202.189a,** chapter 2, for limits and regulations.

Dangers.—A **naval restricted area** is about 0.6 mile south of Key West Light; limits and regulations are given in **207.173,** chapter 2.

The waters off the naval station at Key West are restricted; limits and regulations are given in **207.173a,** chapter 2.

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; limits and regulations are given in **204.95,** chapter 2.

Tides.—The mean range of tide is 1.3 feet at Key West, and 2.5 feet at the Northwest Channel jetties. Daily predictions for Key West are given in the Tide Tables.

Currents.—In the southern approaches to Key West within the 10-fathom curve currents are weak and variable. In the main channel west of Fort Taylor, the flood (northerly) and the ebb (southerly) currents at strength average 1.0 knot and 1.7 knots, respectively. In the upper turning basin the flood sets northeastward and the ebb southwestward 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. Daily predictions for Key West are given in the Tidal Current Tables. However, both the time and velocity of the tidal current are influenced by winds.

Weather.—See appendix for **Key West Climatological Table** and **storm warning displays** in the Key West area.

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 who have on board a pilot licensed by the Federal government. Vessels are boarded day or night at the sea buoy. The pilot boat is a 45-foot launch with white hull and buff housing and deck; flies the code flag **H,** and is equipped with radiotelephone (2182 or 2738 kcs.). Pilots can be notified in advance by radiotelephone or radiotelegraph through the Tampa Marine operator, telephone Key West 296–5512, or through the ships' agents. Fishermen at Key West are available as pilots for Hawk Channel.

Vessels frequently find it convenient to make use of a special service performed by the pilot boat at Key West. If requested by radio or telegraph, the pilot boat will meet vessels at the outer buoy at the entrance to the Main Ship Channel to deliver orders or provisions; there is a charge for this service.

Towage.—There is commercial towage service for small vessels. Key West is the regular station for a large salvage tug. General equipment is available for heavy salvage work.

Quarantine.—Vessels subject to quarantine inspection are boarded off Fort Taylor, and no vessel is permitted to dock before obtaining pratique. The quarantine anchorage is in Man of War Harbor if size and draft of vessel permits. Larger vessels anchor in the outer harbor.

The United States Public Health Service maintains an outpatient office at Key West. In addition to the County and Navy hospitals, two private hospitals are available.

Customs.—Key West is a port of entry and marine documents are issued.

Immigration officials are stationed at Key West for the inspection of passengers and crews of vessels in the foreign trade.

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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 6 m.p.h. is enforced in the Main Ship Channel between lighted buoy 10 and the inner harbor. The harbormaster can be contacted by radiotelephone through the Tampa Marine operator, telephone Key West Cypress 4-1815 for local weather and marine information and berthing instructions.

Wharves.—The Municipal Wharf is the only commercial deepwater wharf in Key West Harbor. It is a marginal wharf with 1,100 feet of berthing space with 30 feet alongside. An oil terminal is on the northern half of the wharf. The only other deepwater wharves in the harbor are at the naval station and naval station annex at the north end of the harbor channel. In 1965, there were no facilities at the Municipal wharf.

Supplies.—Bunker C, diesel fuel, gasoline, fresh water, and marine and yacht supplies are available at Key West.

Since the port is less than an hour's run off the main route for ships passing the southern end of Florida, it is a convenient port of call for provisions and fuel. Local arrangements can be made for delivery of provisions and supplies to vessels laying-to off the entrance to the Main Ship Channel (see Pilotage).

and marine and yacht supplies are available at Key West. Two of these are in Key West Bight and one is just outside the bight. The largest marine railway in the bight can haul out vessels up to 165 feet in length for general hull and engine repairs. Above water hull and engine repairs can be made to larger vessels. The yard outside the bight has a 12-ton travelift that can haul out craft up to 40 feet in length. Radio and electronic repairs can be made.

Small-craft facilities.—Small craft moor in **Key West Bight,** and in **Garrison Bight** at the Municipal Marina, or at the Key West Yacht Club. The depth into the basin west of Key West Bight is about 19 feet with 7 feet at the fuel pumps. A causeway across the southwestern 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 northern part of the bight and the entrance has a clearance of 34 feet over the entrance channel. Anchorage in 6 to 8 feet is available at the Municipal Marina and at the Key West Yacht Club in the bight. Public small-boat 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 north, and there is air service to Miami. Bus service is available to mainland points.

Safe Harbor, 4 miles eastward of Key West, is a deepwater harbor on the south side of Stock Island. A power plant and desalination plant on the east side, the fishing harbor on the west side, and a sand and gravel plant and cement mixing plant at the head are conspicuous. In January 1965, the controlling depth in the entrance channel was reported to be 20 feet with greater depths inside the harbor. A lighted buoy marks the approach.

The fishing harbor on the west side has cold storage and seafood packing plants and numerous shrimp boats tie up at the finger piers. A shipyard on the west side at the head, north of the fish piers, has a 100-ton marine lift that can haul out craft up to 120 feet in length for hull and engine repairs. A boatyard and marina at the southeast end of Stock Island east of the harbor has a 12-ton travelift that can haul out craft up to 50 feet in length and builds craft up to 45 feet. A large marina on the east side just north of the power plant has berthing with electricity in depths of 15 feet. Gasoline, diesel fuel, ice, and fresh water are available at the fish piers and at the marina, which also has marine and yacht supplies, and a launching ramp.

Cow Key Channel, between Stock Island and Key West and marked by daybeacons to the bridges, has a least depth of about 2 feet. Shallow draft boats can pass through the highway bridges between the keys. The bridges have fixed spans with a minimum width of 16 feet and a clearance of 8 feet. A small marina just south of the bridges has gasoline and water available. North of the bridges the channel is unmarked and difficult to follow.

Charts 1252, 1351.—The area from Key West for 63 miles westward 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 south 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, southward and westward 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; for limits and regulations, see **204.90,** chapter 2.

Boca Grande Channel, between **Boca Grande Key** and the Marquesas Keys, is about 15 miles westward 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 buoys, 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 east coast. Good anchorage is available 1 mile northeastward of Boca Grande Key for boats drawing less than 5 feet.

Currents.—In Boca Grande Channel the average veloc-

ity of the current is 1.2 knots; the flood current sets northward and the ebb southward. The velocity of the current is considerably influenced by the winds.

The **Marquesas Keys,** on the west 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 south-by-east direction, passing well to eastward of the coral heads a mile south of the opening. **Ellis Rock,** 4 miles northwest of the Marquesas Keys, is covered 7 feet and surrounded by depths of 21 to 39 feet; the rock is marked by a buoy.

Danger zones of bombing and strafing target areas, centered on targets, are in the vicinity of the Marquesas Keys; limits and regulations are given in **204.95,** chapter 2.

A large shoal, the western part of which is known as **The Quicksands,** extends 18 miles westerly 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 eastern part.

Halfmoon Shoal, covered 8 feet, is off the western end of The Quicksands. A wreck covered 6 feet and marked by a buoy is on the western edge of the shoal.

New Ground, a shoal with a least depth of 4 feet at its western end, is about 6 miles long. It extends in an east-west direction about 3.5 miles north of The Quicksands. A lighted whistle buoy is off the western end. The water shoals abruptly on the north side of New Ground, and vessels should stay in depths greater than 13 fathoms to insure 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 by vessels, lies west of Halfmoon Shoal, but is not recommended. Southwest of Halfmoon Shoal, depths of 20 to 22 feet rise abruptly from depths of about 40 feet.

Isaac Shoal, 5 miles west of Halfmoon Shoal and 2 miles southeast of Rebecca Shoal, is covered 14 feet. The shoal rises from depths of 36 to 60 feet.

Rebecca Shoal, 43 miles west 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 southerly 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 within a mile southeast and west of the light.

Currents.—Between Halfmoon Shoal and Rebecca Shoal at Isaac Shoal the current floods northward with an average velocity at strength of about 1.0 knot and ebbs southward with an average velocity of about 0.8 knot. The velocity of the current is considerably influenced by the wind.

The current south of New Ground Shoal has an average velocity of 0.7 knot with the flood setting northeastward and the ebb southwestward. The velocity and direction of the current are influenced considerably by the wind.

Chart 1351.—**Rebecca Shoal Channel,** immediately westward of Rebecca Shoal Light, frequently is used by vessels bound from the Straits of Florida to points on the west coast of Florida. Vessels bound for Mobile and points west pass to the westward of the Dry Tortugas.

So far as known, Rebecca Shoal Channel is clear, but possibily 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 south of The Quicksands before turning northward. The passage is well lighted.

Chart 585.—The **Dry Tortugas** are a group of small keys and reefs 63 miles westward from Key West. The group is about 11 miles long, in a northeast-southwest direction, and 6 miles wide. **Pulaski Shoal,** at the northeastern end of the group, is 12 miles northwestward 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 hexagonal pyramidal skeleton tower on piles on the east 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 a wall 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 southeast bastion. Garden Key and the surrounding waters of the Dry Tortugas are subject to rules and regulations prescribed by the Secretary of the Interior.

The southerly and northerly of the three wharves on the eastern side of the key are reported to be in ruins. The center wharfs, off the southeast front of the fort, is reported in good condition, with 16 to 22 feet alongside. No fuel, provisions, or fresh water are available.

Small craft should not try to make Dry Tortugas from Key West, due to 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 westward of Garden Key. **Dry Tortugas Light (24°38.0′ N., 82°55.2′ W.),** 151 feet above the water, is shown from a conical tower, lower half white and upper half black, near the center of Loggerhead Key. A radiobeacon is at the light.

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.

Bush Key, just eastward 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 eastward or southeastward, 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 northwestward or southwestward, 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 buoyed 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 south of **East Key** and **Middle Key**, and passes between the marked 25-foot shoal southward of **Hospital Key** and **Iowa Rock** off **Bush Key Shoal.** The reefs south of Middle Key can be cleared by keeping south 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 one mile east of Garden Key, the current floods northward and ebbs southward with an average velocity of 0.6 knot.

Southwest Channel leads betwen the reefs westward and southwestward of Garden Key and those off Loggerhead Key. The least depth found along the buoyed 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 northward, is northward and northwestward 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 with buoys.

In emergencies, the best shelter is southwest of Garden Key and the channel encircling it, where protection is afforded from northwesterly winds. However, the holding ground is poor, as boats drag anchor along the silty bottom.

Anchorage regulations for Tortugas Harbor are given in **202.190,** chapter 2.

Tides and currents.—The mean range of tide at Garden Key is 1.2 feet. In Southwest Channel, 1 mile south of Loggerhead Key, the current floods northward and ebbs southwestward at average velocity at strength of 0.5 knot. In Southeast Channel the current floods northward and the ebb southward 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 1351.—For 10 miles westward 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 west of Loggerhead Key and has a least known depth of 38 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 1113.—From Cape Sable to San Carlos Bay the west 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 north-northwestward 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. On account of frequency of northers during the winter months, this track is not recommended for small craft, and the route across Florida Bay is to be preferred.

Chart 1251.—Moser Channel, 36 miles eastward 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.

The tidal current at the Moser Channel bridge floods north-northwestward with an average velocity of 1.4 knots and ebbs south-eastward with an average velocity of 1.8 knots. Wind effects modify considerably the current velocities and directions.

A **danger zone** used for strafing operations is 9 miles northwestward of Moser Channel bridge; see **204.86,** chapter 2, for limits and regulations.

Charts 1249, 1250.—Florida Bay, a triangular-shaped body of water between the Florida Keys and the south coast of the mainland, extends in a general east-west direction from Shell and Bogie Keys to Cape Sable. Depths are shallow and irregular; the bottom is mostly coral, with a thin covering of silt in the eastern part. From April to October the waters of the bay are clear and the shoals plainly discernible, but during the winter months the water frequently turns milky and renders the shoals indistinguishable.

In the eastern part of the bay are numerous ridges and reefs which bare, or nearly bare, at low water. The western part of the bay has depths ranging from 7 to 13 feet, and the bottom is covered with loggerhead sponges and small coral heads.

Chart 598-SC.—Flamingo, on the mainland about 9 miles east of East Cape, is a tourist center in **Everglades National Park,** at the entrance of **Buttonwood Canal.** An

entrance channel, dredged from the 7-foot contour in the bay to the canal entrance, has a depth of about 5 feet. The channel is marked by lights and daybeacons. The highway bridge about 0.5 mile above the mouth of the canal has a 45-foot fixed span with a clearance of 10 feet. A marina at Flamingo, with about 5 feet alongside, can accommodate about 100 small craft. Gasoline, diesel fuel, water, ice, ramp, and limited marine supplies are available. A 2-ton marine hoist and a marine lift are available to handle boats up to 50 tons in weight and 40 feet in length. The marine lift is owned by the National Park Service and boats are hauled out only on request from the manager of the marina. A standpipe on the east side of the entrance is prominent.

See appendix for **storm warning displays.**

Charts 1250, 1253, 1254.—Cape Sable, the low and wooded southwestern 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.—Lines from the Marquesas to Cape Sable are described in § **82.60,** chapter 2.

Small vessels can find good anchorage 1.5 miles southeast of East Cape in 7 to 8 feet of water. The even marl bottom is good holding ground, and the anchorage is well protected from northerly winds. A drainage canal opening into Florida Bay 1 mile east 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 south. Only trappers and fishermen frequent this area.

From Northwest Cape the coast trends north for 20 miles, then northwestward 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.

Nothing stands out prominently along this section of the coast, 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 north 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. The rivers afford good anchorage for craft able to cross the bars off the entrances.

Charts 598–SC, 599–SC.—Craft drawing up to 3½ feet can traverse the system of tidal bays, creeks, and canals from Flamingo Visitors Center to the Gulf of Mexico 6 miles north of Northwest Cape. The route through Buttonwood 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.

Ponce de Leon Bay is a nearly rectangular bight 7 miles north of Northwest Cape. **Shark Point,** on the north side of the bight, and **Shark River Island,** on the south 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 northern 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 east of north or south, and the shoal on the northwest 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 east and southeast 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 southeast corner of Ponce de Leon Bay. At the southern end of Oyster Bay is the entrance to **Joe River,** a tidal channel extending some 10 miles in a southeasterly direction to the southern 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 easterly 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. Northeasterly winds often cause drops in the water level of a half foot. At the southern 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 south side of **Shark River Island** about 6 miles north 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 east-northeastward 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 east side of Ponce de Leon Bay. Some 8 miles northeastward, 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 north and east from Tarpon Bay into the Everglades.

Harney River, emptying into the Gulf about 11 miles

north 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 north of Northwest Cape. About 3½ feet can be taken over the bar 1.5 miles southwest 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 which extend northward along the coast for some 60 miles. Launches 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.

Lostmans River is entered through **First Bay,** which is about 19 miles northward of Northwest Cape. Local boatmen use the north 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** is located on the north side of the entrance to the river. The radio tower is prominent.

Chart 1253.—Seminole Point, 24 miles northward from Northwest Cape, is fairly prominent when standing up the coast at a distance of 2 to 3 miles off. The point is the southwest end of **Plover Key,** and is the most westerly land seen until Pavilion Key is picked up to the northwestward.

Limited anchorage, protected in all weather, is available for boats drawing up to 4 feet between the keys of the group northwest of **Snake Key.** Approach the south end of the group on an easterly course and follow the shore at a distance of about 50 yards until in a landlocked harbor between the keys.

Chart 1254.—Pavilion Key, 30 miles northward 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 easterly point of the southern end of Pavilion Key. The approach to the anchorage passes close westward of the small key 0.3 mile southeast of Pavilion Key.

Chatham River and **Huston River** empty into the Gulf 3 miles eastward 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, 6 miles north-northwestward from Pavilion Key, marks the entrance to **Chokoloskee Pass,** the approach to the town of Chokoloskee. Jewel Key is a small flat island, easily identified by two prominent clumps of trees.

Chokoloskee is a year-round community on an island, about 0.5 mile in diameter, near the southeastern end of Chokoloskee Bay about 3 miles east-northeastward of Jewel Key. The island is joined to the mainland near Everglades 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. In 1965, it was reported that 6 feet could be taken to the island's facilities in privately marked channels through **Rabbit Key Pass** and Chokoloskee Pass. At low water, during periods of northerly 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 in a 6-foot dredged channel marked by daybeacons across the bay to the basin of the National Park Service at the northwest end of the causeway.

There are four marinas on the island. One is at the north end of the east side of the causeway. The other three are at the south end of the island. Two of them have boatyards that build craft up to 36 feet in length. The largest marine railway can haul out craft up to 50 feet in length for hull and engine repairs. Two marinas have protected basins. All have slips at which berthage with electricity is available. One has an 8-ton lift that can haul out craft up to 35 feet in length. Gasoline, diesel fuel, water, ice, yacht and marine supplies, wet and dry storage, boat ramps, and a machine shop are available.

Indian Key, on the west 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 northeast of Indian Key in depths of 8 to 13 feet, and about 1 mile northeast 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, 38 miles northward of Northwest Cape, is the approach to the town of Everglades. Federal project depth is 8 feet through the channel, marked by lights and daybeacons, from Indian Key, through Chokoloskee Bay and **Barron River** to a turning basin at Everglades. In December 1966, the controlling depth was 6 feet. An overhead power cable about midway of the town has a clearance of 65 feet.

A side channel, dredged to 6 feet and marked by daybeacons, leads southeastward from the channel at the mouth of Barron River to a turning basin and the protected basin of the National Park Service. A visitors center of The Everglades National Park is under construction 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 south end of the bank extending off the south end of the key, marks the entrance to the pass. The mean range of tide is 3.4 feet at Indian Key.

Everglades, a town about 0.5 mile above the mouth of Barron River, has a sizable shrimp and sponge industry, and is the tourist center for **The Everglades National Park.** It is also a center for sport fishing in The Everglades and the offshore waters in the Gulf, and the shipping center for the truck-farming and fruit-growing interests in the vicinity. 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 a hospital, and several fish packing and sponge processing plants. Small-craft facilities here can provide gasoline, diesel fuel, water, ice, marine supplies, electronic repairs, engine and hull repairs, and dry open and covered storage; a 35-foot marine railway is also available. Several launching ramps are along the waterfront. A mile-long section along the bulkheaded east bank of the town is used for berthing. Local fishing guides will act as pilots for The Everglades and adjacent waters of the Gulf.

The National Park Service has an office in the post office building. The mean range of tide is 2.0 feet at Everglades.

See appendix for **storm warning displays.**

West Pass, 2.8 miles northwestward from Indian Key, extends generally northeastward for 3 miles from the north side of **Tiger Key** to **West Pass Bay.** A draft of 2 feet can be taken to West Pass Bay, thence eastward into Chokoloskee Bay and southeastward to Barron River and Everglades. West Pass is unmarked.

Fakahatchee Pass, 4 miles northwestward from Indian Key, extends northeastward for 3 miles from the west side of **Round Key** to **Fakahatchee Bay. Fakahatchee** is a small settlement on an island on the south side of the Bay. No supplies are available.

Cape Romano is the south end of a large island 78 miles northward from Key West. Here the coast changes its trend from northwest by west to north-northwest.

Northward of Cape Romano deep water approaches the coast much more closely than it does south 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. A radar tower on the north side of the entrance to Caxambas Pass is the most prominent landmark in the area. The buff-colored buildings near the tower are prominent at a distance of 5 to 6 miles offshore. Readily identifiable are the light at Big Marco Pass, and the pier, buildings, and water tank at Naples.

Cape Romano Shoals, extending 10 miles southward from the cape, are a series of irregular patches that bare in places near the shore and have depths of 1 to 10 feet over them farther off. A lighted bell buoy marks the south 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 southward and the ebb northward.

Gullivan Bay is between Cape Romano and the islands to the eastward. At the head of the bay is **Coon Key** which marks the southern approach to Goodland, Big Marco River, and also the route westward to Caxambas Pass. On the approach from southeastward, **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 eastward 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 northwestward 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 south point of the entrance.

Big Marco Pass, 8 miles northward from Cape Romano, is marked by a light, daybeacons, buoys, and a lighted buoy 2 miles off the pass. The channel over the bar is subject to change, and the buoys marking it are shifted from time to time. Shoals extend a mile seaward on either side of the channel; these usually are indicated by breakers or discolored water. A shoal which uncovers at low water extends about 250 yards northwest from the light. In February 1965, the controlling depth over the bar was reported to be 5 feet, but local fishermen reported that too much reliance should not be placed in the two buoys marking the approach from southward, as they did not always mark the best water. It was also reported that, in good weather, 5 to 6 feet of water could be found in an approach from the westward with Big Marco Pass Daybeacon 4 bearing 073°.

Big Marco River trends eastward and then southward 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. 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 southeast to southwest, 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 north of Coon Key, has a swing span with a clearance of 8 feet. The overhead cable above the bridge has a clearance of 57 feet.

Marco Island, a large island situated betwen Caxambas Bay, Big Marco Pass, and Big Marco River, has for the most part been developed as a residential year-round community. Lagoons have been dredged and the marshland backfilled to provide for waterfront homesites. A yacht club and a large marina are on Big Marco River at the northeast end of the island. Gasoline, diesel fuel, water, ice, and yacht supplies are available at the marina. In February 1965, numerous homes had already been built and the project was well along in development.

Collier City, at the south 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 east 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; a 35-foot marine railway is also available. Local fishing guides are available and will act as pilots for the waters.

Marco is a small settlement at the north end of Marco Island on the south bank of Big Marco River 1 mile from the light in Big Marco Pass. The town is known locally as **Old Marco Village.** There are marinas where gasoline, diesel fuel, water, ice, and marine and yacht supplies are available. There is a protected basin at the inn where berthage with electricity and fresh water is available in 6 to 12 feet of water. Berthage is also available at other marinas. There are several ramps. Local fishing guides act as pilots for the adjacent waters. State Route 92 connects all parts of Marco Island with the Tamiami Trail about 11 miles inland.

Smokehouse Bay enters Big Marco River from the southward at Old Marco Village. In 1965, 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. It is connected by State Route 391 with the Tamiami Trail about 8 miles inland. Marinas are on the north side on Johnson Bay. Gasoline, diesel fuel, water, ice, marine and yacht supplies, ramps, and berthage in 6 to 17 feet are available at the marinas. Local fishing guides act as pilots for the adjacent waters of the Gulf and the bays and channels. In 1965, 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.

Routes.—Approaching Big Marco River from Gullivan Bay, a course of **325°** from a position 0.3 mile northeast of Coon Key Light leads between the north end of Coon Key and Big Marco River Daybeacon 2. Then follow the daybeacons. After passing through the draw of the highway bridge, head north-northeast for 100 yards before heading north 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 northerly from Marco to Naples through creeks and dredged channels. Federal project depth is 6 feet; in February 1962, the controlling depth was 4 feet. The waterway is well marked.

Hurricane Pass, 1.5 miles northward from Big Marco Pass, was cut through the barrier beach by a hurricane. Depths in the pass, in 1965, were reported to be 6 feet, and local fishermen sometimes use the pass in preference to Big Marco Pass.

Little Marco Pass, 3 miles northward from Big Marco Pass, has a depth of about 2 feet over the bar. The pass is unmarked and is little used.

Gordon Pass, 16.5 miles northward of Cape Romano, is the entrance to Naples Bay and also the northern 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. The pass and the bay channel have been improved by dredging. Federal project depths of 12 feet over the bar and through the pass, and thence 10 feet to just below the highway bridge at Naples, were available in 1963. An overhead power cable over the pass has a clearance of 65 feet, **Gordon Pass Lighted Buoy 1 (26°05.4′ N., 81°48.7′ W.)** marks the entrance.

Naples, 2.5 miles northward of Gordon Pass, is a large year-round tourist center on the Bay of Naples and the outer Gulf coast. It has sizable fishing and sponge industries, and airport, and a new modern hospital. It is on the Tamiami Trail and served by the passenger and freight service of the Atlantic Coast Line Railroad. Lagoons have been dredged and the former marshland backfilled to form waterfront homesites in the areas of **Port Royal** at the south end of the city, **Royal Harbor** on the east side of Naples Bay, and **The Moorings** at the north end of the city.

Several tall water tanks, apartment and hotel buildings, and the kiosks on the 1,000-foot Municipal Fishing Pier extending into the Gulf are prominent.

There are several boatyards on Naples Bay, a large private yacht basin with covered berths on the north side of the entrance, several marinas, a large Municipal Yacht Basin with a 45-ton lift in **Crayton Cove,** and a large boatel just north of it. The small-craft facilities can provide gasoline, diesel fuel, water, ice, dry open and covered storage, marine and yacht supplies, and hull, engine, and electronic repairs. The largest marine railway in the area can handle craft up to 95 feet in length; lifts up to 50 tons are also available. There is a **Dockmaster** at the Municipal Yacht Basin, and a **Harbormaster** 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. Local and interstate bus lines and railroad serve the city. See appendix for **storm warning displays.**

Doctors Pass, locally known as **Moorings Pass,** about 5 miles northward of Gordon Pass, has been improved by dredging. The entrance is protected by two stone jetties. A large apartment building south of the entrance is prominent. Many large homes are north and south of the pass and around the shores of **Mooring Bay, Bowline Bay, Compass Cove,** and **Hurricane Harbor** inside the entrance. A yacht basin and marina, and a yacht club are on the inside of the pass just south of the entrance. Gasoline, diesel fuel, fresh water, ice, marine supplies, and covered and open berthage are available. In 1965, there was reported to be 5 feet in the entrance and from 7 to 15 feet at the marina and the various basins.

Charts 1254, 1255.—Clam Pass, about 5 miles north of Naples, is shoal and used only by outboards in good weather.

Wiggins Pass, 4 miles northward of Clam Pass, is shoal and used only by small craft entering **Cocohatchee River** and the chain of lagoons and inland waterways that lead

northward 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 Springs 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 1965, there was reported to be 3 feet in Big Hickory Pass and 3 to 10 feet in the lagoons and waterways.

Several marinas and fish camps are south of the bridge over Big Hickory Pass. Fuel, provisions, water, berthage, and ramps are available at the marinas. Stakes mark the channels leading northward through Estero Bay to Big Hickory, New, and Big Carlos Passes.

The highway continues northward from Big Hickory Pass over causeways on the islets in the south end of Estero Bay with bridges over New Pass, the pass just northward of Big Hickory Island, and Big Carlos Pass. The bridge over New Pass has a 50-foot fixed span with a clearance of 30 feet, and the one over the entrance to the lagoon on the east side of **Black Island** has a 30-foot fixed span with a clearance of 10 feet.

In 1965 there was reported to be a depth of 4 feet in **New Pass** and the channel leading southward to the marinas south of Big Hickory Pass. The channel is marked by stakes.

Charts 856–SC, 1255.—San Carlos Bay, 41 miles north-northwestward 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 months.

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 eastern end of **Sanibel Island.**

Caloosa Lighted Bell Buoy 2 (26°23.7′ N., 81°55.6′ W.), about 6 miles southeastward 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.—Federal project depth in San Carlos Bay is 12 feet from the Gulf to Punta Rassa and the mouth of Caloosahatchee River. In September 1963, the controlling midchannel depth was 9½ feet from the Gulf to the mouth of Caloosahatchee River. Lights, daybeacons, and buoys mark the channels.

Estero Pass opens into the eastern end of San Carlos Bay 2.5 miles from Sanibel Island Light. Small vessels can find secure anchorage just inside the pass. A Federal project provides for a 12-foot channel through San Carlos Bay; thence 11 feet through Estero and Matanzas Passes to the upper shrimp terminals. In October 1966, the controlling depth was 11 feet. The channel is marked by lights, daybeacons, and buoys.

The highway bridge which 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.

There are extensive small-craft facilities in the vicinity of the bridge connecting the north end of Estero Island with San Carlos Island, and a boatyard with a 100-foot marine railway is about 2 miles south of the bridge on the east side of Estero Island. Gasoline, water, ice, marine and yacht supplies, hull, engine, and electronics repairs, ramps, storage, and diesel fuel are available. A 80-foot marine railway, and lifts up to 20 tons are also available.

In 1963, the controlling midchannel depth was 3½ feet in the channel, privately marked by daybeacons, leading southeastward between San Carlos Island and Estero Island, through Matanzas Pass to Big Carlos Pass. Caution should be observed in navigating this channel. Drafts up to 4 feet can be carried through Big Carlos Pass with local knowledge; however, in 1966 a shoal was reported building up in the pass. There are no daybeacons across the shoal water outside the pass.

A highway bridge crossing Big Carlos Pass from Carlos Point to Black Island has a 50-foot bascule span with a clearance of 23 feet at the center; see **203.432a,** chapter 2, for drawspan regulations. A marina on Carlos Point just north of the bridge has covered and open berthage, ramps, gasoline, water, and ice. In 1965, there was reported to be 5 feet in the approach and at the berths.

About a mile northwest of the bridge a 2,100-foot dredged cut, 150 feet wide, leads to a basin 500 feet long and 200 feet wide. In 1965, there were reported depths of 20 feet in the cut and 15 feet in the basin. A marina in the basin has covered and open berthage, a ramp, gasoline, water, and marine and yacht supplies. Diesel fuel can be obtained by truck on short notice.

Fort Myers Beach, on Estero Island, is a winter resort with a municipal yacht basin. A good highway leads to Fort Myers and connects with the highway leading to Sanibel Island toll bridge. Small-craft facilities were covered previously. See appendix for **storm warning displays.**

Punta Rassa, on the east side of San Carlos Bay and 2 miles north of Sanibel Island Light, has a small settlement on the point, and a marina where gasoline, water, ice, and marine and yacht supplies are available. Covered and open berthage with electricity and covered and open dry storage, and two surfaced ramps are also available. The marina has a fork lift that can handle craft up to 23 feet for hull and engine repairs and storage. In September 1963, the controlling depth in the approach to the basin was 2½ feet. See appendix for **storm warning displays.**

Sanibel Island Causeway and toll bridge crossing San Carlos Bay from Punta Rassa to Sanibel Island has three bridges over the channels. Bridge "A" 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 west end has a fixed span with a clearance of 26 feet.

Sanibel Island Channel along the northeast 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.

The power cable between Woodrings Point and St. James City is submerged where it crosses the main channel and the channel to Tarpon Bay.

Anchorage.—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 southeastward of Sanibel Island Light. With northerly winds there is good anchorage in depths of 16 to 24 feet under the lee of the southern end of Sanibel Island, with the light bearing anywhere between northeast and north-by-west. The anchorage off Punta Rassa is good, but the tidal currents have considerable velocity at times. There is good anchorage along the northeast shore of Sanibel Island west 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 which is unsurveyed and caution must be exercised in using it.

Tides and currents.—The mean range of tide at Point Ybel is 1.8 feet and less than 2 feet in Pine Island Sound. The average velocity of the current is 1.0 knot in San Carlos Bay off Point Ybel.

Caloosahatchee River flows generally southwesterly 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.

Federal project depth is 10 feet in Caloosahatchee River from Punta Rassa to Fort Myers. In September 1963, the controlling midchannel depth was 9 feet. The channel is well marked by lights, daybeacons, and ranges.

The diurnal range of tide in Caloosahatchee River is 2.4 feet at Punta Rassa and 1.2 feet at Fort Myers.

A dredged channel leading from the entrance to Caloosachatchee River southwestward to Pine Island Sound is part of the Federal project for the Intracoastal Waterway to Anclote River. The midchannel controlling depth was 9 feet in 1964.

Port Comfort in **Punta Rassa Cove** has a boatyard and marina that has open and covered berthage with electricity and wet and dry open and covered storage, and a surfaced ramp. Gasoline, water, ice, and some marine and yacht supplies are available. A marine railway can haul out craft up to 60 feet in length for hull, engine, and electronic repairs, or storage. The controlling depth in the privately marked channel to the basin was reported to be 4 feet in February 1965.

Little Shell Island is on the north side of the river channel opposite **Shell Point**; gasoline and water are available.

In September 1963, the controlling depth to the pier was 3½ feet with 4 feet alongside. In 1965, it was reported that the facilities were on a part time basis and that fuel was not always available.

Iona Cove, on the south side of the river and 1 mile above Shell Point, is the site of a small repair yard and boat basin with wet storage accommodations for 50 boats. The marine railway can haul out vessels up to 40 feet in length for hull, engine, and electronic repairs. Gasoline, diesel fuel, water, ice, open and covered berthage with electricity, marine and yacht supplies, and a surfaced ramp are available. In September 1963, there was 4 feet in the approach channel and 3½ feet in the basin. Privately maintained beacons and a lighted range mark the entrance channel; the rear range light is visible from the river channel.

Cape Coral, the extensive canalized area northwestward of **Redfish Point** on the north side of the river 7 miles above the mouth, is the site of a large year-round community. A privately marked channel, which had a controlling midchannel depth of 6½ feet, in September 1963, leads to the basin and marina of the Cape Coral Yacht and Racquet Club. There was 4½ to 13 feet in the basin and the lagoons of the development. Gasoline, water, ice, berthing with electricity, a surfaced ramp, a 1½-ton lift, and marine and yacht supplies are available.

In February 1965, there was reported to be 2 feet in the channel leading to the western entrance to the lagoons at the western half of the Cape Coral development.

Deep Lagoon (Big Slough), across the river from Cape Coral, provides good anchorage and mooring for drafts up to 7 feet. In September 1963, the controlling depth was 7 feet in the privately marked channel to the lagoon. A commercial shell and cement plant is on the basin. There were no other marine facilities in 1965.

The highway bridge crossing Caloosahatchee River from Negro Head to Cape Coral has a fixed span with a clearance of 55 feet at the center.

Wyomi (Whiskey) Creek, on the south side of the river 10 miles above the mouth, has a privately-marked channel with a reported depth of 2 feet in February 1965. A housing development borders the creek but there are no marine facilities.

Waterway Estates is a community on the west bank of the river opposite Fort Myers, about 2 miles southwestward of the Edison Bridge. Lagoons have been dredged to provide waterfront homesites. A channel leading to a basin and marina had a reported depth of 5 feet in February 1965, with 5 to 10 feet in the basins and lagoons. Gasoline, water, ice, and berthage with electricity are available at the marina.

Hancock Creek, on the north bank of Caloosahatchee River across from Fort Myers, leads to a housing development a mile upstream. In September 1963, the channel had a controlling midchannel depth of 3 feet and was well marked by privately-maintained 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 south bank of Caloosahatchee River 14 miles above the mouth, is the commercial center for this part of the State. The city is served by the Atlantic 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. See appendix for **Fort Myers Climatological Table** and **storm warning displays.**

Fuel and complete supplies are available at Fort Myers. The largest marine railway, 0.7 mile east of Edison Bridge, can haul out vessels up to 100 feet in length for hull and engine repairs. The yard has 4 railways, machine shops, and builds wood and steel vessels. Gasoline, diesel fuel, water, berthage with electricity, and marine and yacht supplies are available. Electronic repairs can be made. In September 1963, the midchannel controlling depth in the privately marked channel leading to the yard was 8 feet, with 8 to 12 feet at the piers.

A marina, about 0.5 mile east of Edison Bridge, has berthage with electricity, a 20-ton travelift that can haul out craft up to 70 feet in length, for hull and engine repairs, or storage. Electronic repairs can be made. Gasoline, water, ice, berthage with electricity, and marine and yacht supplies are available. Diesel fuel can be obtained by truck. In September 1963, the controlling depth was 5 feet in the privately marked channel to the basin.

Fort Myers Municipal Yacht Basin is between the Edison Bridge and the fixed highway bridge 0.4 mile southwest of it. In 1965, the controlling depth in the approach channel was reported to be 10 feet with 7½ feet, in September 1963, within the protected basin. Excellent berthage with electricity, gasoline, diesel fuel, water, ice, marine and yacht supplies, and a ramp are available. Engine and electronic repairs can be made. A dockmaster is in attendance to assign berths and can be reached by telephone, Edison 4–1281, or on holidays on Edison 4–1285. Local fishing guides can be obtained as pilots for the adjacent waterways and the Gulf.

Royal Palms Yacht Club is about a mile southwestward of Edison Bridge. Gasoline, diesel fuel, water, and berthing with electricity are available for members or guests. In February 1965, 7 feet was reported in the privately marked approach channel.

Edison Memorial Bridge, which crosses Caloosahatchee River at Fort Myers, has a bascule span with a clearance of 10 feet in the center and 6 feet at the fenders. Drawspan regulations are given in **203.462,** chapter 2.

U.S. Route 41 (Tamiami Trail) highway bridge crossing the river about 0.4 mile southwest of Edison Bridge has a fixed span with a clearance of 55 feet.

Above the Edison Memorial Bridge, two overhead power cables cross the river with clearances of 78 and 80 feet.

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 Notice to Mariners. See **United States Coast Pilot 4, Atlantic Coast, Cape Henry to Key West,** for detailed description of the waterway.

The coast from San Carlos Bay trends north-northwestward to Boca Grande, the entrance to Charlotte Harbor. The barrier islands of Sanibel, Captiva, North Captiva, and Lacosta are separated from the large Pine Island to the eastward by Pine Island Sound.

Sanibel Island is a 10-mile long hook-shaped island almost tropical in climate and vegetation. A marina in the basin about a mile west of Point Ybel has gasoline, diesel fuel, water, ice, berthage with electricity, a surfaced ramp, and marine and yacht supplies; engine repairs can be made. In February 1965, there was reported to be 5 feet in the approach channel and 3 to 4 feet in the basin.

A marina in Tarpon Bay, about 4 miles westward of Point Ybel, has gasoline, water, ice, berthage with electricity, and a surfaced 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 16-mile channel through the sound has been improved by dredging as part of the extension of the Intracoastal Waterway from Caloosahatchee River to Anclote Anchorage. In October 1966, Federal project depth of 9 feet was available. The channel is well marked by lights, daybeacons, and a buoy. It has been reported that strong cross currents have been encountered especially during the ebb spring tides in the section of the waterway between Daybeacons 2A and 8.

Matlacha Pass is a shallow body of water extending northward 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 is narrow and crooked and has numerous oyster bars. This channel is not recommended without local knowledge. State Route 78 highway bridge from Pine Island to Little Pine Island and to the mainland over Matlacha Pass has a swing span with a width of 29 feet and a clearance of 8 feet; the overhead power cable at the bridge has a clearance of 64 feet. Gasoline, and oil can be obtained at the small docks near the bridge.

Pine Island, between Pine Island Sound and Matlacha Pass, is about 13 miles long and about 2.5 miles wide at the northern 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 southern end of Pine Island, about 4 miles northwest of Sanibel Island Light. In September 1963, the entrance channel had a controlling depth of 3 feet and within the canal depths were 7 to 9 feet. Gasoline, water, and some supplies can be obtained at a small pier which has 2 feet alongside and can be approached only by small craft. There is a 1-ton hoist and a ramp.

There are several marinas and fish camps on **Monroe Canal** and **Henley Canal** where gasoline, water, berthage, ice, and some supplies can be obtained. Private daybeacons mark the entrance to **Long Cut** which leads to the canals. In September 1963, the controlling midchannel depth was 3 feet. A road leads from St. James City to the northern end of Pine Island and connects with a road across Little Pine Island and Matlacha Pass to Fort Myers.

Bokeelia is a small settlement on **Bokeelia Island,** at the northerly end of Pine Island on the southern side of

Charlotte Harbor. Drafts up to about 5 feet can be taken to the wharf at Bokeelia. A small marina at Bokeelia, in **Back Bay,** can provide gasoline, water and ice; berths and a launching ramp are available. A road connects with the southern end of Pine Island and with the bridge over Matlacha Pass to the mainland. Boats on the fish runs out of Punta Gorda provide service to Bokeelia and the settlements on Pine Island Sound.

Blind Pass separates Sanibel Island from **Captiva Island.** The pass is not marked and has a controlling depth of only 1 foot. A highway bridge over the pass has a fixed span with a width of 33 feet and a clearance of 8 feet. There is a fish camp at the bridge where water and ice are available.

Captiva is a fishing village on Captiva Island about 3 miles north of Blind Pass. Gasoline, water, and some supplies are obtainable at Captiva. The approach channel, marked by a light, daybeacons, and an unlighted range has a controlling depth of about 4 feet.

Redfish Pass, about 2 miles north of Captiva, leads into Pine Island Sound 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.

A small marina near the west end of Captiva Island, just inside the pass, has gasoline, water, ice, limited berthage with electricity, and a surfaced ramp.

Captiva Pass, leading from the Gulf into Pine Island Sound about 5 miles north of Captiva, between North Captiva and Lacosta Island, is used to some extent by small fishing boats. The channel is unmarked, and local knowledge is required to carry the best water. There is about 6 feet of water in the pass. Fair anchorage is available for small boats in Safety Harbor, which is 0.5 mile south of Captiva Pass and 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, a winter resort near the north end of Pine Island Sound, has a large hotel. On the northwest side of the island is a natural small-boat basin. Several channels, reported to be unmarked, lead into the basin; local knowledge is required to avoid the shoal areas. Gasoline, diesel fuel, water, ice, and a 2-ton lift are available at a hotel marina on the east side of the island. A depth of about 6 feet can be taken to the hotel wharf.

Lacosta Island is on the south side of the entrance to Charlotte Harbor. **Pelican Bay,** on the northeast 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 south-southeasterly from the north end of the island; the controlling depth is about 5 feet. A small circular basin at the north end of the bay affords excellent protection to small craft, but the entrance is reported almost filled in and is difficult to navigate.

A channel, marked by daybeacons, leads eastward from Pine Island Sound, northward of Useppa Island, and thence northeastward to Charlotte Harbor.

Charts 857–SC, 1255.—Charlotte Harbor, about 60 miles south-southeastward from Tampa Bay, is the approach to Port Boca Grande, Boca Grande, Punta Gorda, and several smaller settlements. On the south side, Charlotte Harbor opens into Pine Island Sound and Matlacha Pass, already described, and on the north side into Gasparilla Sound.

Port Boca Grande on the inner side of the south end of Gasparilla Island is an important phosphate rock shipping port. The town of **Boca Grande** is about 2 miles to the northward.

Prominent features.—When approaching the entrance from the southward or southwestward, 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 south 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 west of Lacosta Island south of the entrance.

Upon closer approach, the loading transporter at Port Boca Grande, a yellow and a black tank, both about 0.4 mile north of the end of the island, will be seen. Two silver-colored water tanks and a radio tower at the town of Boca Grande also are prominent. **Port Boca Grande Light (26°43.0′ N., 82°15.7′ W.),** 41 feet above the water, is shown from a white frame dwelling on the south 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.—Charlotte Harbor is entered from the Gulf via the maintained Boca Grande Channel. Federal project depths are 32 feet from the Gulf to Port Boca Grande, and thence 10 feet to the Municipal Terminal at Punta Gorda. See Notice to Mariners and latest editions of charts for controlling depths for Boca Grande Channel. In 1961, the controlling depth from Port Boca Grande to the highway bridge at Punta Gorda was 7 feet. The channels are well marked by lighted ranges and other aids. A break on the north side of the channel near the south end of Gasparilla Island forms a swash channel which was reported to have a controlling depth of 10 feet in 1965. 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 north side of the channel between Boca Grande Entrance Front Range Light and the Inner Channel Range Front Light.

Anchorage.—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. 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 north 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 southeast with an average velocity of 0.6 knot; the ebb current is weak and variable. To the north at the Myakka River bridges the current floods to the northwest and ebbs to the east with an average velocity of about 0.5 knot. In Peace River the current floods to the northeast and ebbs to the southwest 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. See appendix for **storm warning displays.**

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 who have on board a pilot licensed by the Federal government. However, most vessels take a pilot. Pilots board vessels off the sea buoy and take vessels in day or night if a berth is available. The pilot boat is a 35-foot motor boat, painted white with buff trim and the word PILOT in black on the bow, flies the code flag "P", and is equipped with portable radiotelephones. The pilots carry portable radiotelephones. Pilots can be obtained by prior notice by radiotelegraph or by radiotelephone through the Tampa Marine Operator to Woodlawn 4-2245, or Woodlawn 4-2252, or through the ship's agents.

Towage.—The pilots have a small towboat available for light towing jobs. Rates are by agreement. There is also a tug available at the oil dock.

Quarantine.—There is no quarantine station at Port Boca Grande. Medical inspection is performed by a health officer who meets ships in port by special arrangement.

Customs.—Port Boca Grande is a port of entry. The Customs Service maintains an office and a deputy collector of customs at the port.

Immigration.—Immigration inspection is handled from Tampa by special arrangement.

Wharves.—The phosphate T-head loading pier is about 0.3 mile northward of Port Boca Grande Light. Phosphate rock can be loaded at a rate of about 1,000 tons an hour. An oil-handling berth is close southward of it. There is reported to be 31 feet alongside the phosphate pier and 35 feet at the oil berth. Caution should be observed in coming alongside the berths because of the possibility of strong current eddies.

Supplies.—Fresh water is piped to the pier, but 24 hours' notice is necessary if more than 40 tons are required. Any amount of ice can be had on short notice. Limited stocks of gasoline, provisions, and marine supplies are available locally; large orders require advance notice.

Repairs.—Small machine-shop repairs can be had locally; large jobs are taken care of with portable equipment from the mainland. About 4 hours' notice is required. Divers are available on a few hours' notice.

Communications.—The Seaboard Air Line Railroad operates freight service in and out of Port Boca Grande.

Boca Grande Bayou, a landlocked lagoon at Boca Grande, provides shelter for small craft. There are marinas, a yacht basin, and boatyards. The largest marine railway can haul out craft up to 70 feet in length for hull and engine repairs, or dry open or covered storage. There is a machine shop at the largest boatyard which builds craft up to 50 feet in length. Open and covered berthage with electricity, marine and yacht supplies, gasoline, diesel fuel, water, and ice are available at the marinas.

The dredged channel into the lagoon is marked by daybeacons, lights, and a lighted range. The channel had a reported controlling depth of 10 feet in 1965. Two highway bridges and a footbridge crossing the bayou limit the height of vessels which go northward in the lagoon, but entry from the northward is possible through an unmarked channel. The bridges have fixed spans with a minimum width of 26 feet and clearance of 11 feet.

Chart 1255.—Riviera Lagoons is a development on Alligator Creek on the east side of Charlotte Harbor about 14 miles northeastward 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 yacht supplies are available. There is a concrete ramp on which a large trailer can haul out craft up to 35 feet in length for hull and engine repairs, or storage.

Peace River empties into the head of Charlotte Harbor from northeastward. Above Punta Gorda the river is navigable for a draft of about 3 feet as far as Hull, 15 miles above the mouth, but caution is necessary to avoid the snags in the upper reaches. Local knowledge is needed to carry the best water. Heavy growth of hyacinth also is found in the upper reaches, which completely blocks many of the small inlets, bayous, and lakes.

The entrance to the river is marked by a light about 1.7 miles west of **Mangrove Point.** The river channel is marked by a light and daybeacons as far as Coon Key just below Cleveland, about 8 miles above the entrance; above that stakes mark the channel.

Punta Gorda, a town on the south bank of Peace River 2 miles above the mouth, has rail and highway connections with points to the north and south, as well as to the interior of the State. Punta Gorda is a commercial fishing port and boats on fish runs connect with various points on Charlotte Harbor and Pine Island Sound for delivery of supplies. A hospital is in the town. See appendix for **storm warning displays.**

Vessels can anchor off Punta Gorda in depths of 6 to 10 feet. Federal project depth in the dredged channel to the Municipal Terminal (City Dock) at the southwest end of the town is 10 feet. The channel is well marked by a light

and daybeacons. In February 1965, dredging was in progress to bring the channel to project depth.

The Municipal Terminal has several seafood processing plants, and a railway siding of the Atlantic Coast Line Railroad. An oil terminal on the south side was inactive in February 1965. There was reported to be 10 to 12 feet along the south side but lesser depths along the north side, which was in poor condition. A fish company has a private shipyard on the north side which has a marine railway that can haul out craft up to 75 feet in length. It is reported that there is little water in the approaches to the railway, and difficulty may be experienced in hauling out vessels for repairs. Gasoline, diesel fuel, water, and ice are available at the wharf.

U.S. Route 41 (Tamiami Trail) highway bridge crossing the river at Punta Gorda has a bascule span with a clearance of 13 feet. An overhead power cable at the bridge has a clearance of 75 feet. The old highway bridge close northeastward, with channel span removed, has been retained as a fishing pier.

The Municipal Marina and trailer camp is between the bridges on the east side. The channel leading to the marina has a controlling midchannel depth of about 4 feet. Gasoline, water, ice, and covered and open berthage in 4 to 5 feet are available. Marine and yacht supplies can be obtained and diesel fuel by truck.

Charlotte Harbor is a community at the northwest end of the bridge. Marinas on the bridge approach can provide gasoline, diesel fuel, water, marine and yacht supplies, ramps, and dry open storage. A 12-ton lift can haul out craft up to 42 feet in length for engine and hull repairs. In February 1965, there was reported to be 4 feet of water in the approaches and at the berths. The Seaboard Air Line Railroad serves the community with bus and freight service.

Port Charlotte is a year-round community on Alligator Bay, immediately northwestward of Charlotte Harbor. It has a hospital, rail freight, and bus connections.

Cleveland is a small village on the south bank 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 Cleveland. The controlling depth is about 4 feet. Overhead power cables crossing the river, about 5 miles above Punta Gorda, have a clearance of 60 feet.

Liverpool, a small settlement on the south bank of the river about 8 miles above the mouth, has gasoline, and water at a fish camp, which has a small dock and ramp. Limited supplies are available. There are numerous private fishing piers and fish camps along the river between Punta Gorda and Liverpool. About 14 miles above the mouth, 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 northwestward. 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 north end of the bridges crossing the river 3 miles above the mouth; limited supplies are available. The highway bridge has a fixed span with a clearance of 24 feet and the swing span of the railroad drawbridge has a channel width of 32 feet and clearances of 3 feet under the drawspan and 6 feet under the trestle. Drawspan regulations are given in **203.245,** chapter 2.

Boats drawing 3 feet can navigate Myakka River as far as the Tamiami Trail Highway Bridge, 11 miles above the mouth. 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. Local knowledge is needed to carry the best water.

The flora and fauna of the Everglades region are preserved in Myakka State Park in the upper reaches of the river.

Charts 857–SC, 586, 1255, 1256.—The coast between Charlotte Harbor and Tampa Bay trends about northwest by north, and has a nearly straight sand beach which 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.

Gasparilla Sound extends northward from Charlotte Harbor for about 7 miles between Gasparilla and Little Gasparilla Islands and the mainland. The sound is navigable for vessels drawing up to 3 feet. Federal project depth is 9 feet from a point off Boca Grande Bayou, through Gasparilla Sound, Placida Harbor, The Cutoff, through Lemon Bay, through Alligator Creek, thence via a landcut to Hatchett Creek, and thence to Roberts Bay and Dona Bay forming a junction with the channel from Venice Inlet to Sarasota Bay.

The railroad trestle which crosses Gasparilla Sound from Placida to the north end of Gasparilla Island has three openings 0.6 mile apart; see **203.245,** chapter 2 for **drawspan regulations.** The northeasterly swing span has a width of 49 feet and a clearance of 4 feet; the middle swing span has a width of 49 feet and a clearance of 4 feet; and the southwesterly fixed span, close to the Gasparilla Island shore, has a width of 10 feet and a clearance of 5 feet. The highway causeway, close northwestward of and parallel with the railroad trestleway, has three openings; a swing span with a clearance of 9 feet over the northeasterly opening; the opening over the main channel from Gasparilla Pass has a fixed span with a width of 48 feet and a clearance of 15 feet; and the southwesterly opening has a 48-foot fixed span with a clearance of 7 feet. On the northwest side of the causeway at the middle span is an overhead power cable with a clearance of 25 feet. About 0.1 mile northwestward of the causeway, an overhead power cable with a clearance

of 40 feet extends across the sound, but this cable is submerged where it crosses the two main channels.

Coral Creek enters the head of Gasparilla Sound from the northward close eastward of the railroad bridge. State Route 771 highway bridge crossing the creek about 0.4 mile above the entrance has a 13-foot fixed span with a clearance of 8 feet. The Seaboard Air Line Railroad trestle close northwestward has clearance for small skiffs only. **Placida** is a small village at the south end of the bridge. A boatyard on the creek close southward of the bridge has a marine railway that can haul out craft up to 35 feet in length for hull and engine repairs. A large marina is in the basin on the east bank of the creek close southward of the highway bridge. Gasoline, diesel fuel, water, ice, marine supplies, and a concrete ramp are available. Covered and open berthage and storage is available. In February 1965, there was reported to be 5 feet of water in the approaches and in the basin. Hull and engine repairs can be made. A shipyard at the marina builds steel and wooden vessels up to 85 feet in length.

At the head of Gasparilla Sound, close eastward of the north end of the railroad bridge, a channel, reported dredged to 10 feet 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 12 feet alongside in February 1965. Gasoline, diesel fuel, water, ice, and some supplies are available.

A small marina between the railroad and highway bridges at the north end, has gasoline, water, ice, a ramp, and berthage.

Gasparilla Pass, between Gasparilla Island and **Little Gasparilla Island,** affords passage from Gasparilla Sound to the Gulf, but is subject to change. Local knowledge is needed to carry the deepest water. The controlling depth over the bar is about 6 feet. In 1965 shoaling was reported in the pass and the aids had been discontinued.

Placida Harbor is a shallow lagoon westward of Gasparilla Sound northward of Little Gasparilla Island. Good small-boat anchorage is available inside the north point of Gasparilla Pass between Little Gasparilla Island and **Bird Key.**

Little Gasparilla Pass is reported filled in by sand. A marine railway on Little Gasparilla Island can handle craft up to 32 feet in length for minor repairs. An overhead power cable crossing the pass has a clearance of 68 feet.

The Cutoff is a narrow shallow pass joining Placida Harbor with Lemon Bay. The route of the extension of the Intracoastal Waterway goes through The Cutoff. Two highway bridges at either end of The Cutoff have been removed to permit dredging the new channel. They will be replaced by new bridges. Overhead power and telegraph cables at the bridge sites have minimum clearances of 78 feet.

Lemon Bay is a shallow lagoon that extends 15 miles northwestward behind the barrier beach from the head of Gasparilla Sound. There are marinas and service facilities along the east shore of Lemon Bay from The Cutoff to Alligator Creek, where the Intracoastal Waterway channel extension departs from the bay to make a loop up the creek and through a landcut to Hatchett Creek at Venice. Fuel, water, ice, open and covered berthage, ramps, and marine and yacht supplies are available at most of them.

Stump Pass, near the south end of Lemon Bay, had a controlling depth of 7 feet in October 1966. The pass is marked by privately-maintained daymarkers. A small marina, on the east side of Lemon Bay opposite Stump Pass, has gasoline, water, and a launching ramp. Depths of about 2 feet can be carried through the bush-staked entrance into the basin. The highway bridge, 15 miles northwestward from Boca Grande, from the mainland to **Manasota Peninsula,** and Punta Gorda Beach, has a bascule span with a clearance of 26 feet.

Punta Gorda Beach is on the west side of the bay just south of the bridge. Gasoline, water, ice, open and covered berthage, ramps, and general supplies are available.

Redfish Cove is on the east side of the bay at the north end of the bridge. There are two marinas near the bridge at the north end where gasoline, open and covered berthage, launching ramps, water, ice, and hull and engine repairs are available.

Englewood is on the east side of the bay about 0.5 mile north of the bridge. There is a boat basin with a marine railway and a 20-ton Travelift that can haul out vessels up to 40 feet in length for general repairs. Open and covered berthage, gasoline, water, a launching ramp, and some supplies are available. A fish house, a mile northwest of the marine railway, has gasoline, water, marine supplies, and a launching ramp.

A bridge across Lemon Bay at **Manasota,** about 6 miles northward from Punta Gorda Beach, has a bascule span with a clearance of 26 feet at the center. The nearby overhead power cable has a clearance of 88 feet.

Several overhead power cables and two highway bridges cross the landcut of the Intracoastal Waterway between Manasota and Hatchett Creek. Least clearance of the overhead power cables is 85 feet. The highway bridges, bascule types, about 4.6 miles (U.S. 41), and about 6 miles (Venice Ave.), above the bridge at Manasota, have clearances of 30 feet and 25 feet, respectively. A highway bridge over Hatchett Creek, about 0.4 mile above the Venice Avenue bridge, has a bascule span with a clearance of 16 feet. Overhead power cables near this bridge have a least clearance of 34 feet.

Venice Inlet, about 26 miles northwestward from Port Boca Grande, has been dredged and the entrance protected by two 600-foot sheet pile jetties. **Venice Inlet Light 1 (27°06.8′ N., 82°28.2′ W.),** 20 feet above the water, is shown from a black skeleton structure on the outer end of the north jetty. Several daybeacons mark the inlet. Federal project depth is 9 feet through the inlet channel. The controlling depth was 8 feet in October 1966.

The city of **Venice** and the towns of **Nokomis** and **Laurel** are on the shores of the three small bays, Roberts, Dona, and Lyons, inside and to the east of Venice Inlet. A water tank is prominent. Drafts of about 2 to 3 feet can be taken to the landings at these towns. There are a number of marinas and a yacht club at the inlet and on the bays, where gasoline, diesel fuel, water, ice, open and covered berthage with electricity, and marine and

yacht supplies are available. There is a 50-ton marine lift at the marina at the inlet, a 7½-ton travelift at the one on Hatchett Creek, and a 25-ton marine lift at Nokomis, and 1 to 2½-ton hoists are available at the others. Hull, engine, and electronic repairs can be made. Open and covered storage is available.

Blackburn Bay, Dryman Bay, Little Sarasota Bay, Sarasota Bay, Roberts Bay, and Sarasota Pass are connecting bodies of water which extend from Venice Inlet to the lower part of Tampa Bay, and are separated from the Gulf by a line of narrow keys. The route of the new section of the Intracoastal Waterway extends through these waters; the channel had a controlling depth of 9 feet in July 1966. All of the dredged sections and critical points are marked by aids to navigation, mostly lights and daybeacons.

A highway bridge crossing **Casey Thorofare** at the south end of **Blackburn Bay** has a bascule span with a clearance of 14 feet at the center. Gasoline, diesel fuel, water, ice, ramps, and berthage with electricity are available at **Casey Keys** about a mile north of Venice Inlet.

Blackburn Point Bridge, a highway bridge crossing the south end of Little Sarasota Bay, 4.5 miles north of Venice Inlet, has a swing span with a clearance of 9 feet. The nearby overhead power cable has a clearance of 65 feet. There is a marina and a fish camp at the bridge. The marina has a 40-ton marine lift that can haul out craft up to 55 feet in length for hull, engine, and electronic repairs, or dry open or covered storage. Open and covered berthage, and marine and yacht supplies are available. Provisions and general supplies can be obtained in the nearby towns.

Midnight Pass, 6 miles northward from Venice Inlet, gives access to the Gulf from **Little Sarasota Bay.** The pass is narrow and has a controlling depth of about 3 feet; strangers should not attempt passage. **Osprey** is a small settlement on the east side of Little Sarasota Bay. Some supplies can be obtained here, but no services are available on the waterfront. There are marinas and a boatyard near the south end of Siesta Key just north of Midnight Pass. There is a 38-ton travelift that can haul out boats up to 55 feet in length for hull and minor engine repairs. Gasoline, diesel fuel, water, ice, open and covered berthage, marine and yacht supplies, and ramps are available.

Holiday Harbor is on the east shore of Little Sarasota Bay about 1.8 miles northward of Midnight Pass. A marina is at the head of the long slip that was reported to have a depth of 4 feet in February 1965, with 10 feet at the berths. Gasoline, diesel fuel, water, ice, and marine and yacht supplies are available. Open and covered berthage, hull and engine repairs, and open and covered storage are available.

A highway bridge at **Stickney Point,** at the north end of Little Sarasota Bay, has a swing span with a clearance of 9 feet. The nearby overhead cable has a clearance of 77 feet. Marinas are at both ends of the bridge. Fuel, water, ice, berthage, storage, and marine supplies are available. Lifts up to 35 tons can haul out craft for engine and hull repairs.

A boatyard near the north end of Siesta Key opposite **Phillippi Creek,** has a 35-ton Travelift that can haul out craft up to 65 feet in length for hull and engine repairs, or open or covered dry storage. Open and covered berthage with electricity, gasoline, diesel fuel, fresh water, and ice are available at the yard. Electronic repairs can be made.

Big Sarasota Pass, 12 miles north-northwestward from Venice Inlet, is an inlet from the Gulf of Mexico to the southern end of Sarasota Bay. The pass lies between **Siesta Key** and **Lido (Cerol Isles) Key,** and is marked by a light and several daybeacons; the buoys at the entrance are shifted frequently to mark the changing channel. The pass had a controlling depth of 7½ feet over the bar in May 1961. Big Sarasota Pass Lighted Buoy 1 (27°15.6′N., 82°34.3′W.) is off the entrance to the pass. Several large hotel buildings at the south end of Lido Key are prominent.

Artificial fishing reefs about 1.5 miles west of Big Sarasota Pass are marked by three privately maintained buoys.

The highway bridge over the south end of Sarasota Bay from the mainland to the north end of Siesta Key has a bascule span with a clearance of 9 feet. A boatyard, on the east side of **Roberts Bay,** south of the bridge has a marine lift that can haul out 25-foot boats for general repairs. Fuel, berthage, and other services are available at the yard and hull and engine repairs can be made.

The **Ringling Causeway** crossing Sarasota Bay from Sarasota to Lido Key via **Coon Key** and **St. Armands Key,** has a bascule span over the north, or main channel with a clearance of 22 feet at the center. Over the south channel, there is a 46-foot fixed span with a clearance of 10 feet. Between Coon Key and St. Armands Key there is a fixed span with a clearance of 7 feet, and between St. Armands Key and Lido Key there are two 18-foot fixed spans with a clearance of 6 feet. There are marinas at **City Island** at the northeast end of Lido Key where fuel, berthage, hoists, ramps, water, ice, and other services are available.

Sarasota, on the eastern shore of Sarasota Bay at the south end, is a prosperous year-round community and a popular winter resort. The Sarasota-Bradenton Municipal Airport is north of the city; rail, bus, and highways connect with points in Florida and other states. There are several hospitals in the town. A number of tall buildings, water tanks, and radio towers show prominently from offshore.

There are several marinas, boatyards, and yacht basins. The Marina Mar Municipal Yacht Basin is in the bight just east of **Cedar Point.** A Federal project provides for an 8-foot channel from the Intracoastal Waterway to the Municipal Yacht Basin. In May 1964, project depths were available in the channel and basin. The small-craft facilities can provide gasoline, diesel fuel, water, ice, ramps, storage, berthage, and marine and yacht supplies. Marine railways and hoists up to 50 tons can haul out craft for engine and hull repairs; electronics repairs can also be made.

See appendix for **storm warning displays.**

Whitaker Bayou, north of Payne Terminal, and Hudson

Bayou, south of the municipal yacht basin, provide excellent shelter for small craft. A highway bridge over Whitaker Bayou has a 32-foot fixed span with a clearance of 7 feet. A power cable over Hudson Bayou has a clearance of 65 feet. The bridge over Hudson Bayou has a 30-foot bascule span with a clearance of 7 feet; 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. The dredged channels into these bayous have controlling depths of about 5 feet.

Marinas and boatyards in Whitaker Bayou can provide gasoline, diesel fuel, water, ice, open and covered berthage, storage, and marine supplies. Craft up to 60 feet in length can be hauled out for complete engine and hull repairs.

New Pass is 2 miles northwestward from Big Sarasota Pass and at the north end of Cerol Isles. The entrance is marked by a lighted buoy. A Federal project provides for a channel dredged to 10 feet over the bar and through the pass into Sarasota Bay, thence 8 feet across the bay to a turning basin at Payne Terminal, and 8 feet in the basin. In May 1964, project depths were available in the channel and basin. The entrance channel is marked by a light and buoys, and the bay channel by a lighted range and daybeacons. The highway bridge over the pass has a bascule span with a clearance of 13 feet. An overhead power cable over the pass near the bridge has a clearance of 80 feet. There are a seafood plant, two marinas, and a boatyard in the basin at Payne Terminal.

Bowlees Creek empties into Sarasota Bay 7 miles north of Big Sarasota Pass. A privately-marked channel, with a controlling depth of about 3 feet, leads to the Holiday Yacht Club and a marina inside the creek. Gasoline, diesel fuel, water, open and covered berthage, and ramps are available.

About 0.4 mile northwestward of Bowlees Creek, a dredged channel marked by private daybeacons leads to the basin of the Bayshore Gardens Yacht Club; depths of about 6 feet are reported in the channel and basin. Fuel, water, berthage, ramp, and marine supplies are available. An artificial fish haven, marked by privately maintained buoys, is 0.5 mile west of the channel entrance.

Longboat Pass, 11 miles northwestward of Big Sarasota Pass, has depths of about 6 feet over the bar. The pass is constantly changing. In 1960 a cut was washed through just south of the main entrance. The channel was marked only by a buoy at the southern end of a shoal extending west and south in an arc from Anna Maria Key.

Longbeach is a small fishing and resort town on Longboat Key on the south side of the inlet. Gasoline and water are available. About 1.5 miles southeastward of Longboat Pass, a privately-marked channel with a depth of about 4 feet leads to a boat basin where gasoline, diesel fuel, water, ice, open and covered berthage, and a ramp are available. A highway bridge over Longboat Pass has a bascule span with a width of 45 feet and a clearance of 17 feet. There are marinas at both ends of the bridge where fuel, water, ice, open and covered berthage with electricity, ramps, and various other services are available.

Buttonwood Harbor, on Longboat Key in Sarasota Bay, is about 4.5 miles south of Longboat Pass. A dredged channel marked by private daybeacons leads to two marinas in the harbor. In 1965, the reported depth in the channel was 5 feet. Fuel, open and covered berthage with electricity, ramps, and other services are available at the marinas.

Anna Maria Key, about 6.5 miles long and about a mile wide near the northern end, extends northwestward from Longboat Pass to Passage Inlet, on the south side of Tampa Bay Entrance. It is separated from the mainland by Sarasota Pass, which joins Sarasota Bay with Tampa Bay. An artificial fishing reef, 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.

Sarasota Pass is marked at its northwestern end by **Sarasota Pass Light 1 (27°32.1′ N., 82°42.8′ W.),** 15 feet above the water and shown from a black box and pointer on a dolphin. The dredged channel through the pass was at Federal project depth of 9 feet in July 1963. The channel is marked by a lighted **146°** range, lights, and daybeacons.

The route of the extension of the Intracoastal Waterway from Caloosahatchee River is through Sarasota Pass thence across lower Tampa Bay to the main ship channel, northward in the St. Petersburg Channel, thence, westward in the dredged channel, close southward of Pinellas Peninsula, that leads into Boca Ciega Bay. Small craft use the dredged Sunshine Skyway Channel which extends parallel with and about 600 yards westward of the Sunshine Skyway between Maximo Point and Mullet Key Shoal. The channel is marked. In October 1966, the controlling depth was 9 feet.

Two highway bridges cross Sarasota Pass between the island and the mainland. State highway 684 bridge from **Bradenton Beach,** near the south end of the island, to **Cortez** on the mainland, has a bascule span with a clearance of 22 feet at center. There are marinas and boatyards at both ends of the bridge where gasoline, diesel fuel, water, ice, marine and yacht supplies, open and covered berthage with electricity, and ramps are available. A 15-ton and several smaller lifts can haul out craft up to 35 feet in length for hull and engine repairs and open or covered dry storage.

See appendix for **storm warning displays.**

Anna Maria is a small village north of Bradenton Beach. A privately marked channel with about 3 feet leads to a yacht club where gasoline, water, and a launch-ramp are available.

There are several marinas and a boatyard at Anna Maria where fuel, water, ice, marine supplies and berthage are available. A marine railway can haul out craft up to 50 feet in length and there are a 20-ton travelift and smaller lifts and boat ramps. Hull, engine, and electronic repairs can be made, and open and covered storage is available. State Route 64 highway bridge crossing Sarasota Pass from Anna Maria to Perico Island has a bascule span with a clearance of 25 feet at the center. The highway was continues on a bridge over **Perico Bayou** and a

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causeway and bridge over the western end of **Palma Sola Bay** to the mainland. These two bridges have 46-foot fixed spans with a clearance of 10 feet.

A marina on Perico Island at the east end of the bridge over the pass has gasoline, diesel fuel, water, ice, open and covered berthage with electricity, marine and yacht supplies, and a ramp. A fork lift can haul out craft up to 30 feet in length for hull and engine repairs or dry storage. In February 1965, there was reported to be 6 feet in the privately-marked channel to the marina.

Currents, Venice Inlet to Cortez.—In Venice Inlet the average velocity is about 1 knot. At the bridge at the south end of Blackburn Bay the current floods to the north and ebbs to the south with an average velocity of about 0.8 knot. At Blackburn Point Bridge at the south end of Little Sarasota Bay, the current floods southward with an average velocity of 1.4 knots and ebbs northward with an average velocity of 0.7 knot. In Midnight Pass the flood current sets northeastward with an average velocity of 1.8 knots and the ebb sets southwestward at an average velocity of 1.4 knots. One day's observation off the bridge at the north end of Little Sarasota Bay showed very weak currents. In Big Sarasota Pass the flood current averages 1.5 knots and the ebb 1 knot. In Sarasota Bay at the entrance to Roberts Bay, the current averages only 0.3 knot. At the bridge off Cedar Point the average velocity at strength is about 0.4 knot. In New Pass the average velocities of flood and ebb are about 1.6 knots and 1 knot, respectively.

In Longboat Pass the current averages about 1.7 knots. In Sarasota Pass off Cortez, the flood current sets to the north and averages about 0.6 knot; the ebb current is weak. Predictions may be obtained from the Tidal Current Tables.

5. TAMPA BAY TO APALACHEE BAY

Chart 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 northward 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 north of Tampa Bay are water tanks and numerous tall buildings along the beaches; a large hotel in Clearwater and two water tanks near the center of Clearwater Beach Island; and Anclote Keys Light.

Between Anclote Keys and Cedar Keys, 60 miles to the northward, 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, heve 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.

Four artificial fish havens, marked by privately-maintained buoys, have been established from 1 mile to 1.3 miles off the beach from Pass-a-Grille to Blind Pass. Another fish haven with a least authorized depth of 22 feet over the obstruction is 10 miles westward of Pass-a-Grille.

The coast extends in a general northwesterly 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 unimportant 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 spongers and 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 1257.—Tampa Bay, a large natural indentation about midway along the west coast of Florida, is one of the important harbors of the Gulf coast and is easily accessible day or night. The bay extends northeasterly for about 20 miles, and is 6 to 7 miles in width. It is the approach to Manatee River, Boca Ciega, Old Tampa Bay, and Hillsborough Bay, and to the cities of St. Petersburg, Port Tampa, East Tampa, Bradenton, and Tampa.

The entrance to Tampa Bay, between Mullet Key on the north, and Anna Maria Key on the south, is 4.5 miles wide. Egmont Channel, the main deepwater ship channel, has been dredged through shoals that extend about 6 miles westward of the entrance. **Tampa Bay Lighted Whistle Buoy (27°35.8′ N., 82°55.6′ W.),** 9 miles west of Egmont Key, marks the apporach 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 north end of the key. A radiobeacon is 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 north end of the key.

Old **Fort DeSoto** on the south end of **Mullet Key** and a tall water tank on St. Jean Key about 1.6 miles northeastward of the fort stands out at the head of Egmont Channel. To the northward of the entrance, numerous tall hotel and apartment buildings, the large white Aquatorium, and several tanks on St. Petersburg Beach, a church spire and very tall water tank on Long Key at the north end of the beach, a tall building on Maximo Point, and farther northward numerous tanks and buildings along the beaches and at St. Petersburg and Gulfport are also prominent.

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.—Federal project depths for the main channels are 36 feet in the entrance from the Gulf, thence 34 feet to Tampa and Port Tampa. See Notice to Mariners and latest edition of charts for controlling depths.

Egmont Channel, the main ship channel, which extends between Mullet Key and Egmont Key, is used by all deep-draft vessels entering Tampa Bay. A lighted **083½°** 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 Tampa, Port Sutton, Alafia River, Port Tampa, and Weedon Island. The channels are marked by lighted ranges, and lighted and unlighted buoys.

Southwest Channel, a natural passage on the south 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 lighted and unlighted buoys. **Passage Key,** on the south 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 southward of Mullet Key in depths of 30 to 35 feet; southwestward of Gadsen Point in natural depths of 29 to 36 feet.

Explosives and quarantine anchorages are east of Mullet Key and south of Interbay Peninsula; limits of the areas are given in **202.193,** chapter 2.

Dangers.—Shoal areas extend seaward from Egmont Key as far as **Palantine Shoal,** which is 5 miles westward of the key and on the south 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 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 fixed span over the main ship channel in the middle of the bay has a clearance of 151 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. In 1967, a new causeway-bridge complex was under construction parallel to and westward of the Sunshine Skyway.

Tides and currents.—The diurnal range of tide in Tampa Bay is about 2.3 feet. Daily tide predictions for St. Petersburg are given in the Tides Tables. 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 southwest wind raises the water by nearly the same amount and advances the time of high water by as much as 1 hour.

Daily 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 6.8 miles west 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 northward and southward, respectively, with velocities usually less than 0.5 knot. Four days of current observations at this location during a period of moderate northerly winds showed a resultant nontidal current of nearly 0.5 knot setting southward.

Caution.—Construction of the Sunshine Skyway Causeway across the entrance to Tampa Bay has changed the currents in the area; see the Tidal Current Tables.

See appendix for **Tampa Climatological Table** and **storm warning displays** in the Tampa Bay area.

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, who 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 sea buoy and Egmont Channel Lighted Bell Buoy 2. Vessels entering by Southwest Channel are usually boarded between Southwest Channel Lighted Buoy 3 and Lighted Buoy 7, 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 fast motorboats with a large P painted on the sides. The pilot lookout station and boats are equipped with radiotelephone and maintain watch on VHF–156.6 mgc. and also monitor 2182 and 2738 kcs. 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 Tampa 229–2302, also St. Petersburg 362–3342, or ship's agents.

There is a pilot at St. Petersburg who can be reached through the Tampa Marine Operator, telephone St. Petersburg 867–1702. His station is at Point Pinellas, but usually boards from the Tampa Bay pilot boat.

Towage.—Vessels usually proceed from the Gulf to Tampa under their own power. Modern tugboats are available.

Quarantine.—The quarantine station is on Davis Islands. The quarantine anchorage is south of Gadsden Point, but vessels are boarded after docking. An outpatient clinic is maintained at the quarantine station. Tampa has several public and private hospitals with ample facilities. The nearest Public Health Service hospital is at Savannah.

Customs and immigration.—Tampa is the district headquarters of customs and port of entry; marine documents are issued. The offices of both the customs and immigration services are in the Federal Building. Vessels are usually boarded at the dock.

Harbor regulations.—The Port of Tampa is under the jurisdiction of the Hillsborough County Port District and includes Tampa proper, Port Tampa, Rattlesnake, and the mouth of Alafia River. The governing body is the Hillsborough County Port Authority which consists of five members appointed by the governor of the State of Florida. The Port Manager and Director enforces the regula-

tions established by the Port Authority. He has authority over all property, terminals, wharves, or other projects owned or controlled by the Port Authority. He is assisted by an Assistant Port Director and a Harbormaster.

Chart 586.—Mullet Key, on the north side of the entrance to Tampa Bay, is low and wooded. The wharf on the southeast side of the key has a depth of about 10 feet at the face. A large pile of rocks covered 2 feet, to the north and nearly in line with the face of the wharf, is a danger for vessels landing with a strong flood current, but is usually marked by tide rips except at slack water.

Old Fort Desoto and a concrete and shell tower, about 25 feet high, at the south end of the key, and a water tank on St. Jean Key are conspicuous. **Fort DeSoto Park** includes Mullet Key, **St. Jean Key, St. Christopher Key,** and **Madeline 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. The park has picnic areas, restrooms, bathhouses, surfaced ramps, and several large parking areas.

Manatee River empties into the south side of Tampa Bay just east 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, and is marked as far as Rocky Bluff. 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.

Federal project depths for Manatee River are 13 feet from Tampa Bay to McNeil Point, thence 9 feet to Rocky Bluff, and thence 4 feet to Mitchellville Bridge, 21 miles above the mouth. In May 1961, midchannel controlling depths were 9 feet to McNeil Point; thence 8 feet to Bradenton, 7 feet to Rocky Bluff, and thence 2 feet to Rye Bridge. Above Rocky Bluff the river was obstructed by snags and debris. The channel is marked by lighted ranges, lights, daybeacons, and a buoy as far as Ellenton.

Two artificial fish havens are in Manatee River. One is on the north side of the river off Snead Point, and the other is on the south side off Wares Creek. Two privately maintained buoys mark each haven.

Bradenton, a winter resort on the south 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 city pier with berthing space for larger vessels along the end and numerous berths for small craft inside the pierhead. The large building at the end of the pier is headquarters for the local Chamber of Commerce and Radio Station WTRL. The South Florida Museum and a city auditorium are at the head of the pier. A protected municipal yacht basin with berthage and a surfaced ramp is close eastward of U.S. Route 41 highway bridge. The town has numerous stores, several hotels, and a hospital. The Sarasota-Bradenton Municipal Airport is about 6 miles south of the city. Gasoline, diesel fuel, ice, provisions, and small-boat supplies are available; local guides can be obtained as pilots.

See appendix for **storm warning displays.**

DeSoto National Memorial of the National Park Service is on **DeSoto (Shaw) Point,** on the south side of the river entrance. A marina and boatyard, about 0.5 mile westward of the point, has two marine railways, the largest of which can haul out craft up to 50 feet in length for hull and engine repairs or dry open and covered storage. Open and covered berthage is available in a basin protected by an L-shaped concrete pier; gasoline and water are available.

Four bridges cross Manatee River at Bradenton. The first, U.S. Route 41 highway bridge close eastward of the city pier, has a bascule span with a clearance of 8 feet; see **203.463,** chapter 2, for drawspan regulations. The second, the Atlantic Coast Line Railroad Bridge 500 yards above the highway bridge, has a bascule span with a clearance of 5 feet. 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. The fourth, the Seaboard Air Line Railroad Bridge about 500 yards farther upstream, has a swing span with a clearance of 6 feet.

Snead Point is on the north bank at the entrance to the river at the western end of **Snead Island. McKay Point** is on the south shore of the island about 1.5 miles eastward of Snead Point. A marina and boatyard in a protected dredged basin on the east side of McKay Point has two marine railways and a 20-ton hoist. Craft up to 100 feet in length can be hauled out for hull and engine repairs or dry open storage. Gasoline, diesel fuel, water, ice, marine supplies, open and covered berthage with electricity, and a surfaced ramp are available. In February 1965, 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 cutoff channel at the eastern end of Snead Island, which has a Federal project depth of 6 feet, leads into Terra Ceia Bay from Manatee River, Daybeacons mark each end of the cutoff channel. The midchannel depth is about 4 feet. A highway bridge over the cutoff has a fixed span with a width of 33 feet and a clearance of 13 feet. An overhead power cable crossing close northeastward of the bridge has a clearance greater than that of the bridge.

A marina on the east bank of the cut, and in the lagoon east of it, has a ramp and a hoist that can haul out craft up to 40 feet in length for hull and engine repairs or dry open or covered storage. Gasoline, water, open and covered berthage with electricity, and marine supplies are available.

Palmetto is on the opposite side of Manatee River from Bradenton. **Ellenton** is on the north bank of the river 2 miles above the Seaboard Air 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. The Palmetto pier has slips for yachts and small boats drawing up to 7½ feet. Piling of a ruined pier extends outward to the channel west of the city pier.

There is a marina in a dredged basin at Ellenton which has a 2-ton hoist that can haul out craft up to 25 feet for

hull and engine repairs, or dry open or covered storage. Gasoline, water, ice, marine supplies, open and covered berthage with electricity, and a ramp are available. In February 1965, there was reported to be only 1½ feet of water in the privately marked approach channel and 5 to 6 feet in the basin.

There are a number of fish camps on the north bank east of Ellenton, some with boat basins, at which fuel, water, and berthage are available. There is a marina in a small basin at **Rocky Bluff,** about 1.5 miles eastward of Ellenton, which has a 2-ton hoist. Gasoline, berthage, and water are available. An overhead power cable crossing the river at Rocky Bluff has a clearance of 49 feet.

Manatee Memorial Hospital is a large white building in **Manatee** on the south bank of the river eastward of Bradenton. There is a large seafood packing and canning plant at Manatee.

Braden River, which empties into Manatee River about 2 miles above the upper highway bridge at Bradenton, has a controlling depth of 3 feet for about 2 miles above the highway bridge, but there are many shoals and the channel is unmarked. State Route 64 highway bridge over Braden River has a 45-foot fixed span with a clearance of 10 feet. Overhead power cables at 0.1 mile and 0.6 mile above the bridge have a least clearance of 32 feet. In 1967, a fixed highway bridge was under construction north of and parallel to State Route 64 highway bridge; design clearance 44 feet horizontal, and 11 feet vertical.

Terra Ceia Bay, just north of Manatee River on the southeastern 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 **McGill Island.** The channel is marked by daybeacons and has a controlling depth of about 5 feet. The Sunshine Skyway crosses the head of the bay on a highway bridge that has a 45-foot fixed span with a clearance of 10 feet.

McMullen Creek enters the head of Terra Ceia Bay from the eastward. A marina in a basin on the north side of the entrance just below the highway bridge has gasoline, water, berthage, and ramp; some supplies are available. There is a boat ramp at the head of **Bishop Harbor** near U.S. Route 41.

Piney Point is a small projection on the southeast side of Tampa Bay about 11 miles above Egmont Key. An abandoned ferry slip is on the point.

Little Manatee River (chart 1257) empties into the southeast 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 is about 3 feet. The channel, marked by private daybeacons, is difficult to follow without local knowledge. **Marsh Branch,** another privately-maintained channel, 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 west of Ruskin has a 25-foot fixed span with a clearance of 12 feet.

At **Shell Point,** on the north side of the entrance to Little Manatee River, is a fish camp with two small wharves and a protected yacht basin. Gasoline, water, barthage and some supplies are available. At the railroad bridge, 2 miles above the mouth, are two fish houses and a small wharf used by excursion boats. Gasoline, oil, water, and provisions are available in the town. The railroad bridge has a swing span with a 35-foot channel width and a clearance of 4 feet. U.S. 41 highway bridge close above has a fixed span with a clearance of 22 feet. The old highway bridge adjacent to it has a swing span with a clearance of 5 feet. The overhead power cables at the bridges have a minimum clearance of 58 feet.

Bahia Beach, about 0.7 mile northeast of **Salt 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 Travelift that can haul out craft up to 50 feet in length for hull and engine repairs, or dry open or covered storage. Electronic repairs can be made. Gasoline, diesel fuel, water, ice, marine supplies, open and covered berthage with electricity, and yacht supplies are available. There is a 1-ton hoist and a ramp.

About 4 miles northeastward of **Mangrove Point** on the east shore of Tampa Bay is another waterfront development with lagoons and waterfront homesites.

Chart 587.—Hillsborough Bay, the northeastern 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 east side of the channel for most of its length. Good anchorage is available for shallow-draft vessels in the central part of the bay westward of the main channel.

In 1965, at the turn in the main ship channel southeastward of Gadsden Point, a 35-foot channel was being dredged to a power plant that was under construction on the east shore of the bay in the vicinity of Big Bend.

Two miles northward from the sharp turn in the main channel, a dredged channel leads eastward 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 north side of Alafia River 0.5 mile above the mouth. The channel is well marked. In January 1966, the controlling depth was 25 feet to the turning basin and 26 feet in the basin. A depth of 28 feet was available in the widener at the entrance to the channel, except for a depth of 18 feet just west of lighted buoy 4.

A draft of about 3 feet can be taken several miles up Alafia River at high water. A highway bridge, 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 29 feet. The railroad bridge just above the highway bridge has a swing span with a width of 40 feet and a clearance of 6 feet. Just above and below the bridges are fish piers and an oil terminal berth where gasoline, and water are available. A nearby marine rail-

way can haul out craft up to 65 feet in length for hull repairs. About 2.5 miles above these bridges there is an overhead power cable with a clearance of 35 feet.

The boat basin for MacDill Field is about 2 miles north of **Gadsden Point** on the west side of Hillsborough Bay. The channel into the basin is well marked. The controlling depth in the channel is about 10 feet and 7 feet in the basin.

Port Sutton (Black Point) is on the east side of Hillsborough Bay opposite the south end of Davis Islands. A dredged channel leads northeastward from the main ship channel to a turning basin and slip at Port Sutton, the site of large power, phosphate, liquid sulphur, ammonia, and salt plants. The stack atop the power plant is floodlighted at night. A marginal wharf and facilities for unloading coal are at the north slip. In January 1966, the controlling depth was 31 feet in the entrance channel, thence in 1965, least depths of 34 feet in the south slip and 28 feet in the north slip. The entrance channel is marked by a **054°–234°** lighted range, and other navigational aids.

McKay Bay, about 1.3 miles north of Port Sutton, is a shallow bay about 1 mile wide and 1.5 miles long. The 22d Street highway causeway across the bay entrance has a fixed span with a clearance of 17 feet. Overhead power and telephone cables close northward of the causeway have clearances of 32 feet. About 0.3 mile beyond 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, dry and liquid sulphur, cement, lumber, tobacco, bananas, citrus fruits, grain, scrap iron, machinery, and general cargo. The University of Southern Florida is at the north end and Tampa University is on the west bank of the Hillsborough River in the city.

Channels.—The main ship channel leads into Tampa Harbor along the east side of **Davis Islands.** The channel divides off the south end of **Seddon Island; Seddon Channel** continues northwestward to a turning basin at the mouth of Hillsborough River, and **Sparkman Channel** leads northward to another turning basin at the south end of **Ybor Channel. Garrison Channel,** an east-west channel between Seddon Island and the Tampa waterfront, connects the two turning basins. The Seaboard Air Line Railroad Bridge over Garrison Channel has a bascule span with a clearance of 5 feet.

Only small boats can pass around the north end of Davis Islands, which are connected with Tampa Bay by a highway bridge having a 34-foot fixed span with a clearance of 10 feet. In 1967, a highway bridge with a fixed span was under construction about 100 yards south of the highway bridge; design clearance 13 feet.

Federal project depths are 34 feet for the main ship channel, Ybor and Sparkman Channels, and 30 feet for Seddon and Garrison Channels, and 30 feet for Ybor Turning Basin. See Notice to Mariners and latest editions of charts for controlling depths.

Information on anchorages, tides and currents, pilotage, towage, quarantine, customs, immigration, and harbor regulations can be found at the beginning of this chapter under general information for Tampa Bay.

Wharves.—There are both public and privately owned and operated waterfront facilities at Tampa with depths of 15 to 34 feet alongside. Most are marginal wharves and have rail and highway connections. The petroleum handling facilities, a cement plant, and two shipyards are on the east side of Garrison Channel. The two Tampa Port Authority Terminals are on the east side of the turning basin at the head of Garrison Channel and on the west side of Ybor Channel near the head. Two phosphate, fertilizer, sulphur, and chemical handling terminals are at the head of Ybor Channel.

The Seaboard Air Line Railroad phosphate elevator and terminals are on Seddon Island. North of the elevator is a terminal especially equipped for discharging, handling, and storing fertilizer and bulk materials, as well as general cargo. On the north side of Seddon Island, facing Garrison Channel, is a lumber terminal. On the mainland side of Garrison Channel are several terminals with long-established facilities for handling general cargo.

There are over 20 dry storage warehouses with over 800,000 square feet of storage space in the port and three cold storage warehouses with over 1½ million cubic feet of storage space. Modern cargo handling equipment, cranes up to 45-ton capacity, and a 100-ton floating crane are available in the port. Fresh water is available at all of the wharves.

Supplies.—Bunker C, diesel fuel, gasoline, ice, provisions, and marine supplies are available in quantity.

Repairs.—A shipyard on the east side of Garrison Channel at the southern end on Hooker Point has a graving dock that is 525 feet long on the keel blocks, 80 feet wide, and 16 feet deep over the sill. Alongside the graving dock is a slip 1,200 feet long and 14 to 16 feet deep. An outfitting wharf has a slip 200 feet long and 20 feet deep. Facilities at the yard include machine, foundry, pattern, carpenter, and electric shops, and a 50-ton gantry crane. There are two smaller floating drydocks, one on the east side of the turning basin at the head of Garrison Channel, and the other at Rattlesnake in Old Tampa Bay, that can lift vessels and barges up to 260 feet long. There are several marine railways in the port; the largest can haul out craft up to 185 feet in length. Electronic repairs can be made.

Communications.—Tampa is served by the Seaboard Air Line Railroad and the Atlantic Coast Line Railroad. Regular scheduled steamship service is maintained between Tampa, foreign ports, Caribbean and West Indies ports. Nine major airlines offer passenger and express service on regular schedules to all points from Tampa International Airport at the west end of the city.

A privately-owned radio station WPD, adjoining the Municipal Terminal on Ybor Channel, is used locally for

communication with ships. Operating hours are from 8:00 a.m. to 5:00 p.m. Radio station WFLA transmits coastal storm warnings and emergency marine information.

Small-craft facilities.—The municipal boat landing is on the west side of the entrance to Hillsborough River. The Majorie Park Yacht Basin on Davis Islands, on the west side of Seddon Channel, has gasoline, diesel fuel, water, a launching ramp, and open and covered berthage for boats up to 40 feet in length. Depths of about 7 feet are in the basin.

Davis Island Yacht Club, in the seaplane basin at the south end of Davis Island, has gasoline, water, and berthage for members and guests.

Tampa Yacht and Country Club is at **Ballast Point** about 4 miles north of Gadsden Point. Gasoline, water, covered berthage with electricity, and other services are available for members and guests. A 1,000-foot public fishing pier is close northward of the yacht club.

Hillsborough River flows southward through the city of Tampa into the turning basin at the north end of Seddon Channel. Daymarkers mark the channel for a short distance on the northwestern 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.

Federal project depths for Hillsborough River channel are 12 feet from the turning basin at the mouth to a point 100 feet south of Lafayette Street Bridge, thence 9 feet to a point 2,000 feet upstream from Columbus Drive bridge, 2.5 miles above the mouth. The controlling depth to just above Columbus Drive Bridge is about 7 feet.

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. New 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. **Drawspan regulations** for the bridges over Hillsborough River are given in **203.465**, chapter 2.

Old Tampa Bay, the northwestern 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. Federal project depth is 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 east side of the north-south reaches of the channel; several spoil islands 5 to 10 feet high are just south of Port Tampa.

A swash channel from Port Tampa parallels the southwest 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 for aircraft is southwesterly of Interbay Peninsula; see **204.100**, chapter 2, for limits and regulations.

A privately dredged channel extends from the south end of Port Tampa channel northwesterly to a turning basin at the power plant at **Weedon Island.** Controlling depths are about 30 feet in the channel and about 28 feet in the basin. The channel is marked by a lighted range, and lighted and unlighted buoys. A barge slip at the plant has a controlling depth of 16 feet.

Port Tampa is an important shipping terminus on the easterly shore of Old Tampa Bay just inside the entrance. The elevators, oil tanks, and the long docks are conspicuous from Tampa Bay as are two high radio towers near the western 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. A wharf on the north side of the entrance is equipped with a traveling crane for handling sulphur, gypsum rock, sand, gravel, and other bulk commodities. Two other wharves on the north side of the slip are used for loading phosphate. On the south side of the slip are several small wharves, one of which is the base for a large tug, while the others are used by various oil companies for receiving petroleum products, and in some instances, for supplying bunker oil to vessels. Port Tampa is served by the Atlantic Coast Line Railroad.

Gandy Highway Bridge (U.S. Highway 92), crossing Old Tampa Bay about 1.5 miles north of Port Tampa, has an opening with two parallel spans, about a mile west of the Interbay Peninsula shore. The northerly one is a fixed span with a clearance of 43 feet; the southerly one is a bascule span with a clearance of 13 feet.

There are two yacht basins, one on either side of the bridge at **Rattlesnake,** at the east end of Gandy Highway Bridge. Unmarked channels lead to the basins. The north basin has covered storage facilities for boats up to 35 feet in length. The controlling depth is reported to be 4 feet. A vertical hoist can lift boats up to 20 tons in weight and 35 feet in length for hull and engine repairs. The south basin has facilities for vessels drawing up to 6 feet. A marine railway can haul out craft up to 40 feet in length for hull and engine repairs. Gasoline, diesel fuel, water, ice, provisions, open and covered berthage with electricity, and dry open and covered storage are available at both basins.

A privately marked channel leads along the south side of the east end of Gandy Bridge approach to a shipyard at the head of the channel. In February 1965, there was reported to be 21 feet in the channel and basin at the yard. The yard has a 1,000-ton floating drydock that can lift vessels up to 235 feet in length 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 is on the south bank of the turning basin west of the shipyard.

South Gandy Channel leads along the south side of the fill at the west end of Gandy Bridge to **Snug Harbor,** where small craft can find good anchorage from storms. Open and covered berthage with electricity and open and covered storage are available at three marinas and boatyards. Craft up to 38 feet can be hauled out for hull and engine repairs. Gasoline, water, ice, and marine and yacht 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 southward, between shoals which can be avoided with a little care. When about 100 yards from the outer end of the highway fill, turn westward and steer parallel with the fill, following the channel markers.

Culbreath Bayou, a small-boat shelter, and a marina about 0.5 mile northwestward of it, are on the eastern shore of Old Tampa Bay southeastward of the easterly end of W. Howard Frankland Bridge. Two channels lead to the facilities. Depths of about 4 feet are in the southern channel, and in February 1965, a controlling depth of 10 feet was reported in the northern channel. The northern channel is marked by daybeacons. The marina has a 25-ton vertical hoist that can handle craft up to 45 feet in length for hull and engine repairs. Open and covered berthage, wet and dry storage, gasoline, diesel fuel, water, ice, and marine supplies are available.

Along the east shore of Old Tampa Bay, north 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 4) and Causeway crosses Old Tampa Bay from just north of Beach Park to Big Island on the western 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 southern 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 westerly end is an 18-foot fixed span with a clearance of 9 feet.

Safety Harbor is a health resort on the northwest shore of old Tampa Bay 2 miles north of the Parkway. Safety Harbor has rail and highway connections with Tampa and St. Petersburg. Gasoline, water, ice, and some supplies are available at the resort.

A draft of 8 feet can be taken within 0.5 mile of the landing at Safety Harbor. A small basin on the south side of the large waterfront fill, 1.6 miles north of Courtney Campbell Parkway, can accommodate boats up to about 4 feet in draft, but the controlling depth into the basin is only about 1½ feet. Gasoline is available in town but not at the basin.

At the head of Old Tampa Bay about 1 mile north 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 northeast shore of the bight.

Charts 586, 587, 858.—St. Petersburg, a large winter resort on the west side of Tampa Bay 6 miles south of Gandy Bridge, is the terminus of two railroads, 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 south.

St. Petersburg has a city hospital and several private hospitals. Gasoline, diesel fuel, water, ice, provisions, and yacht supplies are available in quantity. Boats can be chartered and guides engaged. The St. Petersburg–Clearwater International Airport is north of the city, and the Albert Whitted Municipal Airport is on the east waterfront at the center of the city.

Prominent features.—The large Municipal Auditorium and the baseball stadium on the east waterfront south of the yacht basins, the three stacks of the powerplant at the southwest corner of Bayboro Harbor, the pavilion on the end of the Municipal Pier, several large office buildings and hotels, radio towers, tanks, and the dome of a church are all prominent.

Channels.—Federal project depths are 20 feet for a channel extending northward for about 5.5 miles from deep water in lower Tampa Bay, and thence 19 feet in the entrance channel leading westward to the basin at the Port of St. Petersburg.

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 westward reach leading to Port Tampa, then turning southwestward into the natural deep-water area extending toward St. Petersburg. The channels are marked by lights, daybeacons, and lighted and unlighted buoys.

Pilotage.—Pilots for St. Petersburg go to Tampa Bay entrance only by previous arrangements. Shipmasters can communicate with the pilots by telegram, or by radiotelephone through the Tampa Marine Operator, telephone St. Petersburg 867-1702. The pilot usually boards from the Tampa Bay pilot boat.

Ships approaching the bar and bound for St. Petersburg, should fly the International Code flags SP. Vessels entering by Egmont Channel are boarded between the sea buoy and lighted bell buoy 2; those coming in by Southwest Channel are boarded inside, near lighted bell buoy 7.

Quarantine, customs, and **immigration.**—Vessels can arrange for inspection by telephoning the officials concerned in Tampa; 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. Federal project depth is 24 feet in the port basin. In March 1963, the controlling depth was 17 feet. A concrete wharf with warehouse, along the north side of the basin, provides berthing space for several vessels. The Coast Guard operates a buoy depot and air-sea rescue base at the outer end. A **restricted area** for seaplanes is off the base; limits and regulations are given in **207.175,** chapter 2.

Bayboro Harbor, which is entered from the inner end of the ship basin, is used by numerous fishing boats and other small commercial craft. Federal project depth is 12 feet in the harbor. The largest of three marine railways in boatyards in the harbor and two railways in Salt Creek can haul out vessels 70 feet in length for complete repairs.

Oil stations and small commercial landings are along the banks of **Salt Creek,** which empties into the south side of Bayboro Harbor. Controlling depths in the creek are 10 feet to the first bend, thence 5 feet to about 100 yards east of the bridge at Third Street, south, which is the head of navigation.

Northward along the St. Petersburg waterfront from the ship basin are the Municipal Pier and three yacht basins. The pier is a long concrete structure with a two story pavilion on its outer end. 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 in length. Depths of about 10 feet are in North and Central Yacht Basins. Gasoline, diesel fuel, water, ice, marine supplies, 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 south of the pier, is used by small sailing vessels.

Lights mark the ends of the moles on either side of the entrance to Central Yacht Basin and the outer corners of the Municipal Pier. Numerous slips are on the north and west sides of the basin, and a public landing is on the west side. The St. Petersburg Yacht Club is in the Central Yacht Basin.

Coffeepot Bayou, 1 mile north 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 **203.245,** chapter 2, for **draw-span regulations.** The entrance channel is well marked with privately-maintained daymarkers, and a depth of about 3 feet can be carried.

Smacks Bayou, about a mile northeast of Coffeepot Bayou, has a controlling depth of about 4 feet in the well-marked approach from the southeast. Inside, there is deeper water resulting from recent 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.

The basins on the south side of **Papys Bayou,** midway between Coffeepot Bayou and the Gandy Bridge, offer good protection for small boats during periods of very bad weather. The controlling depth into the bayou is about 2½ feet. Local knowledge is needed to find the best water.

Papys Bayou leads into **Bayou Grande.** Weedon Drive Highway Bridge crossing the north end of Bayou Grande has a 25-foot fixed span with a clearance of 10 feet. An overhead power cable at the bridge has a clearance of 27 feet. Above Bayou Grande, the waterway is known as **Riviera Bay.** A highway bridge at the west end has a 22-foot fixed span with a clearance of 10 feet.

Big Bayou is a mile south of the St. Petersburg ship basin. The privately-marked channel into the bayou has a controlling depth of about 4 feet. A marina on Big Bayou has fuel, water, berthage, and some services.

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 and a pipeline. The bridges have 40-foot fixed spans with clearance of 10 feet at the center. The pipeline has a clearance of 10 feet.

Little Bayou is 2.5 miles south of the ship basin. A privately owned yacht basin is in the southern part of the bayou. A dredged channel extends southward from Little Bayou to deep water in the bay. The controlling depth in the channel is about 4 feet and about 5 feet in the basin.

Point Pinellas is the southeast extremity of Pinellas Peninsula. The abandoned ferry slip is now used for berthing of excursion and party boats. Some services are available.

A section of the main channel of the Intracoastal Waterway passes westward from Tampa Bay into Boca Ciega Bay through a dredged cut about 0.5 mile south of the point and is marked by lights and daybeacons. Federal project depth for this section of the waterway is 9 feet. See Notice to Mariners and latest editions of charts for controlling depths. Boca Ciega Bay Lighted Buoy 1 marks the eastern entrance. A bridge on the Sunshine Skyway over the channel about 2 miles westward of Point Pinellas has a bascule span with a clearance of 21 feet at the center.

Charts 586, 858.—Boca Ciega Bay extends 13 miles northwestward 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 constructed linking many of the keys.

Sunshine Skyway Channel is a section of the Intracoastal Waterway from Caloosahatchee River to Anclote Anchorage, which parallels the Sunshine Skyway, and about 0.3 miles westward of it. It is the most direct route between Sarasota Pass across the lower end of Tampa Bay to Clearwater Harbor. Federal project depth in this section of the waterway is 9 feet. See Notice to Mariners and latest editions of charts for controlling depths. The channel is marked by lights, daybeacons and buoys. **Sunshine Skyway Park** is a State receational area along the skyway eastward of the channel. A small protected small-craft basin is in the park on the west side

at Bunces Pass; a ramp and limited berthage are available. The depth in the basin was reported to be 3 feet in 1965. Small craft can continue northward from the Skyway Channel through Cats Point Channel and rejoin the main channel of the Intracoastal Waterway about 1.4 miles northward of Pinellas Bayway.

Tidal currents in Boca Ciega Bay seldom exceed 0.5 knot. In Pass-a-Grille Channel, the flood current sets northward with an average velocity of 1.2 knots and ebbs southward at an average velocity of 1.4 knots. In Johns Pass, the flood sets northeastward at an average velocity of 2.0 knots and ebbs southwestward at an average velocity of 1.5 knots. Predictions for several places in these waters can be obtained from the Tidal Current Tables.

Bunces Pass is a passage into the southern 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. The Pinellas Bayway Bridge over the pass has a 50-foot fixed span with a clearance of 19 feet. The Sunshine Skyway Bridge over the eastern end of the pass has a 50-foot 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 south end of Mullet Key Bayou. Small craft can anchor in the bayou.

Maximo Point, the southwestern extremity of Pinellas Peninsula, is at the north end of the Sunshine Skyway Causeway. There is a small-boat basin that has covered berthage with electricity for over 125 boats up to 23 feet in length. Gasoline, oil, water, ice, a ramp, and some marine supplies are available. The controlling depth into the basin is about 3 feet.

On Maximo Point, east of the Sunshine Skyway, there is a large prominent apartment hotel and motel which has a boat basin where gasoline, diesel fuel, water, and open berthage with electricity are available.

Cats Point Channel extends northward from the main channel of the Intracoastal Waterway at Boca Ciega Bay Daybeacon 14, about 500 yards westward of the Sunshine Skyway, thence northwestward along the landfill west of Cats Point, and thence across the upper part of Boca Ciega Bay, and joins the main channel of the Intracoastal Waterway about 1.4 miles northward of the Pinellas Bayway. Federal project depth is 6 feet. See Notice to Mariners and latest editions of charts for controlling depths. The channel is marked by lights, daybeacons, and buoys.

Frenchman Creek is on the east side of Boca Ciega Bay about 0.3 mile northward of Maximo Point. There is a marina and boatyard at the head of the creek which has a 15-ton vertical lift that can haul out craft up to 40 feet in length for hull and engine repairs and dry covered and open storage. Open and covered berthage with electricity for over 200 boats, gasoline, diesel fuel, water, ice, and marine and yacht supplies are available. The twin bridges of the Sunshine Skyway cross the creek on 26-foot fixed spans with clearances of 18 feet.

The controlling depth is about 5 feet in the privately-marked channel leading from Cats Point Channel to the basin.

Cats Point is on the east side of Boca Ciega Bay 1.1 miles northward of Maximo Point. A large marina is on the lagoons close northward of Cats Point. Gasoline, diesel fuel, water, ice, marine and yacht supplies, a ramp, and covered and open berthage with electricity for more than 300 boats are available. The controlling depth into the lagoons is 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 Terra Verde, Cabbage Key, Cunningham Key, and the other keys southward 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 Pinellas Bayway crossing the channel at Cats Point has a 41-foot fixed span with a clearance of 18 feet. Another highway bridge of the bayway crossing the channel between two sections of the landfill westward of Cats Point has a 38-foot fixed span with a clearance of 12 feet. Overhead power cables crossing the channel at the two bridges have clearances of 40 feet.

Tierra Verde is a winter resort on two keys which were formerly called **Pine Key** and **Cabbage Key.** A marina here has fuel, berthage, and other services. The bridge of the Pinellas Bayway which crosses the main channel of the Intracoastal Waterway from Tierra Verde to the landfill northward of it has a bascule span with a clearance of 25 feet at the center.

St. Petersburg Beach is a winter resort on the 5-mile long barrier island that was formerly known as **Long Key. Pass-a-Grille Beach, Don Ce Sar Beach,** and **Lido Beach** are sections of the resort city. Many large hotels and apartment buildings, a large white aquatorium, and several tanks are prominent. The Veterans Administration headquarters building, formerly a hotel, is at St. Petersburg Beach.

Pass-a-Grille Pass separates St. Petersburg Beach from Tierra Verde. **North Channel,** the bar channel, leads from the Gulf to Pass-a-Grille Channel which joins the main channel of the Intracoastal Waterway at the north end of Tierra Verde. Federal project depth is 10 feet in the bar channel, thence 8 feet to the Intracoastal Waterway. The channel is well marked by lights and daybeacons, but it subject to frequent shoaling. In 1966, the controlling depth was 8 feet to the Intracoastal Waterway. South Channel leads to the pass from the southwestward and passes eastward of Shell Key; it is unmarked and not recommended.

Depths of 8 to 10 feet can be taken to the service wharves, marinas, and boatyards on the island channel between the beach and **Vina del Mar.** Gasoline, diesel fuel, water, ice, marine and yacht supplies, open berthage, and open and covered storage are available along the channel. A 20-ton travelift and several smaller lifts are available at the boatyards.

A submerged jet fuel storage tank facility is about 100 yards off the shore in Pass-a-Grille Channel about 0.3 mile north of the southerly tip of Pass-a-Grille Beach.

Mud Key Channel connects the island channel with the main channel of the Intracoastal Waterway northward of Vina del Mar. A bridge of the Pinellas Bayway from St. Petersburg Beach to the landfill eastward has a 19-foot fixed span with a clearance of 9 feet. About 500 yards eastward another bridge over the main channel of the Intracoastal Waterway has a bascule span with a clearance of 25 feet at the center.

Gulfport is a city on the north shore of Boca Ciega Bay opposite St. Petersburg Beach. 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 northwest can be seen from seaward.

Clam Bayou is on the east side of the city. A marked channel leads across Boca Ciega Bay from the head of Pass-a-Grille Channel to the bayou. A privately marked **035°** lighted range and daybeacons mark a dredged cut leading into the Gulfport City Marina close westward of the entrance to the bayou. There was a reported depth of 5 feet in the channel and basin in February 1965. A harbormaster is in attendance at the marina and can be reached by radiotelephone: Gulfport 344–3321. **A speed limit** of 5 m.p.h. is enforced. Fuel, water, ice, provisions, yacht supplies, a ramp, and open and covered berthage with electricity are available. The **harbormaster** assigns berthage. The Gulfport Yacht Club and a division of the Coast Guard Auxiliary are on the west side of the entrance to the basin.

A boatyard at the entrance to Clam Bayou, close eastward of the city marina, has 30-ton and 7-ton travelifts and a marine railway that can haul out craft up to 50 feet in length for hull and engine repairs, or open or covered storage. Berthage, and marine and yacht supplies are available at the boatyard and electronic repairs can be arranged for.

South Pasadena is a city on the east shore of Boca Ciega near the head of the bay. Privately-marked channels, which lead into **Bear Creek** from the Intracoastal Waterway, were reported to have a controlling depth of 4½ feet in February 1965. The channel leaves the waterway south of **Pasadena Isle**, passes around the south end of the isle, then splits into two channels, one leading northwestward to the marina at the mainland end of Corey Causeway and the other leads northward to the marina on the west side of the entrance to the creek. Gasoline, diesel fuel, water, ice, marine and yacht supplies, and open and covered berthage with electricity are available for over 300 boats up to 65 feet in length at the two marinas. There are a 45-ton hoist and a 6-ton travelift at the marinas which can haul out craft up to 50 feet in length for hull and engine repairs, or dry open or covered storage. Electronic repairs can be made.

Corey (Pasadena) Causeway crosses Boca Ciega Bay from St. Petersburg Beach to the mainland at South Pasadena. The causeway bridge that crosses the Intracoastal Waterway has a bascule span with a clearance of 8 feet. An overhead power cable along the causeway is submerged where it crosses the Intracoastal Waterway channel. Close northward of Corey Causeway, another causeway connecting the same points crosses Boca Ciega Bay. The bascule span over the Intracoastal Waterway has a clearance of 23 feet at the center, and the two fixed spans crossing minor channels to the northeastward have clearances of 6 feet.

See appendix for **storm warning displays.**

Blind Pass is a shallow pass from the Gulf to Boca Ciega Bay between the north end of St. Petersburg Beach and Treasure Island. There are several very prominent landmarks near the pass, which include a large white 10-story apartment hotel, a large white aquatorium south of the entrance, and a large hotel with penthouse, a church spire, and a large water tank on which is a privately maintained light 134 feet above the water. The pass is used by local fishermen and other small craft drawing up to 3 feet. The controlling midchannel depth is about 3 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 are marinas along the pass and at the bridge where fuel, water, ice, open and covered berthage, and other services are available.

Treasure Island is a winter resort with many hotels, motels, and other conveniences. Paradise Island, Isle of Palms, and Capri Isle are land filled residential areas with numerous lagoons and private berths at waterfront homesites off the east shore of Treasure Island.

Chart 858.—Treasure Island Causeway crosses Boca Ciega Bay from Treasure Island via Paradise Island and South Causeway Isle to the mainland at St. Petersburg. The causeway has a bascule span over the main channel with a clearance of 8 feet. The east and west openings between Treasure and Paradise Islands and South Causeway Island to the mainland have fixed spans with clearances of 4 and 5 feet, respectively.

Johns Pass about 3 miles northward of Blind Pass, between Treasure Island and **Sand Key**, affords passage for small craft from the Gulf to the northern part of Boca Ciega Bay. A Federal project provides for a 10-foot bar channel from the Gulf of Mexico through Johns Pass, thence 8- and 6-foot channels leading northward to the Intracoastal Waterway in Boca Ciega Bay. The channel is marked by lights and daybeacons, but is subject to frequent shoaling. In 1966, the controlling depth was 6 feet to the Intracoastal Waterway. A natural channel just inside the pass leads eastward to the Intracoastal Waterway; it is marked at its eastern end by a daybeacon.

State Route 699 highway bridge over the pass has a bascule span with a clearance of 6 feet. An overhead power cable southwest of the bridge has a clearance of 66 feet.

Numerous fishing piers are near Johns Pass bridge. Gasoline, water, berthage, and other services are available. **Madeira Beach** is a small community on Sand Key at the northwest end of the bridge. A large marina and two boatyards at Madeira Beach have marine railways and hoists, the largest of which can haul out craft up to 65

feet in length and 7 feet in draft for hull and engine repairs. The northerly of the two boatyards is in a cove known locally as Snug Harbor.

See appendix for **storm warning displays.**

Long Bayou, an arm of Boca Ciega Bay opposite Johns Pass, extends in a northerly direction for about 3 miles to a dam, which forms **Lake Seminole.** A highway bridge crossing the bayou about a mile above the mouth has a 28-foot fixed span with a clearance of 10 feet. In 1965, a new highway bridge under construction close southward will have a 40-foot fixed span with a clearance of 12 feet at the center. An overhead power cable at the bridge has a clearance of 34 feet. A railroad bridge close northward of the highway bridge has a 24-foot fixed span with a clearance of 7 feet.

Cross Bayou enters Long Bayou just above the railroad bridge. **Cross Bayou Canal,** principally a drainage ditch, connects Old Tampa Bay with Cross Bayou.

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 marked by a privately-maintained light 129 feet above the water, about 1.4 miles northwestward of Johns Pass, a large apartment hotel with penthouse, on the island, and the water tank at the veterans hospital in Bay Pines are all conspicuous.

The Intracoastal Waterway passes through the northern end of Boca Ciega Bay between Sand Key and the mainland, then through The Narrows to Clearwater Harbor. Federal project depth for this section of the waterway is 9 feet. See Notice to Mariners and latest editions of charts for controlling depths.

Welch Causeway, crossing Boca Ciega Bay from Sand Key to the mainland at a point 1.5 miles northwest of Johns Pass, has a bascule span with a clearance of 25 feet at the center. The shallow cove just east of the mainland end of the bridge 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 north of the bridge, 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 berthage with electricity for 120 craft up to 40 feet in length are available. A 23-ton Travelift can haul out craft up to 40 feet in length for hull and engine repairs. Another basin at the northeast end of Welch Causeway on the mainland, with a depth of 4 feet, has a marina where gasoline, water, covered and open berthage with electricity for 40 boats, and a launching ramp are available. A hoist can lift out craft up to 45 feet for hull and engine repairs or storage.

The Narrows, which connects the northwest end of Boca Ciega Bay with the south end of Clearwater Harbor, is about 4 miles long and marked by lights and daybeacons. On the west side of The Narrows near the south end are rocks which are covered at high water; to avoid them mariners should favor the east bank. A marina and boatel inside the bight on Sand Key, just south of The Narrows, has gasoline, diesel fuel, water, ice, open and covered berthage with electricity, and limited supplies. Gasoline, diesel fuel, berthage, and water are also available at several marinas on Sand Key along The Narrows.

The highway bridge over The Narrows, from the mainland to **Haven Beach** on Sand Key, has a bascule span with a clearance of 25 feet. About 0.7 mile north of the bridge, a T-head fishing pier extends about 1,000 feet into the Gulf.

Clearwater Harbor extends about 7 miles northward from The Narrows to Dunedin Pass and has an average width of about a mile. The harbor is mostly shoal, except for the new section of the inland waterway recently dredged to 9 feet and the natural channels varying in depth from 5 to 14 feet. **Belleair Beach Causeway** crosses the harbor from Sand Key to the mainland at a point 2.1 miles north of the bridge over The Narrows; the causeway has a bascule span with a clearance of 21 feet. **Belleair,** about 1 mile north of the 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 west side of Clearwater Harbor.

The several channels in Clearwater Harbor are marked by numerous aids which should be followed closely as some sections are quite crooked. **Clearwater Pass,** 12 miles northward from Johns Pass, extends eastward from the Gulf between the north end of Sand Key and the south end of **Clearwater Beach Island.** The pass is crossed by a highway bascule bridge with a clearance of 24 feet at the center. See appendix for **storm warning displays.**

Federal project depths for the dredged channels are 10 feet through Clearwater Pass; thence 8 feet eastward to the Intracoastal Waterway, and 8 feet in the channel leading northward from the pass along the east side of Clearwater Beach Island to a turning basin at the Municipal Marina. In November–December 1966, the centerline controlling depth was 5½ feet from the Gulf through Clearwater Pass Channel to Clearwater Pass Light 12, thence 5½ feet in the channel leading northward to the turning basin, thence 8 feet in the basin; controlling depth of 6½ feet was available in the channel leading southeastward from Clearwater Pass Light 12 to the junction with the Intracoastal Waterway. The channels are well marked by lights, buoys, and daybeacons. **Clearwater Pass Lighted Bell Buoy (27°58.1′ N., 82°50.7′ W.)** marks the entrance from the Gulf.

Tides and currents.—The mean range of tide at Clearwater is 1.8 feet. The tidal current in Clearwater Pass averages about 1.2 knots and at Clearwater in the vicinity of the bridge about 0.4 knot.

Clearwater, the seat of Pinellas County on the east 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 north end of Clearwater Beach Island, two tall water tanks near the middle of the island, two large hotels on the island on the north side of the Memorial Causeway, a prominent hotel in Clearwater, several

tall radio towers, and several prominent buildings. The city has three hospitals. Paved highways connect with all points of the State and the city is served by freight and passenger service of the Atlantic Coast Line and Seaboard Air Line Railroads. Bus lines and numerous truck lines also maintain service. The St. Petersburg-Clearwater International Airport is about seven miles southeast of the city.

The city operates the City Pier and Municipal Marina at the turning basin at the head of the channel on Clearwater Beach Island at the western end of the causeway. Fuel, berthage with electricity, and other services are available at the Municipal Marina. The **Harbormaster** has his office at the marina and assigns the berths. He can be reached by radiotelephone, phone: 442-5690, for marine information or berthing instructions.

The Clearwater Yacht Club is in a basin on Clearwater Beach Island about 0.4 mile north of the Municipal Marina. There are four other marinas on the island on the north side of the causeway and a boatyard in a basin about 0.5 mile north of the east end of the causeway in Clearwater. A 10-ton travelift and several smaller lifts, and a marine railway that can haul out craft up to 55 feet in length for hull and engine repairs, or dry open or covered storage are available. Electronic repairs can be made. Gasoline, diesel fuel, water, ice, marine and yacht supplies, and open and covered berthage with electricity are available at the marinas and the boatyard. Local guides can be hired as pilots.

See appendix for **storm warning displays.**

Clearwater Harbor is a link in the Intracoastal Waterway from Caloosahatchee River to Anclote River. The channel through the harbor passes close alongshore off Clearwater. Clearwater Memorial Causeway crosses Clearwater Harbor from Clearwater to Clearwater Beach. The bridge over the main channel has a bascule span with a clearance of 25 feet at the center; see **203.466**, chapter 2, for drawspan regulations. The fixed span in the highway bridge at the west end of the causeway has a clearance of 14 feet at the center.

Federal project depth in this section of the Intracoastal Waterway from Clearwater Harbor to Anclote River is 9 feet. See Notice to Mariners and latest editions of charts for controlling depths.

There is berthage and a ramp in a protected yacht basin at the mouth of Stevenson Creek about 1.4 miles north of the east end of the Memorial Causeway.

Charts 858, 1257.—St. Joseph Sound extends northward 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 is 3 miles north of Clearwater Pass at the opposite end of Clearwater Beach Island. A marked channel inside the pass leads along the inner side of the island southeasterly to the Clearwater Harbor Channel.

An artificial fish haven about 1.3 miles long and 300 yards wide is about 3 miles westward of the entrance to the pass.

Mandalay Channel continues along the inner side of the island to the Memorial Causeway, passing the Clearwater Yacht Club near the middle of the island. Gasoline, diesel fuel, water, and covered berthage are available. The depth over the bar at Dunedin Pass is about 3 feet.

Dunedin Channel branches eastward from Dunedin Pass and leads to the wharves at Dunedin; about 4 feet can be taken to the wharves by following this marked channel.

Because the bars are subject to change, the chart cannot be relied upon to show the latest conditions, but inside the passage the channels are fairly stable, and the chart is a good guide. When the sea is smooth, which is the only time that a stranger should enter, the channels usually can be discerned by the difference in color of the water.

Dunedin is a resort town on the east shore of St. Joseph Sound, about 3 miles north of Clearwater. A large hotel, two tanks, and a stack are conspicuous. The town has a hospital, and railway and highway connections to other parts of Florida. The Dunedin Marina is in a basin protected by two moles. There is a commercial fish pier and berthage with electricity for about 200 boats. Gasoline, water, ice, and marine and yacht supplies are available. A large motel is on the north mole and a yacht club on the outer mole. A ramp is also available. In 1965, there was reported to be 6 feet in the entrance channel and basin. A **harbormaster** is in attendance and assigns berths; he can be reached by radiotelephone; phone 733-4251. The mean range of tide at Dunedin is 1.9 feet. The tidal current in Dunedin Pass averages 1.0 knot at strength.

See appendix for **storm warning displays.**

Hurricane Pass, between Caladesi Island and Honeymoon Island, is subject to change, but with local knowledge 3 to 5 feet can be carried. On a favorable tide a draft of a little more than 3 feet can be carried to the sound, but 3 feet is all that a stranger should attempt, and that only on a rising tide. Daybeacons mark the pass.

Five miles off St. Joseph Sound the current floods northward and ebbs southward with a velocity of 0.5 knot.

Curlew Creek is about 5 miles north of Clearwater. A marina in a basin on the creek has gasoline, water, ice, open and covered berthage, marine and yacht supplies, a ramp, and a 1-ton hoist. In February 1965, there was reported to be 3 feet in the creek channel and basin.

About 5.5 miles north of Clearwater, Honeymoon Island Causeway crosses St. Joseph Sound from the mainland to **Honeymoon Island.** A highway bridge in the causeway over the Intracoastal Waterway has a bascule span with a clearance of 24 feet. A fixed bridge in the causeway near the western end has a 45-foot fixed span with a clearance of 11 feet.

Minnow Creek is about 6 miles north of Clearwater. A dredged channel with a reported depth of about 5 feet, and marked by private daybeacons, leads to basins in **Smith Bayou** at the mouth of the creek. There are three boatyards and marinas in the basins which had reported depths of 4 to 6 feet in 1965. There are a 20-ton travelift, two marine railways, and a fork lift that can haul out craft up to 35 feet for hull and engine repairs, or dry open or covered storage. Craft up to 45 feet can be built at the

boatyards. Gasoline, water, ice, marine and yacht supplies, and open and covered berthage with electricity are available. There are several fish camps on Smith Bayou.

Ozona is about a mile north of Minnow Creek. A dredged channel, marked by a light and daybeacons, leads to a basin at a fish company pier. The controlling depth is about 8 feet in the channel and basin. The shrimp fleet base is in **Sutherland Bayou** about 0.5 mile north of Ozona. Fuel and water are available at the fish pier.

A **boiling spring** is close to shore about 7 miles north of Clearwater and just south of **Crystal Beach.** 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 north of Ozona, a marked channel, which in February 1965 had a reported depth of 2½ feet, leads to a marina in a basin at **Klosterman Point** on the east shore of the sound. Gasoline, water, a ramp, and open and covered berthage with electricity are available. A 1-ton hoist can haul out craft up to 23 feet for hull and engine repairs or dry open or covered storage.

There is a ramp at the Municipal Pier about 1.3 miles north of Klosterman Point.

Anclote Keys, several in number, are about 13 miles northward from 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 south end of Anclote Key, the largest of the group. The trees on the south 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 westerly gales for vessels up to 7 feet in draft. The anchorage can be reached by passing either northward or southward of the keys, both passages being well marked. Vessels drawing more than 7 feet can anchor westward of the keys where, though more exposed to westerly 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 0.7 knot on the flood and ebb.

Anclote River empties into Anclote Anchorage over a broad shoal area. A radar installation on the north side of the entrance is conspicuous from the northwest at a distance of 10 miles. Federal project depth is 9 feet from the Gulf to a turning basin at Tarpon Springs. In 1965, the controlling depth was 9 feet from the Gulf to Anclote Anchorage, thence 8 feet in Anclote River from the entrance to and in the turning basin. 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 north bank of Anclote River about 1 mile above the mouth. A fish camp here 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 south 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 west 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 bridge.

There are several boatyards and marinas, a yacht club, and a service wharf at Tarpon Springs. The largest marine railway in the area can handle craft up to 100 feet in length for engine and hull repairs. Craft up to 90 feet in length are built. Gasoline, diesel fuel, water, ice, marine and yacht supplies, dry open or covered storage, berthage, electronic repairs, and lifts are available. The yacht club is on the east bank of Tarpon Bayou at the bridge. The mean range of **tide** at Tarpon Springs is 1.9 feet.

See appendix for **storm warning displays.**

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 Bay** empty into Anclote River along the west side of Tarpon Springs. The junction is at the north end of a small island; the river channel passes to the east of the island, and Anclote River South Channel to the bayous passes to the west. The south channel branches at Chesapeake Point into Kreamer Bayou on the west and via Tarpon Bayou into Whitcomb Bay on the east. 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; the clearance of the nearby overhead power cable is 38 feet. A public wharf is south of the entrance to **Spring Bayou,** the second arm to the east in Whitcomb Bay, 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 Bay, which is centrally located in the town of Tarpon Springs.

Chart 1258.—The shoals that extend over 10 miles offshore along the coast for 40 miles northward 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. Martins 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. About 4 miles northward of Anclote River a channel, marked by a privately-maintained light and daybeacons, leads toward Big Bayou

Point. No services are available here. A depth of about 4 feet is reported in the channel.

An artificial fishing reef, marked by privately-maintained buoys, is about 6 miles westward of the light at the entrance to Pithlachascotee River.

Pithlachascotee River, locally known as the **Cotee River,** empties into the Gulf 7 miles northward from Anclote River. The river has as extensive shoal area off the mouth and numerous oyster reefs just inside. Local fishing boats up to 4 feet in draft navigate the river to the upper highway bridge. The controlling depth is about 2 feet across the shoals off the mouth of the river. A privately-maintained light marks the entrance, and daymarkers mark the river channel. Depths of 2 feet and greater can be carried to New Port Richey.

Port Richey is a small town at the entrance to the river. A marina and a boatyard are here. The largest marine railway at the boatyard can handle craft up to 40 feet in length for engine, hull, and electronic repairs. There are two other marinas near the highway bridge. Gasoline, diesel fuel, water, ice, open and covered berthage, ramps, and marine and yacht supplies are available.

See appendix for **storm warning displays.**

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.

Three bridges cross the Pithlachascotee. The first, U.S. Route 19 highway 1.2 miles above the mouth, has a 50-foot bascule span with a clearance of 9 feet. Drawspan regulations are given in **203.245,** chapter 2. About 2 miles above the mouth is an overhead power cable with an estimated clearance of 40 feet. About 2.7 miles above the mouth is a highway bridge that has a 40-foot fixed span with clearance of 10 feet, and 0.6 mile above that bridge, is another highway bridge with a 27-foot fixed span with clearance of 6 feet. Overhead power and telephone cables crossing the river about 0.2 mile above the bridge have clearances of 42 feet.

Hudson is a small town on Hudson Creek which empties into the Gulf 12 miles northward from Anclote River. A depth of about 2 feet can be carried into the creek. The entrance channel through the flats is marked by privately-maintained daymarkers. Gasoline, water, ice, berthage for outboards, and a launching ramp are available at a small marina.

Aripeka is a village on **Hammock Creek,** 17 miles northward from Anclote River. There are numerous deep springs and shoals in the creek, which has a controlling 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 north and south 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 northerly of the two highway bridges. The village, on State highway 595, has a launching ramp.

Hernando Beach (Gulf Coast Retreat) is the site of a large housing development 20 miles northward of Anclote River. Gasoline, water, provisions, ice, berthage, and launching ramps are available at the two marinas. Repairs to outboards can be made. The approach channel can be followed by keeping the jetty and fill spit to the northward about 15 yards. This channel has depths of about 5 feet.

Bayport is a village at the mouth of **Weekiwachee River** 23 miles northward from Anclote River. On a favorable tide a draft of about 2 feet can be taken to fish camps on the river and to the village. The channel begins close southward of **Beacon Rock,** which is 2 miles offshore and covers at high water, and continues in a generally east-by-south direction through the oyster reefs and into the river.

Chassahowitzka River empties into **Chassahowitzka Bay** 31 miles north of Anclote River. On a favorable tide a draft of about 3 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 hyacinths and grass; the controlling 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.

Bird Island is prominent in the entrance to Chassahowitzka Bay. **Black Rock,** 1.3 miles seaward from the key, bares at half tide. **Chassahowitzka Point,** on the north side of the bay, is a high and conspicuous mangrove key.

Homosassa River empties into **Homosassa Bay** 37 miles northward from Anclote Key Light. **St. Martins Keys** are prominent mangrove islets on the north side of the bay entrance. In 1966, an obstruction consisting of a bent railroad track rail was reported about 2.6 miles west 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 are here. A highway leads to the town of Crystal River where gasoline, diesel fuel, ice, covered berthage, marine supplies, and a launching ramp are available at a marina. A Federal project provides for a channel 5 feet deep through the four bars at the entrance to the river.

In 1965, a depth of 3 feet could be taken to **Homosassa Springs,** where fuel, berthage, and a ramp are available at a motel near the main coastal highway U.S. Route 19. **Homosassa Bay Entrance Light 2 (28°41.4′ N., 82°48.7′ W.),** about 3.3 miles southwestward 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 clearance of 66 feet.

Crystal River empties into the north side of **Crystal Bay** 46 miles northward from Anclote Keys Light and 23 miles southeastward from the town of Cedar Keys. **Mangrove Point,** on the south side of the entrance to the bay, is prominent in the approach from the southwest. The

white shell of **Shell Island,** on the south side of the river's entrance, is prominent when approached from the dredged channel across Crystal Reefs.

Federal project depths for Crystal River channel are 6 feet from the Gulf to the town of Crystal River. The entrance is across a large shoal area, thence across **Crystal Reefs** through the dredged channel. The channel has a controlling midchannel depth of about 6 feet to **Salt River** and thence about 3 feet to the town of Crystal River. Above Salt River local knowledge is necessary to carry the best water. Gasoline and water are available at a pier on the north side of Crystal River, 5 miles above the mouth. **Crystal River Approach Lighted Buoy (28°53.0′ N., 82°58.0′ W.),** about 12 miles westward 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.

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 three marinas and two boatyards. The largest marine railway can haul out craft up to 50 feet in length for hull and engine repairs or dry open or covered storage. Gasoline, diesel fuel, water, ice, provisions, marine and yacht supplies, open and covered berthage with electricity, ramps, and hoists are available. There is a motel on **Kings Bay** south of the town at which gasoline, water, ice, and open berthage with electricity are available. 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.—A course **081°** from the sea buoy leads past the inner approach buoy to the entrance. If coming from the southward, 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 channel through Crystal Reefs. The river is entered at the north side of Shell Island where there is a shoal area with a depth of 6 feet, which is the controlling depth that can be taken to Salt River. 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 west end of a small island when entering the inner basin at Crystal River. An overhead power cable with a clearance of 30 feet crosses the inner basin.

Chart 1259.—An 8-mile approach channel, 14 feet deep, has been dredged from the Gulf to the New Crystal River Power Plant about 2 miles northwestward from Crystal River entrance. The inner end of the channel is protected by two dikes extending to shore. The northerly dike is about 3 miles long and the southerly one about 2 miles long. The 500-foot stack and the power plant are conspicuous. The channel is privately marked by lights and daybeacons.

Cross Florida Barge Canal, now under construction, enters the Gulf about 2.5 miles northward of the power plant. The 8.5 mile western approach channel is being dredged to a depth of 12 feet. The canal will extend from the St. Johns River, just above Palatka, and will have 5 navigation locks for barge traffic.

Withlacoochee River rises in the central part of the Florida Peninsula and empties into the Gulf about 17 miles southeast 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, and a buoy about 3.7 miles west-southwestward of it, mark the approach.

A Federal project for the river provides for a channel 10 feet deep from the Gulf to Inglis, thence 2 feet for about half the year to **Croom,** 74 miles above the mouth. In January 1962, the channel was at project depth to the powerplant at Inglis; and thence 4 feet to the powerplant dam 11 miles above the mouth. The entrance channel is marked by lights, a buoy, 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 the power plant without too much difficulty. U.S. Route 19 highway bridge crossing the river at Inglis has a 35-foot fixed span with a clearance of 7 feet. Floating logs and other debris obstruct the channel above Inglis.

The lock in the dam is 133 feet long and 36 feet wide. Although the lock is in working order, small fishing boats able to pass under the highway bridge at Inglis go upriver to the dam and are hauled around the dam at the power company's expense. The lock can be opened if the boats are too large to be hauled by truck. The pool created by the dam extends nearly to **Dunnellon,** 24 miles above the mouth.

Port Inglis, at the mouth of the river is virtually abandoned. A launching ramp is available. A marina in a basin on the north bank of the river about 2 miles above the mouth has a marine railway that can haul out craft up to 60 feet in length for hull and engine repairs or dry open or covered storage. Gasoline, diesel fuel, water, ice, provisions, marine and yacht supplies, and covered and open berthage with electricity are available at the marina. Local guides can be hired as pilots for the river and the Gulf. They can be reached at the marina by VHF ship-to-shore radiotelephone, or through the Tampa Marine Operator, telephone 447-2477.

Yankeetown, the principal town on the river, is a small winter resort and fishing village 3 miles above Port Inglis. A city boat basin with ramp and free berthage is located here. There are several fish camps with wharves here. 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 north bank. A highway 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 large electric plant 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.

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Tides and currents.—The mean range of tide is 2.5 feet. Off the mouth of the river a tidal current sets easterly during the flood and westerly during the ebb. The ebb is said to attain a velocity of 3 knots at times, and this must be taken into account by vessels coming in from the entrance buoy. A strong northeasterly wind may increase the velocity of the ebb current and a southwesterly wind may decrease it.

Waccasassa River, 10 miles northward from Withlacoochee River, is of little navigational importance because of the extensive Waccasassa Reefs off its mouth.

Cedar Keys, 95 miles northward from 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 south side of the key. **Seahorse Reef,** a dangerous shoal with little depth over it, extends 11 miles southwestward 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 bell buoy is 2.5 miles southwestward of the light.

Main Ship Channel leads in a general northeasterly direction between East Bank and West Bank, eastward of Seahorse Key and Grassy Key; thence by a crooked and winding channel westward of Atsena Otie Key into Cedar Key Harbor. Federal project depth is 10½ feet from the Gulf to Cedar Key. The controlling depth is about 9½ feet. The channel is well marked by lights and daybeacons. Extreme caution must be exercised at two hairpin curves.

Northwest Channel, leading from the westward between North Bank and South Bank, in April–September 1965, had a controlling midchannel depth of 8 feet from the entrance to the 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. Local Fishermen report a controlling depth of 4 feet in **Deadmans Channel,** which is unmarked and should not be used without local knowledge.

South Bar Channel, the approach channel to Cedar Key from the eastward, 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 months; southerly winds bring it in and northerly 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 eastward on the flood and westward 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. A draft of 8½ feet can be taken through the main channel to the city dock which has depths of 8 to 15 feet alongside; there is 4 feet alongside the fuel pier. A boat basin enclosed by a circular mole is at Cedar Key. Gasoline, diesel fuel, water, ice, and some supplies for small boats are available.

The **Cedar Key State Memorial and Museum** is on the west side of Way Key. An airstrip is here. An inactive boatyard and a marina with limited berthage and a ramp are in **Daughtry Bayou.** See appendix for **storm warning displays.**

Suwannee Sound, 7 miles northward 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 Suwanee Sound is through **Derrick Key Gap,** 4 miles northwestward from Cedar Keys. Federal project depth is 6 feet for a dredged channel through Derrick Key Gap into Suwannee Sound. The controlling midchannel depth is about 4 feet. The channel is marked by daybeacons.

Steamboat Gap, Ranch Bar Gap, and **West Gap** are unmarked secondary channels with depths of 4 feet or less, and should not be entered without local knowledge. **Shell Bar Channel,** about 1 mile northwest 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 west of **Lone Cabbage Reef,** which extends northwesterly from **Lone Cabbage Island** to East Pass; the reef bares in spots at low water and is to be avoided.

The controlling depth is about 5 feet from Suwannee Sound into East Pass. The channel is marked by daybeacons.

Suwannee River empties into the sound through the two mouths known as **East Pass** and **West Pass.** East Pass is the main entrance. West Pass is little used and good only for shallow-draft boats. Federal project depths are 5 feet for a channel dredged through the shoals off the entrance to East Pass; thence 5 feet in the river up to Branford, and thence 4 feet to Ellaville. The dredged channel has a controlling depth of about 5 feet.

Once inside a draft of about 3 feet can be carried up Suwannee River to **Branford,** 65 miles above the mouth; a draft of 2 to 3 feet can be carried to the rapids 2 miles below **Ellaville,** 110 miles above the mouth; and at high stages small boats can go to **White Springs,** 150 miles above the mouth.

New channels have been dredged into the river and Salt Creek by the Suwannee River Authority. The entrance channel leads on the bearing 102° from a point in the Gulf about 1.4 miles 260° from **Axe Island,** thence southward and eastward of **Little Bradford Island** to **Northwest Pass.** At the southeast end of Little Bradford the channel divides into two branches. One branch continues eastward through **Wadley Pass** to a junction with West Pass. The other leads northward through Northwest Pass, thence northeastward into **Salt Creek** to the village of **Suwannee.** In December 1964, the controlling depth in the channels was reported to be 5 feet. The channels are marked by privately maintained daybeacons.

The mean range of **tide** at the mouth of the river is about 2.4 feet. Extreme fluctuations occur due to freshets. Low river stage occurs in the winter and high river stage in the fall months. There is little commerce on the river. Water is available at the fish camp at **Vista,** 9 miles above the mouth.

Gasoline, water, and provisions can be obtained at **Fowler Bluff,** 13 miles above the mouth. Gasoline, water, and provisions are obtainable at **Manatee Springs State Park,** 19 miles above the mouth, and at **Old Town** at U.S. highway 19 bridge, 28 miles above the mouth of the river. 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 Atlantic Coast Line Railroad Bridge at Old Town about 31 miles above the mouth. This bridge has a swing span with a channel width of 48 feet and a clearance of 2 feet at high water stage and 15 feet at low water stage. See **203.245,** chapter 2, for drawspan regulations for the railroad drawbridge near Old Town. Numerous overhead power cables cross Sawannee River between the mouth and Ellaville; least clearance is 23 feet.

Boiler Gap, 2 miles northwestward from Suwannee River, is a staked channel with a controlling depth of 1 foot. The gap was formerly used by local boats going up Salt Creek to **Suwannee,** a village on **Barbree Island** 1 mile above the mouth of the creek. The newly dredged channel through Northwest Pass is now used. There are marinas, several fish camps, fish wharves, a seafood packing plant, and a post office at Suwannee. Gasoline, a limited supply of water, ramps, and open and covered berthage are available. Minor hull and engine repairs can be made. State highway 349 connects the village with Old Town on the main coastal highway.

Shired Island is a village at the mouth of **Shired Creek,** which is about 18 miles northwestward from Cedar Keys. The village can be reached from the south by a winding staked channel through the oyster bars which was reported to have depths of about 3 to 5 feet in 1965.

There is a marina and fish camp at which gasoline, water, provisions, a boat ramp, and limited berthage with electricity are available. A paved road, State highway 357, joins State highway 351 leading to Cross City.

Chart 1260.—Horseshoe Beach is a village on **Horseshoe Point,** which is 5 miles west-northwestward from Shired Creek. The village has a seafood packing plant, several fish wharves, a county wharf, and is a shrimp boat base. State highway 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 red pointer and box on a dolphin, marks the approach. Federal project depths are 6 feet from the Gulf to a turning basin at the 100-foot marginal county wharf. In October 1966, project depth was available in the channel and controlling depth of 5½ feet was 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 north side of the point. This channel is marked by private daybeacons. The basin was being bulkheaded and improved as a small-boat haven in 1965.

Spoil banks are on either side of the entrance channel about in the middle of the dredged cut. An artificial fish haven is about 6 miles southeastward of the entrance light. There are fish wharves on a dredged basin that extends about 1,000 feet northeastward from the eastern end of the turning basin. There is an inactive boatyard at the head of the basin with a marine railway that can haul out craft up to 50 feet in length for minor hull and engine repairs. Gasoline, diesel fuel, limited supplies of water and provisions, ice, open and covered berthage, and a concrete ramp are available.

Pepperfish Keys, 29 miles northwestward from Cedar Keys, 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 behind the same key where depths are 6 to 8 feet and the bottom is sand with patches of boulders. The approach to the anchorage is through an unmarked channel which extends in an east-southeast direction. Boats of less than 4 feet in draft can enter by keeping in dark water; the shoals are discernible by their lighter color.

Steinhatchee River empties into **Deadman Bay** 37 miles northwestward from Cedar Keys. **Steinhatchee River Light 1 (29°39.4′ N., 83°27.4′ W.),** 30 feet above the water and shown from a white square pyramidal tower on piles, marks the entrance. In June 1964, Federal project depth of 6 feet was available in a dredged channel through Deadman Bay to a turning basin at the seafood plants on the south bank of the river about 2 miles above the mouth. The channel is marked by lights and daybeacons.

Steinhatchee is a small village and fishing resort on the north bank of the river about 1.2 miles above the mouth. There are marinas with boat lifts, and two fish camps here. Craft up to 30 feet in length can be hauled out for hull and engine repairs, or open or covered storage. Gasoline, diesel fuel, water, provisions, open and covered berthage with electricity, and ramps are available. On the south bank of the river about 0.5 mile above Steinhatchee there are seafood packing plants, a fishing pier, and two boatyards, one of which is inactive and the other private. Craft up to 50 feet in length can be hauled out in an emergency. Fuel, water, ice and covered berthage are available.

About 2.3 miles above the mouth State highway 358 swing bridge crossing the river has a clearance of 8 feet. At **Jena,** about 3 miles above the mouth, there is a small marina where gasoline, 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 highway 358 connects Jena with the main coastal highway, U.S. Route 19. State highway 51 runs along the north bank of the river to the main highway. State highway 361 runs along

the coast as far as Adams Beach and joins U.S. Route 19 a few miles south of **Perry.**

Dallus Creek, 5 miles northwestward 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 paved road connects with the main highway.

The pine trees on **Piney Point,** 10 miles northwestward from Steinhatchee River, are visible from well offshore on a clear day. Several small villages northward of Piney Point have roads connecting with State highway 361 and the main U.S. Route 19 coastal highway, but offer no supplies. **Fish Creek** (village) is 0.5 mile above the mouth of Fish Creek, 2 miles northward from Piney Point.

Cedar Beach on **Cedar Island,** about 13 miles northwestward of Steinhatchee, has a boat ramp and a fishing pier. Fresh water is available.

Keaton Beach, a fishing village 4 miles northwestward of Piney Point, has small docks and a small-boat channel. There is a marina in a basin that has a concrete ramp, and some berthage. Gasoline, water, some yacht supplies, and provisions are available.

Jug Island, a summer resort 5 miles northwestward of Piney Point, has a small-boat wharf. **Adams Beach** is 8 miles north from Piney Point. **Yates Creek Landing** and **Spring Warrior** are small landings on the creeks of the same names 9 and 11 miles, respectively, north-northwestward from the point.

Fenholloway River empties into the Gulf of Mexico eastward of Apalachee Bay and 64 miles northwestward from Cedar Keys. 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

Charts 1114, 1115.—The coast consists of a chain of generally narrow and wooded sand islands that trends southwestward for about 40 miles from Apalachee Bay to Cape St. George, thence northwestward for 95 miles to Choctawhatchee Bay, and thence about 80 miles westward and southwestward 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 eastern 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 westward.

Chart 1261.—Apalachee Bay, about 170 miles northwest of Tampa Bay, is formed by the bend in the coastline from a northwesterly to a southwesterly 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 south of Apalachee Bay; limits and regulations are given in **204.111,** chapter 2.

Econfina River, entering the eastern part of Apalachee Bay, is used mostly by local fishermen as an anchorage. The river channel is rocky and should be used with caution. **Econfina Landing,** on the west bank 2 miles above the mouth, has facilities for small craft. Gasoline, oil, ice, water, a natural ramp, and limited berthage are available. Another small fish camp is a short distance northward on the west bank. In February 1965, there was reported to be 3½ to 4 feet in the channel to the fish camps, under normal conditions. During protracted periods of offshore winds, less than 2 feet may be available. A State highway leads to the main coastal highway U.S. Route 98.

Aucilla River flows into Apalachee Bay 4.5 miles northwestward of Econfina River. A depth of 1 foot can be taken into the river on a favorable tide, but the approach for a distance of 3 miles is a narrow winding channel, unmarked and difficult for strangers. There are fish camps on the river and a public ramp at the bridge of the main coastal highway about 3.5 miles above the mouth.

St. Marks National Wildlife Refuge covers the coastal area between Aucilla River and Shell Point, about 5 miles westof St. Marks River.

Chart 484.—St. Marks River flows into the head of Apalachee Bay 83 miles northwestward of Cedar Keys and 54 miles northeastward of Cape St. George. The river is the approach to the town of **St. Marks** about 5.5 miles above the entrance. Fishing is the principal industry, but considerable oil is brought in by barges for the power plant about 0.5 mile above the town.

Prominent feature.—St. Marks Light (30°04.3′ 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 Federal project provides for a channel dredged to 12 feet from the Gulf to a turning basin at St. Marks, thence to the powerplant about 0.5 mile above the turning basin. In June 1964, project depths were available in the channel and turning basin. The channel is marked by a lighted range, lights, daybeacons, and lighted and unlighted buoys. There are depths of 8 feet or more in the natural channel of the river from the head of the project 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 east side of Spanish Hole, about 0.3 mile northwestward of St. Marks Light, for the St. Marks Bird Refuge boat anchorage. The controlling depth is about 2½ feet. The channel is restricted for use of U.S. Government vessels only.

Wakulla River enters St. Marks River 5 miles north of St. Marks Light. A draft of 7 feet can be taken upriver for about 0.4 mile above the confluence, and 3 feet to Wakulla Springs, 7 miles above St. Marks. Grass obstructs the channel and local knowledge is needed to carry the best water.

Anchorages.—Spanish Hole is an anchorage between the oyster bars in the mouth of St. Marks River, 0.5 mile westward of St. Marks Light. Depths of 10 to 19 feet are in the anchorage with shallow water close-to on all sides. A wreck, visible at high water, is on the northeast side of Spanish Hole.

Dangers.—Shoal water extends about 3 miles southward of St. Marks Light and numerous shoals are on both sides of the channel. They are for the most part unmarked. An overhead power cable crossing the river at St. Marks has a clearance of 74 feet.

Tides and currents.—The mean range of tide is 2.4 feet Daily predictions for St. Marks River are given in the Tide Tables. 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.

Wharves.—There are several privately-owned wharves and an oil handling berth at St. Marks. There are three marinas, two of which have boatyards. The larger of two marine railways can haul out craft up to 60 feet in length for hull and engine repairs. Open or covered storage is available as well as open and covered berthage with electricity and ramps.

Supplies.—Gasoline, diesel fuel, water, ice, and marine and yacht supplies are available.

Newport is a small resort about 4.5 miles above St. Marks. There are several marine railways at Newport and a seafood plant. U.S. Route 98 highway bridge crossing the river has a 40-foot bascule span with a clearance of 9 feet; see **203.245,** chapter 2, for **drawspan regulations.** A public boat ramp is above the bridge in Phillips State Park. Fuel and some supplies are available.

Chart 1261.—A beach resort is at **Shell Point,** about 5 miles west of St. Marks River. A marina is in a dredged basin on the point. Gasoline, diesel fuel, fresh water, ice, marine and yacht supplies, and open and covered berthage with electricity are available. There is a concrete ramp, and craft can be hauled out for engine repairs, or storage. In February 1965, there was reported to be 5 feet in the privately-marked entrance channel and 10 to 15 feet in the basin. The mean range of **tide** is 2.5 feet. **Shell Point Light (30°02.4′ N., 84°17.5′ W.),** 20 feet above the water and shown from a black box on a black pile, marks the approach.

Panacea Harbor, in Dickerson (King) Bay, is about 10 miles southwestward of St. Marks Light. A Federal project provides for an 8-foot channel from Apalachee Bay to the public wharf at the town of **Panacea.** In June 1966, the controlling midchannel depth was 5 feet. The channel is marked by lights and daybeacons. Panacea is a summer resort and fishing center with a seafood processing plant. Gasoline is available at the public wharf and some supplies can be obtained in town. The mean range of **tide** is 3.4 feet.

Ochlockonee Bay, on the west 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 southern half of the mouth is closed entirely by oyster bars. The entrance is between **Ochlockonee Point** on the north and **Bald Point** on the south. **Ochlockonee Bay Approach Light 2 (29°56.2′ N., 84°18.0′ W.),** 16 feet above the water and shown from a red triangular daymark on a dolphin, about 3 miles southeastward of Ochlockonee Point marks the approach to the bay.

A narrow channel marked by private markers leads into the bay. In February 1965, 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 north side of Ochlockonee Bay about a mile in from the end of the 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 eastward of it. A marina in the basin has covered and open berthage with electricity, a ramp, and open and covered dry storage.

Gasoline, diesel fuel, water, ice, and some marine and yacht supplies are available. Provisions can be obtained in Panacea.

There are two artificial fishing reefs in Apalachee Bay. One is about 1.9 miles 171° from Shell Point Light and the other about 4.5 miles 113° from Ochlockonee Bay Approach Light 2. They are unmarked.

U.S. Route 98 highway bridge, about 2.3 miles west of the entrance to the bay, has a 36-foot fixed span with a clearance of 13 feet. There is a small-boat basin on the east side of the north end of the bridge. Limited berthage, a ramp, and water are available in the basin which was reported to have depths of 3 to 10 feet in February 1965, but there was little water in the entrance to the basin. Gasoline, provisions, and supplies can be obtained closeby.

About 1.5 miles west of the bridge on the north bank, there is a marina in a basin reported dredged to 12 feet. In February 1965, there was reported to be 9 feet in the privately-marked channel from the bay. Gasoline, fresh water, marine and yacht supplies, and open and covered berthage are available. There is a concrete ramp, and a forklift can haul out craft up to 30 feet in length for hull and engine repairs, or dry open or covered storage. In February 1965, the basin was being enlarged and bulkheaded.

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 westward to the junction of Crooked River and then turns northward and finally eastward. 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.

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 eastern mouth.

Ochlockonee Shoal, lying about 8 miles southeastward of Ochlockonee Point, has depths ranging from 3 to 15 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 southeast of the shoal. The

buoy also marks the approach to St. Marks River and Apalachee Bay.

Charts 1261, 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 westerly side of Apalachee Bay, westward to Carrabelle. The island is separated from the mainland by Ochlockonee Bay, and by Ochlockonee, Crooked, and Carrabelle Rivers.

About 11.4 miles west of Lighthouse Point there is a 669-foot high radio tower, marked by obstruction lights, which can be seen from far off in clear weather.

South Shoal extends southward from the east 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 southern end of the shoal.

Duer Channel, unmarked and subject to frequent change, lies at the eastern 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, unimportant body of water at the easterly end of St. George Sound, is formed by a long, narrow spit of land which extends westward from Lighthouse Point. There is good anchorage north of **Peninsula Point** in depths of 5 to 7 feet, hard sand bottom. A crooked and unmarked channel with a depth of 7 feet leads to the anchorage from Duer Channel; local knowledge is essential to follow this channel.

There is a large marina in a basin in the harbor about 0.8 mile east of the end of the point. Gasoline, diesel fuel, water, ice, marine and yacht supplies, open and covered storage with electricity, and radiotelephone are available. There are a 1-ton lift and ramp on which a mobile cradle can haul out craft up to 35 feet in length for hull and engine repairs, or dry open or covered storage. Local guides are available to act as pilots. In February 1965, there was reported to be 3 to 5 feet in the basin. Florida State University has a marine laboratory on the point east of the marina.

See appendix for **storm warning displays.**

Dog Island Reef, lying 5 to 6 miles offshore south of St. James Island, extends from a point about 5 miles west-southwestward of Lighthouse Point to the eastern 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 northern extremity by a buoy, and by a buoy near its western end about 2.7 miles eastward of the east end of Dog Island.

Dog Island, a narrow, sparsely wooded island over 5 miles long, is the first land sighted in approaching East Pass from southeastward. A toll-ferry runs from Carrabelle to the small cove on the north side at the eastern end of the island. Several houses are on the island and rental rooms are available near the ferry landing. In February 1965, the controlling depth was reported to be 7 feet to the ferry slip. A small marina in the cove has gasoline and limited berthage.

Lanark is a small village about 9 miles westward of Peninsula Point. There is a small private boat basin which has a ramp and berthage for local residents. A privately-marked channel leading to the basin was reported to have a controlling depth of 6 feet in February 1965. Gasoline, diesel fuel, and fresh water are available in the basin.

Chart 865.—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 southwestward 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 is a **customs port of entry.**

Carrabelle River flows into St. George Sound 5 miles north-northeastward 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.

Prominent features.—Approaching East Pass from southeastward 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 west end of Dog Island.

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 north shore of St. George Sound, about 2.3 miles westward of the town.

Channels.—Federal project depths are 27 feet in East Pass to Dog Island, thence 25 feet through St. George Sound and Carrabelle River to a turning basin of the same depth off the town, and thence 10 feet in the river to the confluence of New River and Crooked River. In May 1966, the controlling depths were 11 feet from the channel entrance to St. George Sound, thence 15 feet to the turning basin, with depths of 7 to 15 feet in the basin, and thence 10 feet to the end of the project.

The channels are marked by lighted ranges, lighted and unlighted buoys, and daybeacons. Carrabelle Channel Entrance Light in line with Crooked River Light on the bearing **333°,** are good marks for the entrance channel across the bar. 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.

Anchorages.—Vessels may anchor in St. George Sound behind the western end of Dog Island in depths of about 20 feet and to the northwestward of the east 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 east 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.

See appendix for **storm warning displays.**

Pilotage.—Arrangements can be made for local fishing guides to pilot yachts from Carrabelle to Tampa and other coast ports. Tugs are available.

Wharves.—The flour company wharf is the largest wharf, and there are a town wharf, several fish wharves, marinas, and service wharves on the waterfront. There is a tieup berth for barges on the south bank of the river opposite the town. There are two boatyards and three marine railways, the largest of which can haul out craft up to 40 feet in length for hull and engine repairs or dry open storage. There are several ramps.

Supplies.—Gasoline, diesel fuel, water, ice, marine and yacht supplies, and berthage are available.

Charts 865, 866, 1262.—St. George Island, the southern boundary of Apalachicola Bay, extends about 24 miles westward from East Pass. The island is densely wooded except at its eastern end, which is a low and barren spit. A ferry runs from **Cat Point** to St. George Island. Privately-maintained daybeacons mark the ferry route from Cat Point westward of Bulkhead Shoal. A marked channel lends to the town of **Eastpoint,** a mile northeastward of Cat Point. In January 1966, the controlling depth was 4½ feet. A bridge-causeway extends from Cat Point to St. George Island; clearances are given in chapter 12. Gasoline, water, and limited supplies are available. Marine railways at Eastpoint can handle craft up to 25 feet in length. There are oyster and fish packing plants and numerous fish piers at Eastpoint.

Bulkhead Shoal, which extends from Cat Point southward to Bulkhead Point on St. George Island, marks the dividing line between St. George Sound and Apalachicola Bay. The Gulf 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 northwestern tip of St. George Island, and **St. Vincent Island.** The pass is the western approach to Apalachicola Bay and the town of Apalachicola.

Apalachicola is on the north shore of Apalachicola Bay at the mouth of the Apalachicola River. The principal industries are fishing and oystering. Waterborne shipments include petroleum products, chemicals, fertilizer products, sand, gravel, cement, liquid and dry sulphur, grain, feeds, and logs. The port is the gateway for the extensive river systems of the Chattahoochee and Flint Rivers. The Gulf Intracoastal Waterway enters Apalachicola River, passes the town, and then continues westward through Jackson River; see chapter 12. The town has several historic buildings, a museum, and a hospital. A U.S. Public Health Service outpatient office is in town. Apalachicola is a **customs port of entry** and marine documents are issued; customs office is in the Post Office building. Pilots are not available, but local fishing guides can be hired as pilots for the adjacent waters and the Gulf.

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 west 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 micro-wave and radio towers, and the highway bridge show up prominently.

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 eastward of St. George Light. The entrance to the cut is protected by twin jetties. Federal project depth is 10 feet. In June 1966, the controlling depth was 8½ feet. The channel is marked by a lighted bell buoy at the entrance, a **334°30′** lighted range, and two unlighted buoys at the inner end of the 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 westward of Sand Island. The passage from inside the pass to Apalachicola is via Link Channel leading southeasterly along the north side of the westerly end of St. George Island, thence through a channel leading northerly to the Intracoastal Waterway and Apalachicola. In 1966, a depth of 10 feet could be carried to Apalachicola, except that in 1964, shoaling to 5½ feet was reported between buoys 3 and 4 in the bar channel. The channels are well marked, and lighted ranges mark West Pass, Link Channel and the approach to Apalachicola. A buoy marks the turn from West Pass to Link Channel. The channel is subject to frequent changes and should be used with caution.

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 Gulf Intracoastal Waterway about 3.5 miles south of Apalachicola.

Two Mile Channel leads northward for 1.2 miles from the bay to a lateral channel leading east and west, parallel to the shore, off the fishing village of **Two Mile,** about 2 miles westward of the entrance to the river. Project depths of 6 feet were available in the channel in January 1966. An entrance light and daybeacons mark the channel.

Scipio Creek Channel leads from the river off Apalachi-

cola to a municipal boat basin in **Scipio Creek.** Project depth is 9 feet for the channel and basin. In 1966, the controlling depth was 8 feet in the channel and 8½ feet 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,** eastward of Sand Island. Another good anchorage is about 1 mile south of the turn in the channel leading to Apalachicola.

Dangers.—An Air Force **restricted area** for drone recovery is close westward of the cut; see **204.113,** chapter 2, for limits and regulations.

Cape St. George Shoal extends 11 miles southward from **Cape St. George,** the southwestern tip of St. George Island. The shoal consists of several detached spots with moderate depths between them. A whistle buoy marks the southern end of the shoal and a buoy is off the eastern side.

Shoals extend more than 3 miles offshore at West Pass. The approach is marked by a bell 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 west 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 southward 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 eastward of the bell buoy. The ebb current runs out through West Pass and divides, part going to the southward 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 north and east 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 westward of Bulkhead Shoal, the ebb current flowing eastward through the cut.

See appendix for **Apalachicola Climatological Table** and **storm warning displays.**

Apalachicola River, formed by the junction of Flint and Chattahoochee Rivers, flows south for about 98 miles into the northern part of Apalachicola Bay. The Gulf Intracoastal Waterway extends through the lower part of Apalachicola River, branching westward through **Jackson River** at its confluence with Apalachicola River about 5 miles above the latter's mouth. Federal project depth is 9 feet for the channel in Apalachicola River to its junction with Flint and Chattahoochee Rivers. Project depths were available in 1964.

Apalachicola River is crossed by a railroad bridge 3.7 miles above the mouth; see chapter 12 for clearance note.

The John Gorrie Memorial Bridge, a highway causeway, crosses **East Bay** from East Point to Apalachicola. The bridge has a swing span across the channel at Apalachicola; clearances are given in chapter 12. About 2.7 miles east of the draw opening is a small-boat opening 36 feet wide with a clearance of 16 feet; this leads into East Bay. North and south of the bridge are numerous private docks at which yachts may berth. The municipal pier and basin are about 300 yards south of the bridge. There are a ramp and open berthage for about 200 boats. The pier has about 3 feet at the outer face, and depths of about 5 feet into the basin.

There are several marinas, service wharves, and two boatyards with marine railways, and a 12-ton lift on the waterfront. The largest marine railway can haul craft up to 85 feet in length for hull and engine repairs or dry open storage. Electronic repairs can be made. Open and covered berthage with electricity is available at the marinas. Craft up to 125 feet can be built at the largest boatyard. There is a small machine shop in the town. There are fish piers on Two Mile Channel, and gasoline and some services are available.

Supplies.—Gasoline, diesel fuel, water, ice, and marine and yacht supplies are available on the waterfront.

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 northeast Georgia and flows generally southwestward and southward to a confluence wth Flint River and Apalachicola River at the southwest corner of the State. A Federal project provides for a 9-foot channel for about 142 miles to Columbus, Ga., In 1964, project depths were available. 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. **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 southwestward to its confluence with Apalachicola 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.

St. Vincent Sound is a shallow and unimportant extension of Apalachicola Bay at its northwestern end. The sound can be entered from eastward through Apalachicola Bay or from the westward 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 west-northwestward 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 inclosing a stairway cylinder. A radiobeacon is near the light.

Cape San Blas Shoals, with depths of 18 feet or less, extend 4 miles southward from the cape. Depths of 24 to 30 feet are found 10 miles south and southwestward of the cape. A lighted bell buoy is moored about 13.5 miles southwestward 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 south of east and northwest, 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 south 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 south and west of Apalachicola; limits and regulations are given in **204.114,** chapter 2.

Charts 867, 1263.—St. Joseph Bay, which extends about 12 miles northward of Cape San Blas, is separated from the Gulf by a long, narrow strip of land and sand hills, wooded in places, that curves north-northwestward from the cape. St. Joseph Bay, recognized as one of the best harbors on the Gulf, is easily entered at any time. **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 eastern 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. Shipping consists mainly of paper, naval stores, and chemical products.

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.

Channels.—From the Gulf, the dredged channel leads across 18-foot shoals to the deeper water inside. Federal project depths are 37 feet to North Channel inside St. Joseph Point, thence 35 feet to the turning basin, and 27 feet in South Channel. See Notice to Mariners and latest editions of charts for controlling depths.

The channels are marked by ranges, lights, and buoys. Port St. Joe Entrance Channel lighted range on top of the papermill is often difficult to see due to 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 which has a depth of 8 feet.

Gulf County Canal provides a connection between St. Joseph Bay and the Gulf Intracoastal Waterway. Federal project depth is 9 feet. In June 1966, the centerline depth was 9 feet. Near the bay entrance the canal is crossed by a bascule bridge with a clearance of 10 feet. The overhead power cable crossing the canal at Highland View has a clearance of 85 feet.

Anchorages.—The entire bay, except for the southern third and a narrow shelf along the sides, is free from shoals and has depths of 24 to 37 feet, hard sand or hard mud bottom. Explosives anchorage acreas and regulations are given in **202.193a,** chapter 2.

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 who 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 Port St. Joe 229-1581, or through the ship's agent. Telegraph service is not available at night. Pilots board incoming vessels in the vicinity of the sea buoy. The pilot boat is painted white with the word PILOT in large black letters on the side and is equipped with radiotelephone 2182 kc and 2738 kc.

Towage.—Tugs are usually obtained from Panama City.

Quarantine.—There is no quarantine station, but vessels subject to visitation are boarded for inspection anywhere in the harbor by a representative of the Public Health Service. A hospital is in the city.

Time.—Port St. Joe is on the Eastern Standard Time, but **Beacon Hill,** site of St. Joseph Point Lighted Range A Rear Light, marks the dividing line between the Eastern and Central Standard Time zones.

Customs.—Vessels bound for Port St. Joe notify the customs officer at Pensacola of their arrival. Port St. Joe is a 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.

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: Port St. Joe 227-3641. A **speed limit** of 4 m.p.h. is posted in the harbor.

Wharves.—A large papermill and an adjoining inactive oil storage depot have a dock 0.5 mile long with depths of 32 feet alongside on the waterfront. In February 1965, the eastern half of the dock was in poor condition. Dock space for small boats is available in the Municipal Boat Basin on the north bank of the Gulf County Canal, just north of the highway bridge.

Supplies.—Gasoline, diesel fuel, groceries, water, ice, marine and yacht supplies, and open and covered berthage are available. There is a concrete ramp at the Municipal Marina on the canal. Waterfront services can be obtained along the canal.

Repairs.—A marine way on the canal can haul out boats up to 40 feet in length for minor engine and hull repairs.

Communications.—Port St. Joe is served by the Apalachicola Northern Railroad and is on the main coastal highway, U.S. Route 98.

Bell Shoal is the broken ground northwestward of the entrance channel making off from St. Andrew Point, 6.5 miles northwest of St. Joseph Point.

Crooked Island is a narrow island extending 7 miles northwestward from St. Andrew Point. The island encloses **St. Andrew Sound**, a shallow, unimportant body of water.

Chart 489.—St. Andrew Bay, a narrow irregularly-shaped harbor, lies 27 miles northwestward 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 Lands End, forms a passage from the Gulf to St. Andrew Bay. An artificial fish haven, marked by buoys, lies about 2.5 miles southwest of the entrance.

Panama City is the seat of Bay County. One of the largest papermills in the world is at **Bay Harbor.** Shipping consists mainly of paper and petroleum products, shell, scrap iron, naval stores, 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. 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 south-southeastward of the stacks. An aviation light is atop the red-and-white checked easterly tank. Next seen are the tall Hotel Dixie Sherman, 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 Light 8 (30°07.4′ N., 85°43.4′ W.), 66 feet above the water, is shown from a skeleton tower with red triangular slatted daymark on mud sills on the easterly side of the dredged entrance. **St. Andrew Bay Entrance Lighted Bell Buoy 1A,** about 2.2 miles southwestward 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.—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.

East Entrance, southeastward 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 westward of **Redfish Point** in depths of 35 to 40 feet.

Dangers.—Danger zones for small arms firing ranges are southeastward of the entrance to St. Andrew Bay; limits and regulations are given in **204.120,** chapter 2.

Caution.—Three lights each showing a flashing white light every 4 seconds have been established on piles by U.S. Navy Mine Defense Laboratory, Panama City, about 1.8 miles southward, 2.2 miles westward, and 4.6 miles westward of the entrance. Due to the similarity in characteristics, these lights may be mistaken for the Sea Buoy, the first channel entrance buoy, or other aids in the vicinity.

Prohibited areas with lighted platforms and fog signals are 11 miles southwestward and 2.3 miles westward of the entrance to St. Andrew Bay; limits and regulations are given in **204.126,** chapter 2.

Tides.—The diurnal range of tide is about 1.5 feet. Winds greatly affect the tide. Long-continued southerly winds raise the water level in the bay and northerly winds lower it.

Currents.—The strong ebb current sets outward through the dredged cut and causes heavy tide rips if the wind is southerly and of moderate strength. Small vessels bound in or out, when there is a moderate southerly or westerly breeze, 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 who 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 Panama City 785-4563 or 785-4192, or through the ship's agents. Pilots board at the sea buoy and take vessels in day or night. The pilot boat is a 43-foot vessel with white hull with PILOT in black letters on the sides, is equipped with radiotelephone and maintains watch on 2182 kc and 2738 kc. Pilots carry portable radiotelephones.

Towage.—Two towboats of 300 hp. and 600 hp. may be had at Millville or Bay Harbor. These are small towboats used for towing barges and assisting large vessels in dock-

ing. All tugs are equipped with portable radiotelephones which are used for transmitting orders and signals in docking and undocking vessels.

Quarantine.—There is no quarantine station, but vessels subject to visitation are boarded for inspection at the docks by a representative of the Public Health Service. An outpatient office is in the city.

Customs.—The U.S. Customs officer is on duty and can be reached at any time if needed. The office is in the Post Office Building. Panama City is a port of entry but marine documents are not issued.

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.

The **harbormaster,** with offices at Bay City Terminal, telephone Panama City 785–4311 or 785–4525, assigns anchorages and berths and enforces the rules and regulations of the port. The Panama City Port Authority has jurisdiction over the port including the municipal marinas and the Port Authority Terminal at the Wainwright Shipyard on Dyers Point.

Wharves.—The principal commercial wharves are at the paper plant at Bay Harbor, on the southeast side of the city proper, and have 30 feet alongside. There is a 425-foot finger pier with transit shed and a 2,200-foot marginal wharf with sheds. About 100,000 square feet of storage space is available in the sheds. The wharves have double-tracked aprons with a depressed track in rear of the sheds. Paper is the principal commodity handled at the terminal, but occasionally some general cargo and oil cargoes for the paper plant are handled. A new Port Authority Terminal is under development at the old Wainwright Shipyard on Dyers Point. There is about 2,600 feet of berthing space with reported depths of about 32 feet alongside in 1966. There are a number of fish wharves in the harbor and a deepwater oil handling berth with 31 feet alongside about 0.3 mile northward of the Panama City Municipal Marina. Small oil-handling berths are at St. Andrew and in Watson Bayou.

Supplies.—Bunker C is not available at Panama City, but diesel fuel can be supplied by truck to vessels at the terminals. Gasoline, diesel fuel, fresh water, ice, provisions, and marine and yacht supplies are available at the two municipal marinas and at the smaller marinas on the bayous.

Repairs.—There is a shipyard on Watson Bayou and two smaller boatyards on Massalina Bayou. The largest marine railway at the yard, on Watson Bayou, can haul out vessels up to 125 feet in length for hull and engine repairs. There are travelifts, lifts, and hoists at the marinas. Open or covered storage is available and electronic repairs can be made. Above water hull and engine repairs can be made to large vessels and there are machine shops in the city.

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 on Buena Vista Point. There are several smaller private marinas on Watson and Massalina Bayous, and others are at the entrance to Lake Ware on Grand Lagoon, and at both ends of Hathaway Bridge. Fuel, water, ice, provisions, and supplies are available at the yacht basins and at most of the marinas. Open and covered berthage with electricity, and open and covered storage are available; hull, engine, and electronic repairs can be made. Panama City Yacht Club is on Massalina Bayou on the west bank just inside the entrance.

Communications.—Panama City is served by the Atlanta and St. Andrew 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 northwest 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 eastern arm, near **Millville,** is a railroad bridge with a 26-foot span with a clearance of 13 feet. The navigation span of the highway bridge close eastward of the railroad bridge has been removed and the road closed to traffic. An oil terminal berth, close westward of the railroad bridge at Millville, has 15 feet alongside. About a mile north of the entrance on the east bank is an oil terminal. About 1.2 miles above the entrance U.S. Route 98 highway bridge crossing the bayou has a 30-foot fixed span with a clearance of 7 feet. There are two marinas at the bridge. The channel is unmarked but two daybeacons mark the entrance.

In **Massalina Bayou,** north 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.

A submerged jetty extends along the northwest 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 northeastward form a good range for the channel. A depth of 9 feet can be carried to the marine service stations at and below U.S. Route 98 highway bridge about 0.4 mile north of the entrance. The bridge has a 30-foot fixed span with a clearance of 6 feet.

About 400 yards northwest of Massalina Bayou is the Municipal Pier and Yacht Basin. Depths along the face of the inner fuel area are about 9 feet. It is protected by small jetties from wind and seas from the southwest through the northwest. A pier northwest of the Municipal Pier is used for receiving petroleum products; depths at the face are more than 31 feet. Another municipally-owned long pier and yacht basin at St. Andrew north of **Buena Vista Point,** is used as a public landing for sport fishermen.

Grand Lagoon extends about 5 miles northwestward from just within the dredged entrance to St. Andrew Bay. A depth of 4 feet can be taken to the marinas near the fixed highway bridge 1.6 miles northwest of the entrance; the bridge has a 23-foot fixed span with a clearance of 8 feet. Gasoline, diesel fuel, water, ice, and supplies are available.

Chart 1263.—East Bay, an arm of St. Andrew Bay extending in a general east-southeasterly direction, is about 18 miles long. The several small towns on East Bay are of little commercial importance.

West Bay, the northwesterly 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 Lands End on the northwest bank of the 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 1115.—From St. Andrew Bay westward for 85 miles to Pensacola Bay, the shoreline is a gently curving sand beach, unbroken except at the entrance to Choctawhatchee Bay, 44 miles westward 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 southerly winds. Small craft bound westward from St. Andrew Bay should use the Intracoastal Waterway.

Chart 1264.—Topsail Bluff, a slightly elevated knoll, is about 10 miles eastward 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; limits and regulations are given in **204.130,** chapter 2. The **danger zone** of a guided missiles test operations area is in the Gulf south of Choctawhatchee Bay; limits and regulations are given in **204.135,** chapter 2.

Charts 870, 871, 1264.—Choctawhatchee Bay Entrance, about 44 miles west-northwest of St. Andrew Bay entrance, extends into the western part of Choctawhatchee Bay between Moreno Point and Santa Rosa Island. Federal project depths are 12 feet in the channel from the Gulf into the bay, and 6 feet in the channel to the harbor at Destin. In 1966, the controlling depth was 10 feet through the entrance, and 6 feet in the side channel to Destin.

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 westward of the entrance.

The channel is marked by lights and buoys, **Choctawhatchee Bay Entrance Lighted Buoy 1 (30°22.5′ N., 86°30.5′ W.),** about 0.3 mile off the entrance to the channel, marks the approach. The channel shoals rapidly across the bar after each dredging, and shifts frequently. To carry the best depths, mariners should be guided by the color of the water. Passage should not be attempted in rough weather.

From close offshore the entrance is easily identified by U.S. Route 98 highway bridge crossing the channel just inside the east end of Santa Rosa Island. The bridge has a fixed span with a 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 west to east with 18 to 38 feet in the western two-thirds, except near the shores, and 9 to 12 feet in the eastern third. Traffic in Choctawhatchee Bay consists principally of travel along the Intracoastal Waterway and oil deliveries to Freeport. A small amount of pulpwood is hauled from Black Creek to Panama City. There are good highway connections to Pensacola and Panama City on both the north and south shores of the bay.

U.S. Route 331 highway causeway over the bay at **Wheeler Point** has a draw opening at the Intracoastal Waterway channel; clearances are given in chapter 12. A small craft opening near the point has a 26-foot fixed span with a clearance of 8 feet.

There is a marina in a basin on the west side of the north end of the bridge which has gasoline, water, a natural ramp, and open and covered storage.

Choctawhatchee River empties into the eastern end of Choctawhatchee Bay. **Cypress, Indian,** and **Mitchell Rivers** are branch outlets northward of the main river. The mouth of Choctawhatchee River is very shallow, and boats enter through either Cypress or Mitchell Rivers, the latter route being more generally used. 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.**

Freeport, a small town on **Fourmile Creek** which empties into **LaGrange Bayou,** is a distribution point for diesel fuel, gasoline, fuel oil, and molasses which are brought in by barge.

Federal project depth in the channel is 12 feet from Choctawhatchee Bay to a 12-foot turning basin at the fixed highway bridge at Freeport, which is the head of navigation. In 1966, project depths were available in the channel and basin. The channel is well marked. The bridge has a channel span width of 18 feet and clearance of 5 feet.

Access channels have been dug through the spoil banks to a channel along the east bank as far as **Ramsey Bayou.** Depths of about 5 feet are reported in these channels.

There are numerous private piers and fish piers on the bayou and the creek. Fuel can be obtained at the oil terminal wharf in an emergency only. Gasoline, provisions, and some 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 westward 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 small marina at the bridge has a concrete ramp.

Boggy Bayou, about 7 miles north-northeastward 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, provisions, fresh water, and ice can be obtained but berthage is limited. There are public ramps.

Valparaiso is a small town on the west bank of the bayou at the intersection of the bayou with **Toms Bayou.** There is a public park with a ramp on the point. A boatyard on the north bank just inside the entrance to Toms Bayou, has a marine railway that can haul out craft up to 83 feet in length for hull and engine repairs. Limited open and covered berthage with electricity is available at the yard. See appendix for **storm warning displays** in the area. A fixed highway bridge across Toms Bayou has a 33-foot channel span with a clearance of 11 feet.

A **restricted area** has been designated in **Weekley Bayou,** an arm of Boggy Bayou; limits and regulations are given in **207.175a,** chapter 2.

Eglin Air Force Base covers the northwest shore of Choctawhatchee Bay from Boggy Bayou to Garnier Bayou. The tanks and buildings on the base are conspicuous.

Bens Lake, about 1.7 miles northeastward of **Black Point,** is an Air Force **restricted area;** for limits and regulations see **207.175b,** chapter 2. The marked channel into the lake has a controlling depth of about 6½ feet.

Joes Bayou, 2 miles northeast of the bay entrance, is entered through a buoyed channel which, in February 1965, was reported to have a controlling depth of 10 feet. The bayou affords good anchorage for small craft. A marine railway here can haul out craft up to 100 feet in length for hull and engine repairs.

Garnier Bayou and **Fivemile Bayou** have a common entrance at the northwest 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 in a protected basin in the cove on the east shore, about 0.3 mile south of the bridge at Shalimar, has a 12-ton travelift that can haul out craft up to 35 feet in length for hull and engine repairs or dry open or covered storage. Gasoline, diesel fuel, fresh water, ice, marine and yacht supplies, a ramp, and open and covered berthage with electricity are available. In February 1965, depths of 10 to 12 feet were reported in the basin.

A marina on the west shore of the bayou about 0.5 mile northwest of the bridge has a ramp, open and covered berthage, gasoline, diesel fuel, and water. Hull and engine repairs can be made and dry open and covered storage is available.

A yacht club on **Smack Point** on the south side of the entrance to Fivemile Bayou has gasoline, berthing, and other services for members and guests.

State Route 85 highway bridge crossing Fivemile Bayou about 0.5 mile west of the entrance has a 50-foot fixed span with a clearance of 19 feet. An overhead power cable at the bridge has a clearance of 55 feet.

Fort Walton Beach, at the western end of Choctawhatchee Bay, is on the Intracoastal Waterway; see 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 east side of the entrance to East Pass. Gasoline, diesel fuel, fresh water, ice, marine and yacht supplies, and limited berthage are available. Local fishing guides can be hired as pilots for the bay and the waters of the Gulf. Charter boats moor on the bay side of Destin close northward of the bridge. In 1965, it was reported that the channel into the lagoon had been dredged to 12 feet, but that shoaling occurs rapidly after each dredging.

A large marina is on Santa Rosa Island about 3 miles west of the highway bridge over East Pass. There is a ramp, and a lift that can haul out craft up to 40 feet in length for hull and engine repairs or dry open or covered storage. Gasoline, diesel fuel, fresh water, open and covered berthage with electricity are available. Two other marinas are at the south end of the bridge over Santa Rosa Sound to Fort Walton Beach. They are discussed with the Intracoastal Waterway in chapter 12.

Chart 1115.—Santa Rosa Sound and its eastern 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 western 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; limits and regulations are given in **204.134** and **204.136,** chapter 2.

Unexploded ordnance lies on the bottom a mile offshore from Santa Rosa Island about 8 miles westward of Choctawhatchee Bay entrance.

Charts 413, 490, 1265.—Pensacola Bay lies 110 miles west-northwestward of Cape San Blas and 125 miles northeastward 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 northward and eastward, respectively, from its eastern 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 eastward 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 westward 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 east or west of the entrance, the 10-fathom curve approaches the coast much more closely eastward of the entrance. Depths of 10 fathoms less than 3 miles off the beach indicate the vessel is eastward 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, naval stores, grain, petroleum products, sand and gravel, flour, canned goods, paper products, produce, chemicals, fertilizer, 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 north of the entrance, is the principal mark for the entrance.

Fort Pickens, on the east point of the entrance, is a part of Fort Pickens State Park. **Fort McRee** is on the west point of the entrance. The lookout tower and buildings of the Coast Guard station 2.5 miles east of the entrance, two spherical elevated tanks 8.6 and 10.8 miles eastward, the westerly one painted red and the easterly one silver, and a 220-foot water tank about 26.5 miles eastward of the entrance are prominent when coming from the eastward. The span of the Perdido Pass highway bridge 13 miles westward of the entrance, the buildings at Gulf Beach 6.5 miles westward are conspicuous when coming from the westward. The wreck of the old battleship MASSACHUSETTS on the south end of Caucus Shoal west 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 south of Warrington can be seen over Santa Rosa Island from the southward.

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 westward 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 Pensacola Safety Fairway; 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 northeastward 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 leads from the bay to a turning basin about a mile above the entrance to the bayou. Project depths are 15 feet in the Entrance Channel and 14 feet in the Inner Channel and basin. In April 1966, a midchannel controlling depth of 9 feet was available to the turning basin and 12 to 14 feet in the basin.

The channels are marked by lighted ranges, lights, daybeacons, and lighted and unlighted buoys.

Anchorages.—Good anchorage can be found in any part of the bay except southward of the naval air station. 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 southward from the western part of Santa Rosa Island. **Caucus Shoal,** with depths of 2 to 18 feet, extends 1.5 miles from the western 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 northwestern tip of the shoal, opposite Fort Pickens.

The **danger zone** of a navy firing range is off Santa Rosa Island; limits and regulations are given in **204.140,** chapter 2. A seaplane **restricted area** is in Pensacola Bay; limits and regulations are given in **207.176,** chapter 2.

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. Northerly winds sometimes lower the water surface 1.5 feet and hurricanes may raise the water surface 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 southward 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.—Northers blow occasionally during the winter, but have little effect on shipping at anchor in the harbor, except to lower the water. From January to April, considerable hazy weather is brought in by southerly winds and cleared away by northerly winds.

See appendix for **Pensacola Climatological Table** and **storm warning displays.**

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 who 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, 2638, and 2830 kcs.

The Pensacola Bar Pilots maintain a lookout tower at the naval air station and can be obtained by making a signal off the bar, by telegraph, radio, by radiotelephone through the Mobile Marine Operator, telephone Pensacola 438-3526 or 438-3476, or through the ship's agent.

Towage.—Tugs 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.—Vessels subject to quarantine must make prior arrangements with the Public Health Service at Mobile, Ala. Vessels are boarded at the dock. There are several good hospitals in Pensacola. The Public Health Service maintains an outpatient office.

Customs and Immigration.—The offices of both the Customs and Immigration Services are located in the Post Office Building. Pensacola is a port of entry and marine documents are issued.

Harbor regulations are established by the Board of Pilot Commissioners and Port Wardens and are enforced by the harbor police. The Pensacola Port Authority establishes regulations governing the piers under their control. The **Port Director** is the operating head of the Port Authority.

Bridges.—No bridges cross Pensacola Bay between the entrance and Pensacola. A highway causeway over the bay between the eastern part of the city and Town Point has a fixed span with a clearance of 50 feet.

Wharves.—The piers and wharves at Pensacola have depths alongside ranging from 10 to 33 feet. With the exception of the fish wharves, all have rail connections, two have transit sheds, and most cargo is handled directly from or to cars or sheds which have a capacity of over 200,000 square feet of storage space for general cargo. There are also facilities for handling and storage of petroleum products and liquid chemicals.

The principal piers and wharves are owned by the city and are managed by the Pensacola Port Authority. Both main piers have mechanical equipment for handling nitrate, paper products, fertilizer, and other bulk cargoes, lumber, and general cargo. The Municipal Recreation Pier is just west of the Port Authority East Pier.

The main slip at the naval air station has a general depth of 29 feet. A smaller slip has depths of 9 to 15 feet. Between the two is a long marginal wharf with a depth of about 40 feet off its face.

Supplies.—An unlimited supply of fresh water, suitable for drinking or boilers, is available at all the piers. The oil bunkering facilities have a capacity of 600 barrels per hour. Ice, gasoline, diesel fuel, bunker C, groceries, and marine supplies can be obtained.

Repairs.—Facilities are available for making repairs to hulls and machinery. The largest marine railway in Bayou Chico can haul out vessels or barges up to 190 feet in length.

Communications.—Pensacola is a seaport terminal for passenger and 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, and three commercial transmitters operate here. Air transportation is available.

The Pensacola Municipal Airport is in the northeastern part of the city.

Small-craft facilities.—For short stops, small boats usually berth at the Municipal Recreation Pier at the foot of Palofox Street or at the smaller wharves between Baylen and Palofox Streets. There are several yacht-storage basins in Bayou Chico on the southwest side of the city. Gasoline and diesel fuel can be procured at numerous marine pumps. West of the bridges, across Bayou Chico entrance, there are two repair yards which can haul out small craft. A small-boat channel with a reported mid-channel depth of 9 feet in 1965, leads from Santa Rosa Sound through Sabine Inlet to a marina in Little Sabine Lake at Pensacola Beach. Gasoline, diesel fuel, fresh water, ice, berthage, a ramp, and some supplies are available. Fuel, berthage, ramps, and some supplies are also available at the two marinas at either end of the bridge over the sound.

Bayou Chico, an inlet in the southwestern part of the city, extends about 1.1 miles westward from the bay where it divides into a northern arm and a southwestern arm. The channel project and depths are covered under channels. Waterborne commerce on the bayou include petroleum products, shell, rafted logs, stone, and sand, gravel, and crushed rock. The Frisco Lines railroad bridge and Barrancas Avenue highway bridge crossing the bayou 0.3 mile above the mouth have bascule spans with minimum clearance of 1 foot. The drawspan regulations for the highway bridge are given in **203.245,** chapter 2. Frisco Line railroad bridge crossing the mouth of the northern 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 northern arm 0.2 mile above the railroad bridge have clearances of 7 feet. Pensacola Yacht Club and basin is on the north side of the entrance to the bayou and an oil handling berth is on the south side. There are several marinas, two boatyards, a shipyard, and shell, sand, and gravel plants on the bayou.

Bayou Texar joins the bay just east of the highway causeway to Town Point. In this bayou a depth of 2 feet can 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 southwest of the center of the city. A dredged channel for seaplanes leads westward through the shoals at the entrance to the bayou and then southward to a turning basin at the Naval Air Station. The controlling depth is about 2 feet.

The Frisco Lines railroad bridge over Bayou Grande at **Jones Point** restricts navigation westward 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.

Chart 1265.—Escambia Bay extends 9 miles northward 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. The channel is through the west draw. In 1965, the twin spans of Interstate Route 10 highway bridges were under construction about 0.3 mile southward of the railroad bridge. The fixed spans will be humped where they pass over the navigation channel and will have a design clearance of 50 feet at the center. The depths in the bay shoal gradually from 15 feet at the mouth to 7 feet in the upper reaches. Federal project depth is 10 feet to the mouth of Escambia River, and thence 10 feet for about 6 miles above the mouth. In February 1967, project depths were obtained. The channel is marked by lights and buoys.

North of **Devil Point** are shoals and submerged obstructions along the western 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 northwestward, extends northward for 48 miles to the Alabama State line where it is known as the **Conecuh River.** The highway bridge about 1.5 miles above the mouth has a fixed span with a clearance of 43 feet. There is a nylon fibre plant and some commerce in cypress logs and petroleum on this river, the latter barged to a power plant about 2 miles above the bridge.

Overhead power cables crossing the river 1.7 and 2.3 miles, respectively, above the bridge have minimum clearances of 60 feet. There are fish camps along the highway bridge on the Escambia and White Rivers that have fuel, berthage, and some supplies.

East Bay, an eastward 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 northern arm of East Bay. The dredged channel through Blackwater Bay is narrow, and vessels drawing close to maximum draft must keep on the ranges. Federal project depths are 9 feet through the bay and river to Milton. In November 1964, the controlling depth to Milton was 9 feet. The channel is marked by lighted ranges, lights, and buoys.

Numerous wrecks, submerged piling, and other obstructions constitute hazards in Blackwater River. **Wright** and **Marquis Basins** are filled with such obstructions. A boatyard 3 miles below Milton, opposite **Shields Point,** has a marine railway capable of hauling out boats up to 35 feet in length for hull and engine repairs, or dry open and covered storage. Gasoline, water, and open and covered storage are available. There is a marina at **Robinson Point,** about 5.5 miles below Milton, that has gasoline, fresh water, and open and covered berthage.

Milton is a small town about 8 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 10 to 15 feet alongside. A marina above the bridges has gasoline, fresh water, open and covered berthage with electricity, and marine and yacht supplies. A crane can haul out craft up to 30 feet in length for hull and engine repairs or dry open or covered storage. There is a ramp. Diesel fuel can be obtained by truck. The Louisville and Nashville railroad bridge crossing the river at Milton has a swing span with a clearance of 8 feet. U.S. Route 90 highway bridge 0.2 mile above the railroad bridge has a bascule span with a clearance of 8 feet.

Chart 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 1265, 872.—Big Lagoon, which extends westward 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.

Perdido Bay, an irregularly shaped body of water, lies 13 miles west of Pensacola Bay entrance and 26 miles east of Mobile Bay entrance. Depths of 7 to 20 feet are found in the bay and in **Perdido River,** the latter being the river that serves as boundary between the States of Florida and Alabama. **Arnica Bay** and **Bay La Launch** connect Perdido Bay with **Wolf Bay** on the westward. Bayou St. John and Perdido Pass connect the bay with the Gulf to the southward.

The highway causeway over Perdido Bay at **Cummings Point** has an opening 40 feet wide 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 natural channel through the pass is subject to change and should be used only with local information. The buoys do not always mark the best water. In February 1965, there was reported to be 10 feet over the bar. The

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channel extends in a general northeast-southwest direction, with breakers showing on either side.

From the pass a depth of 4 feet can be taken to the Intracoastal Waterway in the lower part of Perdido Bay through a marked channel in **Bayou St. John.** A depth of about 3½ feet can be carried into Terry Cove and Johnson Cove through a narrow channel which turns sharply at Alabama Point and passes westward of Robinson Island. An overhead power cable crossing the channel has a clearance of 59 feet. In **Terry Cove** and **Johnson Cove,** there are two marinas with boat basins and a boat basin at a lodge. Marine railways at the boatyards can haul out craft up to 45 feet in length for general repairs. Gasoline, water, marine and yacht supplies, and open and covered storage and berthage are available.

In February 1965, a reported depth of 5 feet could be carried through Perdido Pass to a marina in **Cotton Bayou**; gasoline, water, marine and yacht supplies, a ramp, and open and covered storage and berthage are available. A fork lift is available to haul out craft up to 20 feet in length for general repairs.

Old River enters Perdido Pass from eastward between Florida Point and **Ono Island.** The mouth of the river is shoal and cannot be entered from the pass except by shallow-draft boats. The Florida-Alabama State boundary passes through Old River.

Little Lagoon is a shallow body of water about 6 miles in length and 0.5 mile in width lying just back of the beach between Perdido and Mobile Bays. In February 1965, the opening 15 miles east of Mobile Point, which formerly connected the lagoon with the Gulf, was closed by sand. The marina and boatyard on the south shore of the lagoon are abandoned.

7. MOBILE BAY TO MISSISSIPPI RIVER

Charts 1266, 872–SC.—Mobile Bay, 40 miles west of Pensacola and 90 miles northeast 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 east and Pelican Point on the west, but most vessels will prefer to follow the dredged channel rather than chance passage between the breakers and shoals that extend 4 miles southward on both sides.

Shipping Safety Fairways.—Vessels should approach Mobile Bay within the Mobile Safety Fairway; see 209.135, chapter 2, for limits of fairway.

Prominent features.—The general appearance of the land is a guide to finding the entrance to Mobile Bay. For a distance of 40 miles eastward of the entrance, the shore, although low, is wooded and unbroken. For 50 miles westward of the entrance there is a chain of islands which, although wooded in places, is generally low and bare.

The most conspicuous landmarks near the entrance is **Sand Island Light (30°11.3′ N., 88°03.0′ W.),** 131 feet above the water shown from a black conical tower just west of the bar channel. A two-story white house is on the northwest side of the light.

Fort Morgan, a historic State shrine, is on **Mobile Point** on the east side of the entrance. The walls of this old brick pentagon-shaped fort are most 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 red-orange fluorescent daymarks. The rear range light is shown below and on the same structure as the light. A radiobeacon is near the light. The station is also equipped for special radio direction-finder calibration; see the Light List for operational information.

The concrete gun emplacements of later fortifications eastward of the old fort are also conspicuous.

Fort Gaines, a conspicuous historic landmark and museum on the east end of Dauphin Island, is prominent on the west side of the entrance. An Air Force radar installation with numerous radar towers, one with a white dome, is at the fort. A spherical elevated tank is two miles west 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 east and Sand Island and West Bank on the west. Federal project depth is 42 feet over the bar. The project is maintained; 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 21 feet or more. Inside the bar depths in the channel increase to as much as 60 feet, with a least width of 500 yards between the shoals which rise abruptly from deep water. The wreck of the MAGNOLIA, on the eastern side of the channel 0.7 mile southwest 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, Sand Island Light, and a **020½°** lighted range on Mobile Point. The rear range light is on the same structure and below Mobile Point Light. See appendix for **storm warning displays.**

From westward, 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 Pelican Island and Dauphin Island, thence eastward into Pelican Bay. The best water can be found by passing to the south of the southern end of **Dauphin Island Spit** before shaping a course northward into Mobile Bay. The channel is marked by two daybeacons and a buoy.

From eastward, 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 navigational aids.

The secondary and other channels are covered geographically under their respective headings.

Anchorages.—The best anchorages in the lower bay for deep-draft vessels are found northward and northwestward of Mobile Point and southward of Middle Ground, where depths range 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 has been established just north of Mobile Point; see **202.194,** chapter 2, for limits and regulations. Two other anchorages for unmanned and other nondescript vessels have been designated, one near Cedar Point and the other in Mississippi Sound south of Biloxi; see **202.194a,** chapter 2, for limits and regulations.

Vessels are not permitted to anchor in the Bar Channel, Mobile Bay Channel, or Mobile River Channel. However, the harbormaster may permit vessels to anchor tempo-

rarily in four locally designated areas adjacent to Mobile River Channel off Pinto and Blakely Islands.

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 north and east of Fort Morgan in **Navy Cove.** Several rock piles are reported in this locality.

Dangers.—Shoals extend about 4.5 miles southward and westward of Mobile Bay entrance. **Southeast Shoal,** covered 3 feet, is on the east side of the Bar Channel, and **Sand Island Shoal,** covered 2 feet, and **West Bank,** covered 4 feet, are on the west side.

Middle Ground, a tongue-shaped shoal with a least depth of 12 feet, extends into the channel from the eastward 1.5 miles north of Fort Morgan. A nearly continuous spoil bank extends along either side of the bay channel from Middle Ground to the mouth of Mobile River. Through these spoil banks are several charted openings for passage to various points in Mobile Bay.

Artificial fishing reefs, marked by buoys, have been constructed of concrete pipe in a rectangular area about 3.5 miles square extending from the shore from 3.7 to 6.2 miles eastward of Mobile Point. The two outer buoys of the 6 buoys marking the fishing reefs are lighted.

Artificial fishing reefs, 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 months, 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. Daily predictions are given in the Tide Tables.

Daily predictions of the current in Mobile Bay entrance are given in the Tidal Current Tables, and similar predictions for a number of locations in Mobile Bay and vicinity are given in those tables. In this area strong winds have considerable effect in modifying the times and velocities of the current, and in using the tables allowance should be made for such effects.

The tidal current near the outer end of the Main Ship Channel is rotary. Both the flood and ebb current 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 southerly winds. Low powered and deep-draft vessels should be guided by the advice of the pilots under these conditions.

Weather.—Considerable fog occurs during the early spring months with southerly breezes; 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. See appendix for **Mobile Climatological Table** and **storm warning displays** in the Mobile Bay area.

Pilotage is compulsory for all foreign vessels and U.S. vessels under register in foreign trade. Pilotage is optional for coastwise vessels who 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, and low frequency radiotelephones (call letters WA-2098). They monitor at all times Channel 13 (156.65 mc.), Channel 16 (156.8 mc.), and also 2738 kc. They fly the code flag P. One of the boats will be found at or near the bar at all times and the pilots will board and take vessels in day or night.

Pilots can be ordered by telegraph (cable address: MOBAPPI), by radio, by radiotelephone through the Mobile Marine Operator (WLO) phone: 432-2639 (Mobile), 861-2453 (Dauphin Island), or through the ship's agents. The pilots request that a reasonably correct estimated time of arrival at the bar be given and should be corrected within two hours of arrival time.

All pilots carry portable radiotelephones. The pilots boats, tugs, and bridges are interconnected on the VHF intraport radiotelephone system with the harbormaster's office. Harbor Pilots from the harbormaster's office dock the ships in the inner harbor, and usually board from the tugs off the entrance to Arlington Channel.

Vessels drawing up to 40 feet are taken in day or night.

Charts 1266, 872-SC.—Bon Secour Bay, extending about 14 miles eastward of Mobile Bay entrance, has depths of 8 to 10 feet. Oyster beds are very extensive along the northeast shore of the bay. The bay is the route of the Intracoastal Waterway which crosses Mobile Bay Channel at a point 2.6 miles north of the latter's entrance. The waterway is described in chapter 12. A basin protected by the hulks of old barges is on the north side of Mobile Point at Fort Morgan. Gasoline, water, ice, and berthage are available.

Bon Secour River empties into the eastern part of Bon Secour Bay. Federal project depth is 10 feet from the Intracoastal Waterway for about 2.7 miles to Daybeacon 30 Swifts Landing; thence 6 feet for 1.3 miles to a shipyard. In October 1966, the controlling depth was 10 feet to Daybeacon 30, thence 6 feet to Daybeacon 37; above that the depth is about 5 feet.

The town of **Bon Secour** is on the north bank of the river, about 1.5 miles above the mouth, where several oyster and fish houses are located. Gasoline, diesel fuel, water, marine and yacht supplies, and some provisions are

available. In the vicinity are two small boatyards. The larger, in the bayou leading to Oyster Bay, can handle craft up to 50 feet in length for hull repairs.

Just below Bon Secour Bridge, about 4 miles above the mouth, there is a boatyard and a marina. The boatyard has a marine railway that can haul out craft up to 40 feet in length for hull and engine repairs, or storage. Gasoline, water, covered berthage, and a ramp are available at the marina. There are fish camps on the river at which fuel, water, and ramps are available.

A highway bridge having a fixed span limits navigation to skiffs between Bon Secour River and **Oyster Bay**, a shallow bay south of Bon Secour.

Chart 1266.—Weeks Bay, on the east bank of Mobile Bay about 6.8 miles northwest of Bon Secour River, has an average depth of 2 to 5 feet. A privately-marked channel with a reported controlling depth of about 5 feet in March 1965, leads through the entrance and across the bay to **Fish River.** An overhead power cable with a clearance of 56 feet crosses the bay at the entrance.

The approach to the bay is marked by a light. About the same depth can be carried into **Magnolia River.** Pulpwood is cut on both rivers and carried to Mobile by barges. Small boats go to **Marlow** on Fish River and **Magnolia Springs** on Magnolia River. State Route 42 highway bridge over Fish River north of Yupon has a fixed span with a clearance of 35 feet. A small marina at the bridge has gasoline, oil, water, and a launching ramp.

State Route 32 highway bridge crossing the river at Marlow about 5.5 miles above the mouth has a fixed span with a clearance of 22 feet. A marina on the west bank a short distance below the bridge has berthing with electricity and a ramp. Gasoline, water, ice, and some marine supplies are available.

East Fowl River enters the west side of Mobile Bay about 13.8 miles northward of the bay entrance. It extends generally southwestward. The entrance is marked by a light, stakes, and three privately maintained buoys. In March 1965, it was reported that a channel had been dredged to 7 feet from Mobile Bay through East Fowl River for about 5 miles above the mouth. Just inside the entrance marinas can provide dockage, 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. There are piers near the bridge where gasoline and berthage are available. An overhead power cable close eastward of the bridge has a clearance of 43 feet. East Fowl River leads into West Fowl River, and thence into Fowl River Bay; these are discussed later in the chapter.

Fowl River, the northwest 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 east side of the bay about 16 miles northward of the entrance; the shoals extending westerly from the point are marked by a light.

Point Clear, Battles Wharf, Seacliff, and **Daphne** are summer resorts along the eastern 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 channel reported dredged to 6 feet and marked by private daybeacons leads to a yacht basin at the hotel. Gasoline, diesel fuel, water, covered berthage with electricity, marine and yacht supplies, and a ramp are available at the basin. A 2-ton crane can lift out craft up to 25 feet in length.

A marina and a boatyard at a basin at **Battles Wharf** has a marine railway that can haul out craft up to 35 feet in length for hull and engine repairs or storage. Gasoline, water, ice, covered berthage with electricity, and marine supplies are available.

Fairhope, on the eastern side of the bay about 17.6 miles above the entrance, is a town with highway and bus connections. A depth of 9 feet is off the municipal pier. Fairhope Yacht Club is located in **Fly Creek.** The entrance to Fly Creek is marked by a light. Federal project depths are 6 feet for the channel and turning basin. In April 1966, project depths were obtained. Gasoline, water, ice, covered and open berthage, and a ramp are available at the yacht club.

Hollingers Island Channel leads westward from a point in Mobile Bay Channel, 18 miles north of the entrance, to a dock and turning basin on the western shore of Mobile Bay. The channel is well marked by lights and daybeacons. The controlling midchannel depth is about 22 feet.

Dog River, emptying into the western side of Mobile Bay at a point about 21 miles north 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. This depth can be carried from the bay into the river, and for about 7 miles upriver to the Louisville and Nashville railroad bridge having 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. An overhead cable at the bridge has a clearance of 68 feet.

A marina is on the south bank just above the highway bridge. The marina has a lift that can haul out craft up to 42 feet for repairs or storage. Another marina and boatyard on the south bank, about 0.4 mile above the bridge, has two marine railways that can haul out craft up to 45 feet in length for repairs or storage. On the north bank just above the bridge, a marina in a dredged basin has a 25-ton travelift that can haul out craft up to 58 feet in length for repairs or storage. An outboard marina is close northwestward of this yard.

About 3 miles above the highway bridge, a marina and boatyard has two marine railways that can haul out craft up to 60 feet in length for repairs or storage. The Dog River Yacht Club is close northward of this yard. Gasoline, diesel fuel, water, ice, covered and open berthage with electricity, and marine and yacht supplies are avail-

able at the marinas on the river. Electronic repairs can be made.

Along the western shore of the bay, north and south of Dog River, there are numerous small-boat landings; many, however, are in ruins.

Mobile, 28 miles north 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 naval stores, 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, bananas, and molasses. 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 white 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, three tall buildings near the waterfront are first seen. The easterly building, which is the highest one, has a pointed finial. Next are seen the water tanks west of Garrows Bend. At night, the aviation light shown from the easterly of the two buildings in Mobile can be seen from almost all points in the bay. 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 the ship channel. An aviation light at Brookley Field, south of Mobile, and the occulting red lights on the radio towers at the mouth of Tensaw River are prominent.

Channels.—From a point 25.7 miles north of the main entrance, **Arlington Channel** leads west-northwestward into a turning basin in the westerly part of Garrows Bend. Federal project depth is 27 feet. The channel is marked by lights, buoys, and daybeacons. **Mobile River Channel** extends from the 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, which leads westward from **Magazine Point,** has a controlling depth of about 12 feet into the **Industrial Canal** which extends about a mile to the southward. Chemicals, seafood, cement, gypsum, sand and gravel, lumber, and 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.

The old ship channel around the south end of **Pinto Island,** which leads to Tensaw River, has a controlling depth of 8 feet. The channel is marked by buoys. **Pinto Pass** has a depth of 3 feet in an unmarked channel from Mobile River to the highway-railroad bridge which has a 20-foot fixed span with a clearance of 6 feet. An overhead cable crosses just west of the bridge. Beyond this point the depths shoal to 1 foot.

Anchorages.—With the extensive berthing space available in Mobile there is little need for anchoring in the harbor. Vessels with permission of the harbormaster may anchor temporarily in four designated places abreast the city eastward 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 can anchor in Mobile River above Cochrane (U.S. Route 90) highway bridge with 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 Louisville and Nashville railroad bridge with a swing span with a clearance of 6 feet; the channel is through the south draw; see **203.491,** chapter 2, for **drawspan regulations.**

Across Threemile Creek there 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 north draw. The second, the Alabama Terminal Docks railroad bridge, has a swing span with a clearance of 4 feet. The channel is through the north 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 north draws. See **203.245,** chapter 2, for **drawspan regulations.** About 0.3 mile above these bridges 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.**

Towage.—Diesel-powered tugs and oceangoing tugs of up to 1,900 hp. are available at Mobile.

Quarantine.—The quarantine station is in the Federal Building. Vessels subject to quarantine are boarded at the dock from 6 a.m. to 6 p.m., and at other times by special arrangements. There is a Public Health Service outpatient clinic in the Federal Building. Mobile has several hospitals and clinics.

Customs.—Mobile is a Customs District Headquarters and port of entry with office in the Federal Building. Marine documents are issued.

Immigration and Naturalization Service maintains an entry office in Mobile in the Federal Building.

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 south-southwestward 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, and assigns berths and enforces the rules and regulations of the port. Ships are handled by the pilots between the sea and the entrance to the inner harbor only; the harbormaster and his deputies have charge of vessels from Arlington Channel northward, and are responsible for docking and shifting vessels between berths in the harbor. Harbormaster's office is in the Administration Building at the State docks, and is connected by the intraport VHF (156.8 mc.) radiotelephone system with all pilot boats, tugs, and the Cochrane and Dauphine Island bridges. The harbormaster can be reached by telephone at 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 terminal facilities for about 30 general cargo berths, five bulk-handling berths and several oil terminals. Most piers and wharves, which extend along the west bank of Mobile River, have depths of 40 feet alongside. A depth of about 12 feet can be carried into Industrial Canal.

The **Alabama State Docks** comprise a modern port terminal, open to all users alike. The facilities include many concrete wharves, fireproof shipside transit sheds and covered warehouse space, a 2½-million-bushel grain elevator, a cotton compress and warehouse, bulk material-handling plant, bonded general cargo warehousing, terminal rail connections, cold storage and quick-freeze plants, and numerous auxiliary facilities including a 75-ton electric derrick, two floating cranes up to 62 tons capacity, locomotive cranes, lift trucks, tractors, and conveyors.

Warehouse and transit shed storage space totals 2½ million square feet, and open storage space totals 600,000 square feet. The high-density cotton compress has a capacity of 120 bales per hour and the concrete warehouse 360,000 square feet or 97,000 bale capacity. The cold storage plant has 450,000 cubic feet of cooler and freezer space. The 2½-million-bushel grain elevator has a meal-handling facility that can store 20,000 tons of soybean meal. The elevator can deliver up to 1,100 tons of meal or 115,000 bushels of grain per hour. A bulk liquid handling facility has storage tank capacity of over 5 million gallons of edible oils and can handle up to 20,000 gallons per hour. The bulk materials handling plant has four unloading towers, a rotary car dumper, and two belt conveyor systems and hatch trimmers. The unloaders have a capacity of up to 2,000 tons free-digging per hour. Covered warehouse space for 35,000 tons of bulk fertilizer and open storage space for 200,000 tons of ore are at the plant. All piers, transit sheds, and warehouses have rail sidings of the terminal railroad, sprinkler system, and 24-hour security watch, and a fireboat is in the harbor.

A 750,000-bushel private grain elevator, oil terminals, chemical and asphalt plants are on Blakeley Island opposite the State docks. A molasses storage and handling plant with a capacity of over 11 million gallons is on Choctaw Point. On McDuffie Island are shell, cement, and concrete mix plants.

A municipal wharf 1,500 feet long is centrally located on the waterfront. The wharves at the bay entrance, just inside Mobile Point, are in ruins and the broken piling are a menace to small craft.

Supplies.—Full stocks of deck and engineer's supplies are carried in the city. Water almost chemically pure is piped to the principal facilities. Oil companies provide oil-bunkering facilities with capacities up to 1,000 barrels per hour and some State docks are piped for fuel oil with a loading capacity of 1,000 barrels per hour. The State coal-handling plant has a bunkering capacity of 600 tons per hour. Floating equipment is available for delivering bunker coal and bunker fuel oil to ships anywhere in the harbor.

Repairs.—Excellent facilities for practically any class of repair work to the hull or machinery of steel or wooden vessels are available at Mobile. There are three large shipyards. The shipyard on Pinto Island has drydocks with capacities of 5,000 to 19,500 tons; the largest can accommodate ships 750 feet in length. There are ways for building commercial freighters, and many repair berths. Another shipyard on Blakeley Island has a 2,500-ton floating drydock. The repair yard at the State docks makes topside repairs and has a 1,000-ton floating drydock and berths for several large ships. Smaller shipyards with marine ways and small floating drydocks are on Blakeley Island south of Fairhope, and in Dog River.

Salvage tugs, seagoing and equipped for heavy work, are available. Barges, derricks, pumps, and diving outfits may be procured for virtually any type of work.

Small-boat facilities.—The principal basins for yachts and small boats are in Dog River. Limited facilities for berthing may be obtained in the west part of Pinto Pass and the smaller docks along the waterfront. All types of supplies and repairs are available. A small-boat basin at Fort Morgan, which is a State Park, has gasoline, oil, and water. Air taxi service to Mobile and charter boat hire are available. The basin can accommodate boats up to 42 feet in length.

Communications.—Mobile is served by four trunk-line railroads, four airlines, and highway connections. Regular steamer communication 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 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 Marine Radio, Channel 16 (156.8 mc.) and Channel 12 (156.6 mc.) 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. The controlling depth to the confluence is about 14 feet.

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 north of the bridge. The south end of Blakeley Island has been extended eastward by dredged fill to the west side of the entrance to Tensaw River. The battleship ALABAMA is permanently moored on the east side of the fill at a State park.

The **Mobile-Tensaw Rivers Cutoff** connects the two rivers about 8 miles above Mobile. Depths in the cutoff are 20 to 26 feet. From the cutoff the channel into Tensaw River is marked by buoys and an unlighted range on the east bank of the river; the controlling depth on the range is about 13 feet. For vessels drawing more than 13 feet, it is necessary to turn south at the eastern end of the cutoff and pass around the south end of Gravine Island and then proceed upriver in the eastern branch.

A railroad bridge over Mobile River, 8.3 miles above the city, has a swing span with a clearance of 4 feet.

Tensaw River, for several miles north and south 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 **203.245**, chapter 2, for **drawspan regulations.**

Light-draft boats can reach Tensaw River either by going up Mobile River to Spanish River and thence down that stream, or from the main channel through the channel south 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 north side of these bridges have clearances of 33 feet. About 0.4 mile south of **Vessel Point** is a small boatyard with marine ways. Boats up to 46 feet in length can be handled for hull and engine repairs. A fish camp has gasoline, fuel, and water.

Waterway traffic 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 the **Black Warrior-Tombigbee Canal 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 June 1966, Federal project depth of 9 feet was available in the waterway.

Several locks and dams are on the waterway. The size of vessel that can navigate this route is controlled by the dimensions of the smallest lock, Number 15, at mile 311, which are: usable length 281.1 feet, width 52 feet, and depth of 10 feet over the sill. The system is being modernized by the construction of new dams and locks.

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. Only bridges of the fixed type cross Mulberry and Locust Forks; least clearance over Mulberry Fork is 31 feet, 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, and steel products.

Mobile River joins the **Alabama River** about 39 miles above Mobile. Considerable amounts of pulpwood, petroleum products, and sand and gravel moves in tows drawing up to 8 feet to Montgomery, Ala., about 300 miles above Mobile. The controlling depth is about 3 feet but greater depths can be carried from November to June.

Chart 1115.—Mississippi Sound extends 70 miles west of Mobile Bay between a chain of narrow, low, sand islands and the mainland, providing a sheltered route for the Gulf 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. 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 1266, 872-SC.—Pass aux Herons connects the southwestern corner of Mobile Bay with the eastern end of Mississippi Sound and is part of the Intracoastal Waterway; see chapter 12.

Grants Pass, 0.3 mile north 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 on Dauphin Island. Federal project depth is 7 feet for a channel from Mississippi Sound through Bayou Aloe to a turning basin of the same depth at Dauphin Island village. The controlling depth was 6 feet in April 1966. The channel is marked with lights and daybeacons. There is a marina and fish camps at the village; gasoline, diesel fuel, water, marine supplies, and berthage are available.

There is a small boat basin at **Fort Gaines** where Coast Guard craft and pilot boat tenders moor. Gasoline and water are available.

Dauphin Island Bay is a shallow bay at the east 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 daybeacons and from Mobile Bay through an inlet protected by a jetty about 0.2 mile north of Pelican Point. A Federal project provides for a 7-foot channel from Mobile Bay through the inlet to an anchorage basin of the same depth at Fort Gaines, and thence a 4-foot connecting channel from the basin to Dauphin Island Bay. In June 1966, the controlling depth was 6½ feet in the entrance channel and anchorage basin, and 4 feet in the connecting channel. A light marks the channel entrance to the inlet.

Shrimp boats and fishing vessels dock at the bulkhead on the south side of the anchorage basin just inside the inlet.

A large marina on the west shore of the bay has a hoist and surfaced ramps. Craft up to 35 feet in length can be hauled out for hull and engine repairs, or dry open or covered storage. Gasoline, diesel fuel, water, ice, open and covered berthage with electricity, and marine and yacht supplies are available. In March 1965, there was reported to be 8 to 9 feet at the berths and 6 feet in the privately-maintained and marked channel that leads along the south and west shores of the bay from the connecting channel to the marina and northward and westward into Mississippi Sound. The highway bridge, part of Dauphin Island causeway, over the northern part of this route has a 40-foot fixed span with a clearance of 25 feet. Overhead power cables at the bridge have a clearance of 33 feet.

Heron Bay is a shallow bay used mainly by crabbing and oyster boats. A small boatyard at the north end of the bay can haul out craft up to 35 feet in length and 3 feet in draft for general repairs. Local knowledge is required to reach this yard. In March 1965, the State was reported to have dredged a 5-foot channel from Mississippi Sound to the head of the bay, with a connecting channel through Heron Bay Cutoff into Mobile Bay.

Heron Bay Cutoff, locally known as **The Cutoff,** about 1.8 miles north 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. Gasoline, fuel oil, water, and limited marine supplies can be obtained at the bridge.

Charts 1266, 874–SC.—West Fowl River enters **Fowl River Bay** about 4 miles northwest of Cedar Point. It extends northeastward along the west 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. State Route 188 highway bridge crossing the river about 2 miles above the mouth has a 35-foot fixed span with a clearance of 10 feet.

Coden is a small fishing village on **Bayou Coden** on the north shore of **Portersville Bay,** northeast of Isle aux Herbes. It has highway connections. Federal project depth in the Bayou Coden Channel is 4 feet to State Route 188 highway bridge about 0.5 mile above the mouth of the bayou. In April 1965, the channel was at project depth; lights and daybeacons mark the channel. The bridge has a 15-foot fixed span with a clearance of 6 feet. There are seafood packing plants, a fish camp, and a marina. A small marine railway can handle craft up to 40 feet in length for hull and engine repairs. Gasoline, diesel fuel, water, open and covered berthage, and a concrete ramp are available at the marina.

Charts 1267, 874–SC.—Bayou la Batre, a tidal stream about 9 miles long, empties into Mississippi Sound 1 mile northwest of Isle aux Herbes. Federal project depth is 12 feet from Mississippi Sound to State Route 188 highway bridge at the town of **Bayou la Batre** about 2.2 miles above the entrance to the bayou. In February 1967, project depths were available. The channel is marked by a **018°** lighted range, and lights. The bridge has a 50-foot bascule span with a clearance of 8 feet. An overhead power cable at the bridge has a clearance of 85 feet.

Shrimp, fishing, and party-boat fleets operate out of Bayou la Batre. The town has several seafood packing plants and canneries. Several shipyards on the bayou are engaged in the construction of wooden vessels and steel-hulled vessels up to 95 feet in length. Machine shop facilities are also available. The largest marine railway in the area can handle craft up to 110 feet in length for engine and hull repairs. Marinas here can provide gasoline, diesel fuel, water, ice, marine and yacht supplies, and open and covered berthage.

The diurnal range of **tide** is 1.5 feet. See appendix for **storm warning displays.**

The Alabama-Mississippi boundary is about 6.5 miles west 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 drawing not more than 8 feet. The pass is subject to frequent changes; it can generally be followed by the deep green water during calm weather and by avoiding the breakers during rough weather. A lighted buoy, and a buoy are on the east side of the pass. The chart and knowledge of local conditions are the best guides.

Charts 414, 874–SC, 1267.—Pascagoula Harbor, one of the important deepwater ports on the Gulf Coast, is on Mississippi Sound about 9 miles northward of **Horn Island Pass.** It is 72 miles westward of Mobile by water, and 51 miles east of Gulfport. The facilities in the port area include a 2½ million-bushel grain elevator, shipyards, and other industries at the mouth of Pascagoula River, and the industrial area centered around **Bayou Casotte,** about 3 miles eastward of Pascagoula River.

Pascagoula, at the mouth of **Pascagoula River,** is a thriving 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 west side of Pascagoula River, which may be seen for several miles. The cranes of the shipyard, a tall elevated tank 0.5 mile eastward of the mouth of the river, and the twin tanks in Pascagoula are prominent from the sound. The range light towers on the west end of Petit Bois Island, the white structure of the abandoned Horn Island light about a mile northeastward of the west end of the island, the cracking towers and tanks at the oil refinery, towers, tanks, and elevators of the fertilizer and refractory plants on the east bank of Bayou Casotte are also prominent. **Horn Island Pass Lighted Bell Buoy 1 (30°11.4′ N., 88°31.8′ W.)**, marks the approach to Horn Island Pass.

Vessels should approach Horn Island Pass and Pascagoula Harbor through the Pascagoula Safety Fairway; see 209.135, chapter 2.

Channels.—The deepwater entrance is through dredged cuts in **Horn Island Pass Channel**, and in Mississippi Sound for about 4 miles north of Petit Bois Island where the channel divides, **Pascagoula Channel** leading about 6 miles northwestward to a turning basin at the railroad bridge at Pascagoula, and **Bayou Casotte Channel** leading about 4 miles northward 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 south or southwest of the sea buoy, weather permitting. Anchorage for vessels up to 15-foot draft is available in Mississippi Sound on either side of the channel. **Explosives anchorage areas** have been designated north and south of the western end of Petit Bois Island; see **202.194b**, chapter 2, for limits and regulations.

Dangers.—Shoal water up to 30 feet extends about 2 miles southwestward of the west end of Petit Bois Island. Spoil banks are on the sides of the channels. Strangers should not close the channel entrance 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 at the mouth of the river 1.6 feet. In Horn Island Pass the tidal current floods northward and ebbs southward 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.

See appendix for **storm warning displays.**

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 who 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 the sea buoy, 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 name *PILOT* on the bow. The boat is equipped with radiotelephone, 2182 and 2738 kcs. Pilots can be notified in advance by radio, telegraph, by radiotelephone through the Mobile Marine Operator, phone: Pascagoula 762–1151, or through the ship's agent.

Towage.—Four tugs of 1,200 and 1,800 hp., and two of 600 hp. are available. Arrangements should be made in advance through the ship's agent.

Quarantine.—Vessels subject to inspection must make arrangements through the quarantine station at Mobile. Vessels are boarded at the dock by a contract physician.

The nearest marine hospital is at New Orleans. There are outpatient offices at Biloxi and Gulfport. The Jackson County Hospital is at Pascagoula.

Customs and Immigration.—Pascagoula is a port of entry and marine documents are issued. Immigration matters are handled by the customs officer.

Harbor regulations.—The Port of Pascagoula is under the control of the Jackson County Port Authority and, under a Port Director, is responsible jointly with the Jackson County Board of Supervisors for the industrial development, port and harbor improvement, and harbor management. A harbormaster appointed by the Port Director enforces the regulations. Dock superintendents at the Port Authority Terminals and grain elevators assign the berths.

Speed limit.—No oceangoing vessel shall proceed in excess of 8 m.p.h. in the channel from Horn Island Pass to the entrance to Pascagoula Harbor and shall not exceed 5 m.p.h. while passing any wharf, dock, or moored craft.

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.

Wharves.—The Port Authority general cargo and Terminal and Grain Elevator are on the west bank of the river about 0.5 mile below the railroad bridge. The 525-foot general cargo wharf has a transit shed with 80,000 square feet of storage space and large open storage space. The 2½ million-bushel grain elevator can handle over 60,000 bushels per hour and has all modern facilities for handling grain. The concrete marginal wharf is 1,200 feet long; both wharves have 40 feet alongside. Depressed tracks are in the rear of the transit shed and there is a large rail storage and marshalling yard at the terminal and elevator. There is 5,300 feet of berthing space at the fitting out finger piers at the largest shipbuilding and repair yard on the east bank just inside the entrance. The 500-foot municipal wharf, now leased to a seafood processing and canning company, is on the east bank just

below the railroad bridge. A small section of the wharf is used by fishing vessels to load ice. There are numerous other wharves on the river used for handling of seafood, fertilizers, sand and gravel, and layup at the smaller shipyards.

On Bayou Casotte a new Port Authority general cargo terminal is in a dredged basin on the east bank about 1 mile north of the entrance. There is 750 feet of berthing space on the north side of the basin and 540 feet on the bayou channel; both have 40 feet alongside. The berth has a steel and concrete transit shed with over 175,000 square feet of storage space, two depressed tracks through the center of the shed and one in the rear. Two warehouses with over 160,000 square feet of storage space, facilities for bulk storage, and a tank farm for storage of liquid cargoes were under construction in 1965. The terminal is equipped with modern cargo handling equipment. There is also a refractory materials plant with an t-shaped wharf on the east bank just inside the entrance to the bayou, a petroleum handling berth at the large oil refinery about half way up the bayou on the east bank and a phosphate elevator and chemical handling berth near the head. These berths have from 25 to 40 feet alongside.

Supplies.—Gasoline, diesel fuel, water, ice, marine and yacht supplies, and provisions can be obtained in Pascagoula; Bunker C and diesel fuel is supplied by barge.

Repairs.—The **Ingalls Shipyard** has facilities on its ways for building nuclear powered submarines, auxiliaries, and merchant ships up to 630 feet in length, 86-foot beam and 18,000 tons. The shipyard has 9 building ways and 5 fitting-out berths of about 600-foot length each for any type of engine room and topside repairs.

Several smaller shipbuilding and repair yards are in Pascagoula where numerous tugs, barges, and small craft are built. The largest of these has a 600-ton floating drydock that can haul out craft up to 175 feet in length. Other yards have marine lifts and marine ways with facilities for hauling out vessels and barges up to 1,000 tons and 240 feet in length, for general repairs. Machine shops are available. Several of the smaller yards build wooden and steel vessels up to 140 feet in length and barges up to 250 feet in length. Deep sea diving and salvage equipment are available. Cranes up to 50-ton capacity are available at the large shipyard.

Communications.—The port is served by passenger and 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 north of the city. The Southern Airways serves the Jackson County Airport about 2 miles northeast of the city. Major bus lines and several motor freight lines serve the city.

Small-craft facilities.—There is a municipal boat basin with berthage for small craft up to 40 feet in length at the head of a channel 0.5 mile long on the east side of the entrance to the river. There were no service facilities in the basin in 1965. The controlling depth in the channel is about 9 feet to the Coast Guard wharf on the south bank, thence 5 feet to the head of the basin. A daybeacon marks the entrance. There are several marinas, service wharves, and boatyards where gasoline, diesel fuel, water, ice, provisions, marine and yacht supplies, ramps, and open and covered berthage with electricity are available. Hull, engine, and electronic repairs can be made and dry storage is available.

Pascagoula (Singing) River is navigable to the confluence of **Leaf** and **Chickasawhay Rivers** about 70 miles above the mouth. In June 1966, the controlling depth in the river channel from the highway bridge at Pascagoula to Moss Point was 12 feet, thence 12 feet up the river to **Dead Lake**, about 34 miles above the mouth, and thence 3 feet to the confluence of Leaf and Chickasawhay Rivers. **Escatawpa (Dog) River** enters Pascagoula River from the eastward about 5 miles above the highway bridge at Pascagoula. In June 1966, the controlling depth was 12 feet to State Route 63 highway bridge at Moss Point, thence 12 feet through **The Cutoff** to the plants above the Mississippi Export railroad bridge. The channel in Pascagoula River for about 3 miles above Pascagoula is marked by lights and a lighted range. Lights mark the cutoff through Escatawpa River.

The log booms of a plywood and veneer mill are on the east bank of **Krebs Lake** about 1 mile above the highway bridge at Pascagoula. Depths of about 17 feet can carried to the facility with local knowledge.

Moss Point is a city on the Escatawpa River about 2 miles above the junction with the Pascagoula River. There are industries in chemical, rubber, paper products, 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. About 2.6 miles above the mouth the Mississippi Export railroad bridge has a swing span with a clearance of 5 feet. Overhead power cables crossing at the bridge have clearances of 80 feet.

About 0.5 mile north of the highway bridge at Pascagoula, a dredged canal, with a controlling depth of about 6 feet, leads through **Marsh Lake** to West Pascagoula River.

About 2.5 miles northward of U.S. Route 90 highway bridge at Pascagoula, a cutoff leads from Pascagoula River through **Bayou Chemise, West Pascagoula River,** and **Middle River** to Mississippi Sound. It is marked by a light at its eastern entrance and a daybeacon in Bayou Chemise. The controlling depth is about 7 feet. West Pascagoula is crossed, about 0.8 mile from the mouth, by 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. Two overhead power cables crossing the river between the bridges have a minimum clearance of 12 feet and the cable above the bridge has a clearance of 33 feet.

Mary Walker Bayou, entering West Pascagoula River about 0.2 mile north of the highway bridge, has a fishing camp just inside the entrance where gasoline, oil, and water are available.

Charts 876–SC, 1267.—Dog Keys Pass forms a connection between Mississippi Sound and the Gulf at the west end of Horn Island. The pass has a depth of about 10 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 **Horn Island West Light 2 (30°14.7′ N., 88°46.2′ W.)**, 25 feet above the water and shown from a red triangular daymark on skeleton tower on the west end of Horn Island. Dog Keys Pass Lighted Buoy 1, about 1.9 miles south-southwestward of the light, marks the channel across the bar.

Isle of Caprice formerly existed midway between Horn Island and Ship Island. A large casino was on the island. The island and casino were destroyed by hurricane about 1917, leaving only a 4 inch diameter pipe from an artesian well. In March 1965, this pipe was reported still intact and discharging fresh water. The well is protected by 3 inch diameter pipes with daymarkers. Only a sandbank remains of the island.

Little Dog Keys Pass, about 3 miles west of Horn Island West Light 2 and between Isle of Caprice and Ship Island, is used by sport fishermen and some fishing craft. In March 1965, 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.

Charts 874–SC, 876–SC, 1267.—Biloxi is a city on a peninsula jutting eastward into Mississippi Sound about 40 miles west of Mobile Bay and 11 miles east of Gulfport. It is an important commercial sport fishing center and winter resort with a large seafood industry. Hundreds of shrimp and oyster boats operate from the port in the season. Numerous large shrimp and oyster canneries are along the eastern 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 west 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 Gulf Intracoastal Waterway which passes through Mississippi Sound about 6 miles south of the city. Principal shipments through the port are seafood, pulpwood, petroleum products, and shell.

Prominent features.—The tank and radio tower at Ocean Springs, five checkered tanks at **Keesler Field,** the lighthouse, and several large hotels in and west of Biloxi are prominent from offshore. At night the aviation light at Keesler Field, and the red lights on the radio tower are 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 north of the channel.

Vessels bound for Biloxi via Dog Keys Pass should approach the pass through the Biloxi Safety Fairway; see 209.135, chapter 2.

Channels.—There are two channels connecting the Biloxi waterfront and Biloxi Bay from the sound. **Biloxi East Channel,** 2.5 miles northward of Dog Keys Pass, is a 12-foot privately dredged project. It leads through Biloxi Bay to a point about a mile southeastward of the first bridge, thence connecting westward with the Biloxi Harbor turning basin. In May 1964, the controlling depth was 7 feet. **Biloxi Channel,** the 12-foot Federal project waterway, leads from Mississippi Sound west of Deer Island to the Biloxi Harbor turning basin, thence eastward to Biloxi East Channel. In September 1966, the controlling depth was 10 feet through the entrance channel to Biloxi Channel Light 10, thence 8 feet to Biloxi East Channel at U.S. Route 90 highway bridge.

A side channel leads to a small-boat basin at **Ocean Springs.** The channel is marked by a light and daybeacon. Controlling depths are reported to be about 6 feet in the basin and about 5 feet in the approach channel from the main channel in Biloxi Bay. Gasoline, diesel fuel, water, ice, and a one ton lift are available.

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 south of Biloxi; see **202.194a,** chapter 2, for limits and regulations.

Tides.—The diurnal range of tide at Biloxi is about 1.8 feet.

See appendix for **storm warning displays.**

Pilotage.—No regular pilots are stationed at Biloxi.

Quarantine.—A Public Health Service outpatient office and two hospitals and numerous clinics are in the city.

Customs officers are stationed in Biloxi. Marine documents are issued by the Coast Guard.

Bridges.—Between Plummer Point and Biloxi the bay is crossed by the new U.S. Highway 90 bridge with a bascule span having a clearance of 40 feet at the center. The swing span of the old highway bridge has been removed, but the approach structures remain and are being used for public recreation. Just above this is the L&N Railroad bridge which has a swing span with a clearance of 4 feet; the channel leads through the west draw. Other bridges in the Biloxi area are covered under their respective waterways.

Wharves.—There are many docks along the southern waterfront. Some of these are private facilities for fishing companies but several are open to the public. The Biloxi small-craft harbor in a basin protected by breakwaters is located north of the west end of Deer Island. The Biloxi Yacht Club is close westward of it. There are several marinas along the south waterfront and numerous launching ramps.

Supplies.—Water, ice, provisions, and marine supplies are available. Diesel fuel, gasoline, and oil are available at the small-craft harbor, marinas, and service facilities along the waterfront.

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.

Repairs.—Several shipyards are located on the water-

front and in Back Bay of Biloxi. The largest has marine ways capable of hauling out vessels up to 80 feet in length for general repairs. The yard also builds boats. There are lifts of various sizes at the marinas and in the small-craft harbor.

Communications.—The Louisville and Nashville Railroad serves the city with passenger and freight service. U.S. Highway 90 passes through the city and State Route 15 leads northward to the central part of the state. Southern Airways has air service to Gulfport Municipal Airport about 8 miles west of the city. Bus lines and several motor freight lines serve the city.

Back Bay of Biloxi extends westward from Biloxi Bay to **Big Lake.** State Route 15 highway bridge crossing the bay at **Shipyard Point** has a swing span with a clearance of 10 feet. The channel is through the north draw. An overhead power cable crossing just west of the bridge has a clearance of 89 feet. The cable 2.8 miles west of that bridge has a clearance of 84 feet at the main channel. At **Deep Point** is a highway swing bridge with a clearance of 11 feet.

A Federal project channel from Biloxi Bay through Back Bay of Biloxi, Big Lake, and in Bernard Bayou to the Air Force Terminal at Handsboro 2.5 miles above the mouth of the bayou provides for a depth of 12 feet. In March 1966, the controlling depth was 10 feet to Shallow Point at the mouth of Bernard Bayou.

Biloxi River empties into the northeast 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. Chumbula Bridge, about 4 miles above the mouth, has a swing span with a clearance of 9 feet; the channel is on the west side of the pivot pier. A power plant is on the river, and barges carry pulpwood from logging camps upriver.

Tchoutacabouffa River empties into Biloxi River about 1 mile north of Big Lake from the northeast. The river is reported navigable for drafts up to 5 feet to **New Bridge,** about 7 miles above the mouth, and for drafts of 3 feet for an additional 6 miles. Cedar Lake bridge, about 4 miles from the mouth, has a swing span with a clearance of 12 feet. 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 north side of the pivot pier; the clearance is 14 feet.

Bernard Bayou, which empties into Big Lake from westward, is good for a draft of 8 feet through buoyed Cranes Neck Channel in Big Lake to the artificial lake at Gulfport Field. With local knowledge, a reported draft of 3 feet can be carried 1.5 miles farther to the head of navigation. An overhead power cable across the bayou about 0.5 mile above the mouth has a clearance of 67 feet. The highway bridge at Handsboro has a bascule span with a clearance of 12 feet.

Small-craft facilities about 1.5 miles above the mouth of the bayou can provide gasoline, water, ice, marine supplies, berthage, and complete engine and hull repairs. A 110-foot marine railway and a 50-ton lift are also available.

Harrison County Industrial Seaway, a 12-foot by 150-foot industrial Canal, is under development by Harrison County Development Commission to afford access to industrial areas along the seaway and Bernard Bayou north of Gulfport. The project extends westward from Big Lake in a landcut from Shallow Point on the north side of the entrance to Bernard Bayou for about 2.5 miles, thence through Bernard Bayou and Gulfport Lake for 2.1 miles. The project is to be extended farther westward to Wolf River and Bay St. Louis at a later date. The seaway is completed for about 4.6 miles west of Shallow Point to the vicinity of Three Rivers Road. In June 1965, project depths were available. The channel is marked by lights.

About 1.5 miles westward of Shallow Point, the Eugene P. Wilkes Bridge at Lorraine Road has a bascule span with a clearance of 29 feet. An overhead power cable crossing the seaway 0.4 mile east of the bridge has a clearance of 81 feet. An overhead power cable about 2.8 miles west of the bridge has a clearance of 80 feet.

Beauvoir, about 3 miles west of Biloxi, has a large resort hotel and a tank which are prominent. A channel dredged to 10 feet in March 1964, and marked by private lights, leads to a large yacht basin in front of the hotel. Gasoline, diesel fuel, water, ice, marine and yacht supplies, and open and covered berthage are available at the basin. There are ramps and a hoist that can handle craft up to 25 feet in length for minor hull, engine, and electronic repairs. Radiotelephone watch on VHF (156.45 mc.) is maintained from 8 a.m. to 5 p.m. at the basin. There is a harbormaster, and a dockmaster assigns the berths.

Charts 1267, 876–SC.—Ship Island Pass lies immediately westward of **Ship Island,** 47 miles westward of Sand Island Light, and 11 miles northward of the northernmost of the Chandeleur Islands. The pass is approached from the Gulf through a dredged channel 6 miles long, which is marked by lighted buoys.

Gulfport, the seat of Harrison County, is a growing port and tourist center. It is about midway between Mobile and New Orleans by rail, and on U.S. Highways 49 and 90. The city is served by airlines, and the Louisville and Nashville and Illinois Central Railroads. Fishing, steel products, chemicals, canning, glass making, and aluminum are some of the city's important industries. Waterborne commerce includes bananas, shell, sisal and jute, fertilizers, chemicals, seafood, flour, woodpulp and products, lumber, and scrap iron. A cotton compress is at Gulfport.

Gulfport Harbor is a State-owned and controlled harbor about 10 miles northwestward 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 eastward and a commercial small-craft harbor is on the west side of the inshore end of the westerly mole.

Prominent features.—On a clear day vessels from eastward, bound for Ship Island Pass, usually sight first the trees on the western part of Ship Island, then the light

and **Fort Massachusetts,** a semicircular brick fort with sodded parapet, located on the western part of Ship Island. Vessels approaching from southward may see Chandeleur Light first.

Ship Island Light (30°12.5′ N., 88°57.7′ W.), 70 feet above the water, is shown from a black slatted daymark on white skeleton tower. The light is on the same structure as Ship Island Range Rear Light. An abandoned lighthouse is about 0.3 mile northwestward of the 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 northwest end of the northernmost of the Chandeleur Islands. A lighted bell buoy is about 2.2 miles north-northwest of the light.

On the approach to Gulfport, the conspicuous objects are a large hotel halfway between Gulfport and Biloxi; two water tanks, and the large buildings in Gulfport. At night a red neon sign on top of the easterly large building in Gulfport and the occulting red lights on the tops of the two radio towers can be seen from the sound. An aviation light is shown from a 62-foot tower at the municipal airport.

Vessels should approach Ship Island Pass and Gulfport through the Gulfport Safety Fairway; see 209.135, chapter 2.

Channels.—Ship Island Bar Channel leads for 6 miles northwestward from the Gulf in a dredged cut to Ship Island Pass. **Gulfport Channel** leads 10 miles northwestward through a dredged cut from the pass through Mississippi Sound to Gulfport Harbor. Federal project depths are 32 feet for the bar channel and 30 feet for Gulfport Channel and ship basin. See Notice to Mariners and latest editions of charts for controlling depths.

The Federal project also provides for the maintenance of a commercial small-craft harbor and entrance channel to a depth of 8 feet close westward of the main channel. In January 1967, the controlling depth into the harbor was 7½ feet.

A depth of about 6½ feet can be taken into Bert Jones Yacht basin east of Gulfport Harbor. Lights and daybeacons mark the channel. Berthing facilities are available and a dockmaster is on duty.

Anchorages.—Large vessels can anchor outside the bay anywhere westward of a line between Chandeleur and Ship Island Lights and have rather smooth water. An especially good anchorage in stormy weather is west of Chandeleur Light in 4 to 5 fathoms. Just south of the bar the holding ground is good and bar pilots report good anchorage 0.5 mile south of Ship Island Pass lighted bell buoy 26.

Ship Island Harbor, northward 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. Depths in the harbor range from 20 to 30 feet, soft bottom.

Dangers.—The shoal making off from the western end of Ship Island at West Point is moving westward. The channel is dredged frequently and when shoal water occurs the buoy is moved westward to mark the channel. Mariners should exercise caution to keep to the westward of this buoy. Mariners are warned not to cut corners at the bends in the channel. Spoil banks are on either side of Gulfport Channel and west 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. Northeast to south winds raise the level of the water and southwest to north 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 under normal weather conditions.

See appendix for **storm warning displays.**

Pilotage is compulsory for all foreign vessels and U.S. vessels under register in foreign trade. Pilotage is optional for coastwise vessels of over 250 tons who have on board a pilot licensed by the Federal government. Pilots board from a small powerboat at the sea buoy off the entrance to Ship Island Bar Channel and take vessels in day or night. Pilots can be obtained by previous notice to the Port Director of the Gulfport State Port Authority by telegraph, radio, radiotelephone through the New Orleans Marine Operator, phone: University 3-3851, or through the ship's agents.

Towage.—Towboats are not stationed permanently at Gulfport, but arrangements can be made with the Port Director for towage. Vessels usually enter and leave under their own power and use tugs only for docking, undocking, and shifting berths.

Quarantine.—Vessels subject to quarantine must make arrangements through Mobile. A Public Health Service outpatient office is at Gulfport and there are private hospitals and clinics. The nearest marine hospital is at New Orleans.

Customs and Immigration officers are stationed at Gulfport. Gulfport is a customs port of entry and marine documents are issued. Vessels are boarded at the dock.

Harbor regulations.—The State-owned harbor is administered and controlled by the Gulfport State Port Authority. 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 East Pier is 925 feet long and has a transit shed with 40,000 square feet of storage space. The banana handling berth on the pier is 515 feet long and has four gantries and belt conveyors that can handle up to 9,600 stems of bananas or boxes, crates, or packages of similar size an hour. Banana handling sheds on the pier can accommodate up to 50 railroad cars or trucks for simultaneous loading. The remainder of the east pier is used for handling sand and gravel, or other bulk cargoes, or petroleum products. Most of the general cargo is

handled at the West Pier which is 1,875 feet long. It has 8 sections of transit sheds with over 200,000 square feet of storage space. Concrete warehouses in the rear of the transit sheds have 140,000 feet of storage space. Both piers have shipside rail trackage and the sheds and warehouses have depressed trackage and truck loading platform. There is a cotton compress in the port. Seafood processing plants are on the City Wharf at the head of the basin and in the commercial small-craft harbor at the inshore end of the west mole. All sheds and warehouses are equipped with sprinkler systems and a fire and security watch is maintained.

Supplies.—Bunker C fuel and diesel oil are piped to the East Pier and can be obtained from tank or barges at the West Pier. Fresh water is piped to all berths. Marine hardware, provisions, ice, and ship supplies of all kinds are available.

Repairs.—No shipyard facilities are available in Gulfport.

Small-craft facilities.—The Bert Jones Yacht Basin, in the yacht harbor close east of the main harbor, has berthing facilities for more than 50 yachts and launching facilities for outboard motor boats. Diesel fuel, gasoline, ice, water, berthage with electricity, ramps, and yacht supplies are available. There is a lift that can haul out craft up to 165 feet in length for hull or engine repairs. The channel into the basin is marked by lights and daybeacons.

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 large Gulfport Municipal Airport about 3 miles northeast of the port has regular airline service.

Charts 1268, 876–SC.—Cat Island Channel and its extension **South Pass,** lying between Cat Island and Isle au Pitre, form the most westerly 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 east and west. The eastern shore of the island extends in a south-southwesterly direction for 4.5 miles with **Great Sand Hill** on the north, and low and narrow South Spit and Phoenix Spit on the south. A light is off Phoenix Spit.

Abandoned Cat Island Light, a 48-foot square house on piles, is off the western end of Cat Island.

Isle au Pitre, on the south side of Cat Island Channel, is low and marshy with scattered clumps of bushes.

Pass Marianne is an alternate passage through the shoals extending across the western end of Mississippi Sound; natural depths are 9 to 14 feet. The pass is south 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 west-southwestward of Merrill Shell Bank Light. **Grand Pass** about 7 miles southward 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 west of Gulfport Harbor. There is some industry in nursery, pecan growing and packaging, and candy making. **Gulf Park College,** at the east end of the city, has a 1,000-foot pier marked by a light. The buildings, stacks, and spire at the college are prominent. A 1,000-foot fishing pier and jetty at the City Park has a small-boat launching ramp. U.S. Highway 90 passes through the city. Clinics and medical service are available. Buses serve the city.

Pass Christian is a city and summer resort 8 miles west of Gulfport on the north shore of Mississippi Sound. Federal project depth is 7 feet in the entrance channel and harbor. In June 1966, controlling depths were 6 feet in the entrance channel and 7 feet in the harbor. The harbor is formed by two moles and protected from the south by two breakwaters extending from the moles. A light marks the end of the easterly breakwater. The harbor can be approached from the east or southwest; both approaches are marked by lights.

Pass Christian Yacht Club is at the outer end of the eastern mole. Fishing vessels unload at the bulkhead of the City Wharf on the eastern mole. Gasoline, water, ice, and berthage are available in the harbor. Diesel fuel can be obtained by truck. There is some industry in fishing, seafood processing and canning, and garment making. A new industrial area and port is under development on Bayou Portage north of the city. U.S. Highway 90 passes through the city. Clinics and medical services are available. Buses serve the city.

Henderson Point is at the western extremity of Pass Christian and on the east side of the entrance to St. Louis Bay. Just north of the point, and between the bridges over the bay, is a small-boat basin which is the base for many shrimp and oyster boats. A fish camp is on the channel which is crossed by several highway bridges with fixed spans with a minimum width of 10 feet and a clearance of 4 feet. Gasoline, diesel fuel, and water are available at the fish camp.

St. Louis Bay is an indentation in the north shore of Mississippi Sound, 11 miles west of Gulfport. Depths in the bay vary from 5 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 10 feet through the west draw, and the four-lane U.S. Route 90 highway bridge has a bascule span with a clearance of 17 feet at the center. In 1967, a new railroad bridge with a permit clearance of 13 feet was under construction just south and parallel to the railroad bridge. An overhead power cable about 25 yards north of the highway bridge has a clearance of 60 feet except at the drawspan where the clearance is 80 feet.

Bayou Portage, which empties into the eastern 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 south-southeastward to Pass Christian. A new industrial area and port is under development on the slip. In July 1966, the controlling depths were 5 feet in the channel, thence in 1963, 12 feet in the slip. The channel is marked by private lights and buoys. The highway bridge about 1 mile above the mouth of the bayou has a single-leaf bascule span with a clearance of 12 feet. An overhead power cable crossing just east of the bridge has a clearance of 48 feet.

Wolf River empties into the east side of St. Louis Bay just above Bayou Portage. Federal project depth is 7 feet from the bay into the river; in June 1966, the controlling depth was 6½ feet. The channel is marked by a light and daybeacons.

De Lisle, a small village on Bayou de Lisle near the mouth of Wolf River, has a boatyard that provides freshwater storage for small craft and can haul out boats up to 50 feet in length. The controlling depth is about 4 feet from Wolf River to the yard; local knowledge is advisable.

The dome of a private school at **Shell Beach,** about 3 miles westward of De Lisle, is prominent from seaward.

The highway bridge over Wolf River near De Lisle has a bascule span with a clearance of 13 feet. An overhead power cable west of the bridge has a clearance of 88 feet.

The highway bridge crossing Wolf River about 48 miles upstream has a swing span with a clearance of 9 feet. The channel is through the right draw.

Jourdan River flows from westward into St. Louis Bay. Federal project depth is 7 feet from the bay into the river; in June 1966, project depth was available. A small boatyard on **Joes Bayou,** just inside the river entrance, can haul out boats up to 38 feet in length for hull and engine repairs.

Watts Bayou (Bayou Galere) 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 advisable. There is covered berthage at an inactive boatyard on the bayou.

Edwards Bayou flows into Watts Bayou at the mouth. In March 1965, depths of about 8 to 10 feet were reported to a marina and boatyard about a mile up the bayou. There are three boat slips with covered berthage at the marina. A lift can handle craft up to 25 feet in length for repairs and storage. Diesel fuel, water, ice, some marine supplies, and a surfaced ramp are available.

Bayou La Croix enters Jourdan River from the westward 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 west side of St. Louis Bay. A depth of 6 feet can be carried to within 0.3 mile of the town.

A small-boat harbor about 0.4 mile northwest of the U.S. 90 highway bridge is protected by two moles. Bay-Waveland Yacht Club is at the outer end of the southeastern mole. Gasoline, water, open berthage, and a ramp are available in the basin. A crane can haul out craft up to 25 feet in length. Some facilities are available at the yacht club in season. There are two hospitals and clinics in the city. The city has passenger and freight service on the Louisville and Nashville Railroad and through bus service is available on U.S. Highway 90 which passes through the city.

Bayou Caddy empties into Mississippi Sound 7 miles southwest of St. Louis Bay. A draft of 3 feet can be carried into the bayou and about 1 mile upstream to an abandoned shrimp factory. A fish camp just inside the entrance on the north bank has gasoline, diesel fuel, and water. Limited supplies can be obtained. A boatyard on the north bank has two marine railways that can haul out vessels up to 65 feet in length for hull and engine repairs.

Three Mile Pass and **Blind Pass** lead to Bay Boudreau from the southern part of the extreme western 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 1270, 1271, 1272.—Chandeleur and **Breton Sounds** lie southward of Mississippi Sound and northward of the Mississippi River Delta; no clear line of demarcation lies between them—Chandeleur is the northerly of the two sounds.

Chandeleur Islands, forming the eastern boundary of Chandeleur Sound, comprise a narrow, crescent-shaped chain of low islands starting 10 miles southward of Ship Island and continuing in a general south-by-west direction for a distance of 23 miles. Southwestward from these islands are **Errol Shoal, Grand Gosier Island** and **Breton Island,** marking the eastern limit of Breton Sound. Chandeleur Sound offers smoother water than the passage eastward of the islands to shallow-draft vessels bound from Mississippi Sound to Mississippi River.

The new Mississippi River-Gulf Outlet Seaway Canal, which enters Breton Sound from the Gulf between Breton Island and Grand Gosier Island, 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 eastern 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.

Ostrica Canal leads into Mississippi River at the village of **Ostrica,** 21.5 miles above Head of Passes. The canal locks are 250 feet long, 40 feet wide, and 22 feet deep. The canal affords passage from Breton Sound through **Quarantine Bay** and **Bayou Tortillon** to Mississippi River. The controlling depth is about 4 feet from the Mississippi River to Quarantine Bay. The lock is in operation daily between the hours of 6:30 a.m. and 5:00 p.m.

The western 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 southern 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 westward.

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 north side of the entrance to Black Bay from Breton Sound. Another light on the north side of Black Bay marks the entrance to **Bayou Terre aux Boeufs.** A depth of about 5½ feet can be carried up the bayou to Delacroix; local knowledge is advisable. Overhead power cables crossing the waterway have a minimum clearance of 30 feet. **Delacroix** is a small settlement on the waterway about 8 miles south of Lake Borgne. There are marine ways capable of hauling out vessels up to 60 feet in length. Vessels can berth at the wharf. Gasoline, diesel fuel, water, ice, provisions, and limited 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 1268, 878.—Lake Borgne, the westward extension of Mississippi Sound, is partly separated from Mississippi Sound by **Grassy, Grand,** and **Le Petit Pass Islands** and their outlying shoals. Between the islands and shoals are several navigable passages including Grand Island and Le Petit Passes. On the northeast 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. Lake Borgne is tidal, but the tides are small and greatly modified by the winds. The tidal currents through Grand Island Pass have velocities exceeding 1.5 knots at times.

Vessels coming from eastward generally enter Lake Borgne through **Grand Island Pass,** which leads between Grand Island and **Lower Point Clear.** The channel is marked and is a portion of the Intracoastal Waterway.

Le Petit Pass, between Le Petit Pass Island and **Malheureux Point,** is little used.

East Pearl River, the principal mouth of **Pearl River,** empties into Lake Borgne from northward. Principal commerce on the river is gravel, sand, and pulpwood. A Federal project provides for a channel 9 feet deep from Lake Borgne into East Pearl River. In August 1966, the controlling depth from the Gulf to deeper water in the river was 8 feet.

East Pearl River has been improved by dredging from Little Lake Pass to a turning basin and slip at the NASA Missile Test Site Center near Gainesville about 17 miles above the mouth. The controlling depth is reported to be 12 feet. Numerous aids to navigation mark the channel above Little Lake Pass.

The Louisville and Nashville railroad bridge with a swing span having a clearance of 14 feet crosses the river at **Baldwin Lodge,** about 1 mile from the mouth. The channel is through the east draw. U.S. Route 90 highway bridge at **Pearlington,** 8.5 miles above the mouth, has a swing span with a clearance of 10 feet through the east draw.

A landing, on the west bank of the river at the bridge, has gasoline, diesel fuel, berthage, and water available.

About 3.5 miles above the mouth, East Pearl River connects with West Pearl River and the Rigolets through **Little Lake Pass, North Pass, East Mouth,** and **West Mouth.** The waterway from East Pearl River through Little Lake Pass, Little Lake, and East Pass to the Rigolets has been improved by dredging. The controlling depth is reported to be 12 feet. The channel is marked by lighted and unlighted buoys.

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 eastern end of the Rigolets. A Federal project provides for a channel 7 feet deep from the mouth of West Pearl River to **Bogalusa,** La., a distance of about 50 miles; three locks, each 65 feet wide and 310 feet long, with 10 feet over the sill, control the depth in the channel. In June 1966, project depth was available. 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 design clearances of 35 feet were under construction in 1965. Near the town of **Pearl River,** 19 miles above the mouth, there are four bridges; the first two are the twin fixed spans of the Interstate 59 highway bridge with clearance of 35 feet. About 200 yards farther upstream, the Southern railroad and U.S. Route 11 highway bridge have swing spans with minimum clearance of 7 feet; see **203.245,** chapter 2, for **drawspan regulations.** The overhead power cables at the railroad bridge have clearances of 60 feet.

262-213 O—67——9

The **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 west of Grand Island Pass. Two swing bridges cross the Rigolets. The first, the Louisville and Nashville railroad bridge about 0.4 mile west of **Catfish Point** in Lake Borgne, has a clearance of 11 feet; navigation is through the east draw. The second, about a mile eastward of Lake Pontchartrain, is U.S. Route 90 highway bridge that has a clearance of 14 feet.

Currents are very irregular and greatly influenced by winds. They set with great velocity through the 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 west-southwest onto the fender on the southwesterly side of the draw, and easterly currents set east by north onto the fender on the northeasterly 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.

Rigolets is a small settlement and railroad station on Rabbit Island. A draft of 12 feet can be carried to the landing on **Little Rigolets** by entering via the Intracoastal Waterway. Good anchorage for small craft is available in Little Rigolets either north or south of the waterway crossing. A small boatyard at Rigolets can haul out craft up to 35 feet in length for general repairs. A power cable over Little Rigolets 250 feet north of the railroad bridge has a clearance of 25 feet.

Fort Pike, an old circular brick fort with sodded top, is just inside the western entrance to Rigolets. To the south of the old fort are several small-boat slips and to the north of the bridge is a boat basin. There are marinas, boatyards, and boat slips, some with complete boatyard facilities, on the Rigolets and on **Geogheagan Canal.**

In March 1965, the controlling depth in the canal was reported to be 8 feet. There are 12 and 70-ton travelifts that can haul out craft up to 78 feet in length for hull and engine repairs, or open or covered dry storage. Electronic repairs can be made. Gasoline, diesel fuel, water, ice, marine and yacht supplies, open and covered berthage with electricity, and a ramp are available. A restaurant is at the marina on the canal about 0.8 mile east of the bridge.

Westward of Fort Pike on both sides of U.S. highway 90, there are fish camps on the Lake Pontchartrain side and **Lake St. Catherine** side. There are marinas on the long bayou that leads into Lake St. Catherine from the Rigolets west of the bridge where fuel, water, ice, open and covered berthage, lifts, and ramps are available.

Chef Menteur Pass, a connecting passage between Lake Borgne and Lake Pontchartrain, is located about 9 miles southwestward of the 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 from Lake Pontchartrain, and two lights mark the Intracoastal Waterway crossing. Chef Menteur Pass is crossed by two swing bridges. The Louisville and Nashville railroad bridge has a clearance of 10 feet. The U.S. Route 90 highway bridge has a clearance of 11 feet. **Chef Menteur** is between the bridges. The largest marine railway in the area can handle craft up to 35 feet in length for hull and engine repairs.

There are several marinas on both sides of the pass at the highway bridge and a boatyard about a mile northeast of the bridge. About 0.4 mile northwestward of the bridge there is a tall blue spherical water tank that is very conspicuous. There are marine railways, travelifts, and ramps. Craft up to 35 feet can be hauled out for hull and engine repairs, or storage. Gasoline, diesel fuel, water, ice, open or covered berthage with electricity, and marine and yacht supplies are available.

Bayou Sauvage is an important waterway leading about 2.7 miles westward from Chef Menteur Pass about 0.3 mile northwestward of the highway bridge. In November 1965, 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. Marine lifts can handle craft up to 75 feet in length for general repairs or storage. The shipyard builds steel vessels up to 150 feet in length. Electronic repairs can be made. Gasoline, diesel fuel, water, ice, and marine and yacht supplies can be obtained.

Charts 1268, 1269, 1271.—Bayou Dupre empties into the southwestern end of Lake Borgne at **Martello Castle.** Petroleum products and fish are the principal commerce on the bayou. Federal project depths are 6 feet from Lake Borgne into and through Bayou Dupre and Lake Borgne Canal to the highway bridge at Violet. A levee has been built through the abandoned lock which connected the Mississippi with Lake Borgne Canal at **Violet.** In August 1966, the controlling depth was 4½ feet from Lake Borgne through the bar channel to the highway bridge at Violet. About 1.2 miles east of Violet there is an overhead cable crossing with clearance of 60 feet. The canal is used by shrimp fishermen who report that it is difficult to navigate during winter low water. A light and daybeacons mark the entrance to the bayou.

Bayou Bienvenue empties into the west side of Lake Borgne about 3.5 mile north of Martello Castle. The bayou connects Lake Borgne with the Mississippi River-Gulf Outlet, and thence leads westward for about 6.3 miles. In August 1966, the controlling depths were 4 feet across the lake bar, thence 6 feet to the Mississippi River-Gulf Outlet, and thence 4 feet for about 2 miles to highway bridge 47.

From their common head at the small settlement of **Yscloskey, Bayou la Loutre** flows southeasterly for 25 miles to **Eloi Bay** (chart 1270), and **Bayou Yscloskey** northeasterly for 2 miles to **Lake Borgne. Bayou St. Malo** leaves Bayou la Loutre 8 miles eastward of Yscloskey and flows northwesterly for 5 miles to **Lake Borgne. Principal**

waterway cargoes are crude petroleum and steel-mill products.

Federal project depths are 5 feet from deep water in Lake Borgne to the shoreline at the mouth of Bayou Yscloskey; 6 feet from deep water in Lake Borgne through Bayou St. Malo, Bayou la Loutre, and **Bayou Eloi** (chart 1270) to deep water in **Lake Eloi**; and 5 feet in Bayou la Loutre between Hopedale and Bayou St. Malo. The entrance to Bayou Yscloskey and Bayou Eloi are marked by lights. Controlling depths may be several feet lesser than project depths. See Notice to Mariners and latest editions of charts for controlling depths.

The marine ways at Yscloskey can handle boats up to 40 feet in length. Gasoline, diesel fuel, water, ice, provisions, and limited quantities of other supplies are available. 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 50 feet up. Overhead power cables crossing Bayou Yscloskey and Bayou la Loutre have a minimum clearance of 30 feet.

Hopedale, 3 miles southeastward along Bayou la Loutre from Yscloskey, has a 150-foot wharf. Gasoline, diesel fuel, water, ice, and provisions are available.

Chart 1269.—Lake Pontchartrain, a fresh-water lake roughly elliptical in shape, is 36 miles long, 22 miles wide at the widest part, 10 to 16 feet deep, and lies northward of the Mississippi River at New Orleans. The lake connects with the Mississippi River through the Inner Harbor Navigation Canal; with Lake Borgne through the 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 have 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 northwest winds prevail.

U.S. Route 11 highway and the Southern railroad causeways cross the eastern end of Lake Pontchartrain. On the highway causeway are two bascule bridges; one, about 1 mile south of **North Shore,** has a clearance of 13 feet; the other, about 0.5 north of Point aux Herbes, has a clearance of 12 feet. On the railroad causeway are two swing bridges; one, about 1 mile south of North Shore, has a clearance of 2 feet; the other, about 1.5 miles north of **South Point,** has a clearance of 1 foot. Overhead cables cross at both highway bridges with clearances of 12 feet but are submerged at the channels. See **203.245,** chapter 2, for **drawspan regulations** for the railroad and highway bridges near South Point.

Near both ends of the highway causeway are marinas and fish camps where fuel, water, ice, ramps, hoists, open and covered berthage, and some provisions are available.

About a mile east of U.S. Route 11 highway causeway is the highway causeway for Interstate Route 10 across Lake Pontchartrain. The fixed span over the navigation channel about 1.3 from the northeast end has a clearance of 65 feet.

Lake Pontchartrain (Toll) Causeway extends 20.9 miles across Lake Pontchartrain from Indian Beach Shore to Lewisburg. Five bridge openings, alternately fixed and bascule, are spaced at intervals of about 3.4 miles along the causeway, the first one north from Indian Beach Shore being a fixed structure. The minimum clearances are 22 feet for the fixed bridges and 18 feet for the drawbridges. In 1967, a new bridge was under construction east of and paralleling the Lake Pontchartrain Causeway.

A pipeline crosses the lake beginning at a point in the vicinity of **Bayou Piquant** and extends in a northeasterly direction to Mandeville. Lights mark the pipeline.

Middle Ground is the shoal portion of Lake Pontchartrain near the Rigolets. A dredged channel extends across the northeastern part of Middle Ground between the Rigolets and deeper water in the vicinity of the northeasterly pair of drawbridges. Lighted ranges and buoys mark the channel which in January 1963, had a controlling depth of 8½ feet.

Bayou Bonfouca, which empties into Lake Pontchartrain 3 miles northwest of the north railroad swing bridge, is the approach to the town of Slidell. There is some commerce in poles, piling, posts, shell, watercraft, chemicals, and sand and gravel. Federal project depth is 10 feet from deep water in Lake Pontchartrain to Slidell. In December 1966, the controlling depths were 10 feet across the bar, thence 9 feet to the highway bridge at Slidell. The highway bridge at Slidell has a swing span with a clearance of 2 feet through the west draw. The bridgetender lives near the bridge and will open on signal, but there may be a slight delay. The overhead power cable at the bridge has a clearance of 58 feet.

Slidell, a town on U.S. Route 11 highway and Southern railroad to New Orleans, has a well-equipped shipyard. The facilities for construction or repair of steel or wooden vessels include three marine ways that can haul out craft up to 250 feet in length and a commercial graving dock 350 feet long, 70 feet wide, and 20 feet over the sill. Tugs, barges, and diving equipment are available for towing or salvage work. Gasoline, diesel fuel, water, ice, provisions, and some boat supplies are available by truck. Other facilities include three loading slips and one wharf with a tramtrack connection.

Lacombe Bayou empties into Lake Pontchartrain 4.5 miles westward of Bayou Bonfouca. A Federal project provides for a channel 8 feet deep through the entrance bar in Lake Pontchartrain to the fish hatchery about 7.1 miles above the mouth of the bayou. In December 1966, the controlling depths were 7 feet across the bar, thence 7½ feet to the highway bridge at **Lacombe** about 6 miles above the mouth, and thence in 1963, 7 feet to the fish hatchery. The entrance channel is marked by a light and an unlighted range. Overhanging trees obstruct the bayou above the fish hatchery.

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 **203.245,**

chapter 2, for **drawspan regulations** of the highway bridge. 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, scrap iron, petroleum products, and drilling equipment. Gasoline, diesel fuel, oil, and water are available on the bayou at an oil company base. There are fish camps and a seaplane base on the bayou.

Mandeville is a summer resort on the north shore of Lake Pontchartrain 20 miles north of New Orleans. Many of the boat landings on the north shore are in ruins. A protected landing is in **Bayou Castine.** The controlling depth over the bar is about 7 feet. To enter the bayou, pass 30 feet from the daymarker at the east jetty.

A marina and boatyard on the bayou has a 8-ton crane that can haul out craft up to 35 feet in length for general repairs or storage. Open and covered berthage with electricity, gasoline, water, and provisions are available and diesel fuel can be obtained by truck. In March 1965, depths of 8 feet were reported in the bayou and basin.

Tchefuncta River flows into Lake Pontchartrain about 21 miles northward of New Orleans. Commerce on the river is in shell, petroleum products, chemicals, and steel products. Federal project depth is 10 feet from that depth in Lake Pontchartrain for 3.1 miles up Tchefuncta River, thence 8 feet in the river and its tributary, **Bogue Falaya,** for 9 miles to the town of **Covington,** La. In December 1966, the controlling depths were 9 feet over the bar, thence 8 feet in the river for about 9.3 miles, and thence 4½ feet to the town of Covington. The entrance is marked by a lighted range, a daybeacon, and buoys. U.S. Route 190 highway bridge crossing the river at Madisonville has a swing span with a clearance of 1 foot. The overhead power cable at the bridge has a clearance of 106 feet.

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 berthage at public landings on either side of the bridge. There are two shipyards that build steel crewboats, tugs, and barges, and a boatyard above the bridge that builds and repairs pleasure craft. The largest marine railway can haul out craft up to 110 feet in length for general hull and engine repairs or storage. There are three marinas above the highway bridge. Gasoline, diesel fuel, water, ice, marine and yacht supplies, open and covered berthage with electricity, and ramps are available.

An overhead power cable extends generally around the perimeter of the western part of Lake Pontchartrain, from the shore near Madisonville to a point about 6.4 miles west 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. Privately-maintained lights partly mark the cable.

Tangipahoa River is a narrow stream flowing into Lake Pontchartrain 6 miles southwestward of Tchefuncta River. In September 1965, the controlling depth over the bar was 3 feet, thence in August 1962, 11 feet to about 4.3 miles above the mouth, thence 2½ feet for about 7.8 miles above this point. Lights mark the entrance channel. Gasoline is available 12 miles above the 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 23 to 50 feet, but the approaches in both lakes, across long bars, restricts navigation to drafts of about 5 feet. From Lake Pontchartrain there are two approach channels, **North Channel** and **South Channel,** the east side of the entrance to each being marked by a light. Both lead to Pass Manchac Light on the north point at the easterly end of the pass.

In December 1966, the controlling depths were 5 feet over the bar in the North Channel in Lake Pontchartrain and 5½ feet over the bar in South Channel. Overhead power cables crossing over the pass about 0.3 mile and 2 miles from the eastern entrance have clearances of 90 feet and 76 feet, respectively.

The west approach is through North Channel along the north shore in Lake Maurepas. In December 1966, the controlling depth was 5½ feet. The channel is marked by a light and daybeacons.

Three bridges cross the western end of the pass. The Illinois Central railroad bridge, the easternmost, has a swing span with a clearance of 4 feet. An overhead power cable crossing at the bridge has a clearance of 64 feet. Close westward of the railroad bridge, the twin fixed spans of Interstate 55 highway bridges have clearances of 51 feet over the normal channel. On the north side of the pass between the railroad bridges is a wharf. Gasoline, water, ice, provisions, and some supplies are available. Diesel fuel can be obtained by truck.

Lake Maurepas, lying west of Lake Pontchartrain, is 11.5 miles long in a northeast and southwest direction, and from 4 to 8 miles in width. Depths range between 10 and 12 feet. 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.

To enter Lake Maurepas from Lake Pontchartrain, pass 125 feet west of South Channel Light and head for Pass Manchac Light. Haul around the point at a distance of 150 to 200 yards, and steer midchannel courses through the pass to the bridges. Then follow the north shore at a distance of 200 to 300 yards for 1.5 miles to avoid the middle ground in the lake entrance.

To go to Tickfaw River, steer **310°** for 3 miles until the light off the entrance opens well clear of the east side of the entrance, then steer for the light on a **000°** course. To get to Amite River, steer **270°** for 6 miles keeping the light a little on the port bow. Leave the entrance markers and the light to the southward and take a midchannel course into the river.

Tickfaw River flows into the northern end of Lake Maurepas over a bar with a controlling depth of 5½ feet in December 1966. The entrance is marked by a light and a daybeacon on the west side of the mouth. On the east

side of the entrance are stumps and a large shoal is on the west side. The river inside the bar, in December 1966, had depths of 11 feet to the mouth of Natalbany River about 1.7 miles above the mouth, thence 12 feet to the mouth of Blood River about 6.5 miles above the mouth, and thence 5 feet for another 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. An overhead power cable crossing just west and parallel to the swing bridge has a clearance of 70 feet.

Natalbany River, a tributary of Tickfaw River, in December 1966, had depths of 10 feet for about 5.2 miles, thence 9 feet for 1.7 miles, and thence 7 feet to the highway bridge at **Springfield** about 8.5 miles above the mouth.

Ponchatoula River, a tributary of Natalbany River, and joining that river about 3.3 miles above the mouth has depths of about 11 feet for 0.8 mile, thence about 5½ feet for 2.5 miles to State Route 22 highway bridge at **Wadesboro.** The bridge has an 18-foot fixed span with a clearance of 4 feet.

Blood River, a tributary of Tickfaw River, in December 1966, had depths of 11½ feet for 0.8 mile, thence 10½ feet for another 0.8 mile, and thence 6½ feet for 1.4 miles. Principal shipment on these four rivers is in shell.

Amite River empties into Lake Maurepas 8 miles westward of Pass Manchac. The entrance is marked by a light. Principal shipments on the river are in shells.

In entering Amite River, pass well to the eastward of the light. In January 1966, the controlling depth across the bar was 4 feet with depths of 7 feet or more to the junction with its tributary Bayou Manchac about 31 miles above the mouth. From the point about 12 miles above the mouth, there are overhanging trees and snags.

Three highway bridges cross Amite River between the mouth and Port Vincent, about 2.8 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 north draw and a clearance of 4 feet. There is a wharf at the bridge with berthing facilities for craft up to 40 feet in length. Gasoline, water, and supplies are available. The bridge at **French Settlement,** about 19 miles above the month, has a swing span with a clearance of 15 feet; see **203.245,** chapter 2, for **drawspan regulations.** An overhead power cable at this bridge has a clearance of 60 feet. The bridge at **Port Vincent** has a swing span with a clearance of 3 feet.

Bayou Manchac has depths of about 4½ 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. 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 south of Amite River. In January 1966, the controlling depth over the bar was 4 feet, thence 11 feet to the Airline Highway, which is the head of navigation. The south side of the entrance to the river is marked by a light.

The **Bonnet Carre Floodway** is located on the southwestern 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 which may be deposited into the lake due to the operations 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 has been built along the south shore of the lake from West End Park eastward to New Orleans Airport.

At **West End Park,** on the south shore of Lake Pontchartrain, is a protected yacht harbor which is entered from eastward. The New Orleans city limits is just west of the harbor.

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 March 1965, the controlling depth in the canal and basins was reported to be 7½ feet. There are two boatyards in Orleans Marina and three marinas along the east bank of New Basin Canal. There are cranes and lifts that can haul out craft up to 85 feet in length for hull and engine repairs, or open or covered dry storage. Electronic repairs can be made.

Gasoline, diesel fuel, water, ice, marine and yacht supplies, open and covered berthage with electricity for 800 boats up to 110 feet in length, and 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 south side of the entrance; a fog signal is at the light.

See appendix for **storm warning displays.**

Pontchartrain Beach, a pleasure resort, is east of Spanish Fort. Two 130-foot floodlighted towers make good landmarks.

Measured course.—A measured statute mile on the bearing 084°30′ is off Pontchartrain Beach.

The Lake Pontchartrain entrance to the Inner Harbor Navigation Canal is marked by a light. Floodlighted towers at **Lincoln Beach Park,** 4 miles northeastward from the airport, are good landmarks.

8. MISSISSIPPI RIVER

Charts 1115, 1116.—Mississippi River empties into the north 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 east of Galveston, and 440 miles east of Corpus Christi. The river is the access to 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. For more detailed information, see Distance between United States Ports.

New Orleans can also be reached by the shorter and deep-draft route through the Mississippi River-Gulf Outlet, about 30 miles northward of South Pass. The outlet 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 East Jetty. A radiobeacon and fog signal are at the light. **East Jetty End Light**, 50 feet above the water on a red triangular daymark on a red skeleton tower on piles is about 100 yards southwestward. A fog signal is at the light. A lighted whistle buoy (Sea Buoy) is 1.6 miles south of the East Jetty.

South Pass 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, black above, located on the west 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 West Jetty at the mouth of the pass. This particular station also is equipped for special radio-direction-finder calibration; see Light List for operational information. A lighted whistle buoy (Sea Buoy) is 1.7 miles southeastward of the jetty light.

The numerous oil well structures in **East Bay**, some of which extend about 3 miles southeast of a line between the jetties at South and Southwest Passes, are also prominent.

New Orleans Lightship (29°22.8′ N., 88°55.3′ W.), with red hull and two masts, and the name NEW ORLEANS in large white letters on the sides is 4.6 miles southeast of the entrance to the Mississippi River–Gulf Outlet Seaway Canal; the light is 66 feet above the water on the foremast. The lightship has a fog signal and a radiobeacon. The code flag signal and radio call is NMNO. The lightship is 27 miles north-northeast of South Pass and 40 miles northeast of Southwest Pass. **Mississippi River Gulf Outlet Entrance Lighted Whistle Buoy MR–GO** (Sea Buoy) is 2.8 miles north-northwestward of the lightship.

There are numerous oil well structures in the vicinity of the entrance to the seaway and the dredging ranges for the channel are prominent.

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 indication that they are approaching land. However, this is not a sure indication; during high-river stages and with northerly 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.—Use of the outlet by ships and other commercial and pleasure craft is continu-

ing 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.

Shipping Safety Fairways.—Vessels should approach the passes and the Mississippi River-Gulf Outlet Canal through the Southwest Pass and South Pass (Mississippi River) Safety Fairways, and the Mississippi River-Gulf Outlet Safety Fairway; see 209.135, chapter 2.

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. See Notice to Mariners and contact local Corps of Engineers office for controlling depths. The channels are well marked.

Mississippi River—Gulf Outlet Seaway Canal is a 66-mile long deepwater channel that extends northwestward from deepwater 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 Island and Breton Island, thence 36 feet deep across Breton Sound northwestward 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 about 61 miles from the entrance, or at Intracoastal Waterway Mile 12.3E, 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 dikes 2.6 miles long on either side of the channel. In 1966, the south dike was being extended about 1.5 miles in a southeasterly direction. The dike will show about 1 foot, but will be submerged about 50 percent of the time. The seaway was still under construction, and in August–September 1966, the controlling centerline depth was 33 feet. The channel is well marked with aids.

Overhead power cables crossing the seaway at Bayou Yscloskey, Paris Road Bridge, and close eastward of the Inner Harbor Navigation Canal have a minimum clearance of 135 feet.

Radio intercommunication on the VHF channel 156.65 mc is maintained between the Paris Road Bridge, Intracoastal Waterway Mile 11.7 E and on the Inner Harbor Navigation Canal lock. Additional installations are planned. These will enable masters to maintain bridge-to-bridge communications with other vessels operating in the areas.

Bridges.—General rules and regulations for the operation of drawbridges over the Mississippi River and its navigable tributaries and outlets are given in **203.555**, chapter 2.

Anchorages.—Vessels should anchor in the Mississippi River-Gulf Outlet Fairway Anchorage northeastward of New Orleans Lightship; see 209.135, chapter 2.

In heavy weather all 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. Anchorage areas at Pilottown and New Orleans are described in **202.195**, chapter 2.

Vessels may anchor off South Pass and Southwest Pass as appropriate, weather permitting.

The 4-mile long anchorage off the west bank opposite Pilottown is 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.

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 west side of the approach channel to Southwest Pass for about a mile beyond the end of the west 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 west 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.

A shoal with depths of 9 to 16 feet extends along the west side of the approach channel to Southwest Pass for about a mile beyond the end of the west jetty. The position of this shoal and its depths are rather constant except for changes during and after high-river stages in the spring.

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 southeastward 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 north and east.

During a light southerly wind a northeasterly set of 2.2 knots has been observed 13 miles southeast of South Pass entrance, and at the same time there was an easterly set of 0.5 knot at the lighter 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 southwestward 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 southeastward 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 21 feet, the mean difference is about 14 feet. Zero on the Carrollton gage is 0.13 foot below Mean Gulf 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 westerly set. At Southwest Pass it sets straight out from between the jetties, thence spreading out fan shaped, with slightly greater velocity to westward.

Weather.—From December to June, fog may be encountered anywhere from 60 miles off the passes to the city of New Orleans. Southerly and easterly winds bring it in, and northerly and westerly winds clear it away. See appendix for **New Orleans Climatological Table and storm warning displays.**

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 from a position 10 or 12 miles southwestward of Dry Tortugas Light on Loggerhead Key. Low-powered vessels of moderate draft sometimes pass northward from Florida Straits through Rebecca Channel, to the westward of Rebecca Shoal Light, and for 200 miles set a course 10° to 20° northward 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 southwestward 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 westward 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 northeastward of the lighted whistle

buoy off South Pass and then follow the curve southwestward to the entrance to the safety fairway. During thick weather, vessels might ground northeastward of South Pass and northward 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 who 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 Seaway 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.

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 Seaway Canal board vessels in the area between New Orleans Lightship and the Sea Buoy, which is 3 miles north-northwestward of the lightship. The **Associated Branch Pilots** have 65-foot diesel-powered tenders with red hulls and white housing. They fly the code flag **P** and are equipped with radiotelephones, VHF–156.45 mc. There is a pilot station at Southwest Pass off the East Jetty about 0.8 mile inside the entrance. The pilot station at South Pass is at a small settlement on the west bank about 0.5 mile above the ends of the jetties. Both pilot stations are equipped with radiotelephones, VHF–156.45 mc. and also monitor 2182 kc. 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—phone: Jackson 2–5233, or through the ship's agents. Vessels are boarded and taken in day or night. All bar pilots carry portable radiotelephones.

The river pilots board vessels off Pilottown about 2 miles above Head of Passes Light. The pilot station, on the east bank at Pilottown, maintains a lookout and is equipped with radiotelephone, VHF–156.65 mc. and also monitors 2182 kc. It has radiotelephone communication with the River pilot's office in New Orleans. The **Crescent River Port Pilots** have fast motorboats painted white with the name RIVER PILOTS in black on the sides. They fly the code flag "P" and are equipped with radiotelephones. All Crescent River Port Pilots carry portable radiotelephones, VHF–156.65 mc., and are in communication with other vessels on the river. The river pilots take vessels from Pilottown upriver to New Orleans and if the vessel is continuing above New Orleans 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—phone: Jackson 5–2174, or through the ship's agents.

The **New Orleans-Baton Rouge Steamship Pilots** usually board off **The Point.** The pilot station is at Arabi on the east bank about 0.5 mile above Chalmette Slip. All the upriver pilots carry portable radiotelephones, VHF–156.65 mc. 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—phone: Jackson 5–5247, or through the ship's agents.

Towage.—Tugs, up to 4,500 hp., are available for assisting in docking and undocking, towing in the harbor and canals, and towing to sea. At the Port of New Orleans the public berthing facilities are of the marginal wharf type, and vessels are usually able to dock and undock without the aid of a tug. 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 with radiotelephones—VHF–156.65 mc. There are three modern diesel-powered fireboats in the harbor.

Quarantine.—The quarantine station is on the west bank of the river about 0.9 mile above Chalmette slip. Vessels come to anchor off the station where they are boarded by quarantine officers. The quarantine anchorage is 3,000 feet long. The upper end is indicated by a quarantine anchorage sign. Service is maintained from 6 a.m. to 6 p.m. Outside of these hours, vessels will be boarded on request, but a charge is made for services. Inspection services for Baton Rouge and Belle Chasse are performed by personnel from the New Orleans station. Port Sulphur is served by personnel from Morgan City. A U.S. Public Health Service Hospital is at New Orleans.

Customs.—New Orleans and Baton Rouge are ports of entry and marine documents are issued. Vessels are generally boarded at berth, however, arrangements can be made for boarding anywhere within the port limits.

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 vessels crew arrivals.

Harbor regulations.—Federal regulations for navigation of the river are given in **207.200,** chapter 2.

Supplies.—An unlimited supply of ship stores, marine hardware, and provisions can be obtained at New Or-

leans. Fresh 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 300 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 1272.—Southwest Pass, the westernmost of the passes of the Mississippi, is 18 miles west-southwestward of South Pass entrance and 295 miles eastward 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 southward from the jetty ends. From the buoy to abreast of Southwest Pass Entrance Light Station, the channel is marked by lighted buoys on the west 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.

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. See Notice to Mariners and contact local Corps of Engineers office for controlling depths.

In the pass the banks are a sufficient guide. Lights are on the east and west banks and a lighted range for entering the pass is at its head. There are oil transfer wharves on both banks of the pass between the jetties and the head of the pass. Lights mark the wharves.

Burrwood is on the southeast bank 5 miles above the jetties. Gasoline and provisions in limited quantities are available here. A large 800-foot T-head oil transfer wharf is on the east bank about 11 miles above the entrance. The ends of the T-head are marked by lights.

South Pass, one of the two important commercial entrances to Mississippi River from the Gulf lies 425 miles northwestward of Dry Tortugas and 90 miles southwestward 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 easterly or southerly direction.

Federal project depth is 30 feet. See Notice to Mariners and contact local Corps of Engineers office for controlling depths.

The entrance approach is marked by a lighted whistle buoy, 1.5 miles southeastward 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 west side of the channel. This dangerous shoal has depths of 2 to 17 feet over it. The lighted bell buoy marks the eastern 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 west side of the channel.

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 northeastward of the lighted bell buoy and about 250 to 300 feet to the westward of the end of the east 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 east jetty is approached. The vessel should be headed to meet the current, and by the time she is abreast the east 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 east and west banks 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. See Notice to Mariners and contact local Corps of Engineers office for controlling depths. 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 (29°09.1′ N., 89°15.0′ W.). From this point measurement is made of all distances on the river southward or below to the mouth of the passes, and northward or above (AHP) to Cairo, Ill. About 0.4 mile below the light on the west bank of South Pass is Head of Passes Light Station Coast Guard wharf.

Pass a Loutre and its branches, **Southeast Pass, North Pass,** and **Northeast Pass,** flows easterly 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 a bell buoy, and Southeast Pass by a bell buoy.

An abandoned lighthouse, a 76-foot black and white spirally-banded tower, is on the north side of Pass a Loutre, 2 miles inside the entrance. Another abandoned lighthouse, a grayish-white tower, is 1.5 miles westward of the entrance to Northeast Pass.

The marsh lands south of Main Pass are used extensively for hunting, oil operations, and 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 36 to 193 feet. There are a few shoals along the river banks, the outer limits of most of which are marked by lighted buoys. On both sides of the river the land is dry, and in the lower reaches it is covered mostly with course grass and willows.

Above Bohemia on the east side and The Jump on the west, levees prevent overflow at high water. Below Bohemia a 10-mile break in the levee permits flood waters to move eastward 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 east side, formerly laid out in sugar and rice plantations, now is given over to pasturage, and market gardens. Extensive orange groves are back of the levees on the west side. New Orleans is reached by river boats and also by railroads and highways which extend down the west bank to Venice (The Jump) and down the east bank to Pointe a la Hache, 9 and 42.5 miles, respectively, above Head of Passes. There is a private road from Pointe a la Hache to Huling.

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 the Standard Oil plant immediately above 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 guide. The distance from Head of Passes to New Orleans is 82.5 miles.

Pilottown is a small village on the east bank of the river 1.7 miles above Head of Passes (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 east bank are marked by privately maintained lights. A 400-foot oil transfer berth and storage area with four large tanks is on the east bank about 0.4 mile north of the Pilottown wharf. There are a few piers at Pilottown where small vessels can obtain fuel and provisions in limited quantities.

Cubits Gap is an opening in the east bank 3 miles above Head of Passes, at which **Raphael,** Main, and **Octave Passes** meet and connect with the river. These passes are navigable for small craft, but Main Pass is the only one having 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; at certain spots these may be crossed by drafts of 5 to 9 feet, with local knowledge.

Cubits Gap Light, on the southeast side of the gap, is a light of 1,200,000 candlepower shown from an 80-foot white skeleton tower; a fog signal at the light is sounded continuously from November 1 to April 30.

Main Pass has a depth 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. The passage over the sill is marked by a daybeacon and an unlighted range. This pass is used considerably by fishing vessels and oil companies operating in Chandeleur and Breton Sounds.

The buildings of the Fish and Wildlife Service and a lookout tower at the old quarantine station on the east bank just above the gap are conspicuous.

The Jump is an opening in the west bank 9.1 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 west bank 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 drill-

ing rigs in the Golf. A shipbuilding and repair yard has marine railways, the largest of which can haul out craft up to 65 feet in length for hull and engine repairs or storage. Large cranes are available and oil well drilling platforms are built at Venice. Gasoline, diesel fuel, water, ice, provisions, marine and yacht supplies, open and covered berthage and ramps are available at marinas and boatyards at The Jump. A Corps of Engineers wharf is on the west bank just north of The Jump. There are wharves and small-craft landings at Venice on Grand Pass and on the west bank of the river between Venice and Boothville. Bus service is available to New Orleans from Venice on State Route 23, which runs along the west bank behind the levee.

Boothville is a small town on the west bank about 14 miles AHP. A public wharf 100 feet long is 12.8 miles AHP at Boothville. An oil transfer berth is on the east bank at **Olga,** 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 1271.—Fort Jackson is on the west bank at the bend in the river about 16.7 miles AHP. Here the river takes a southwesterly trend for about 2 miles, then trends west-northwestward.

Fort St. Philip on the north bank of the bend opposite Fort Jackson has a public wharf. At **Triumph** on the south bank about 19.7 miles AHP there is an oil transfer pontoon wharf marked by private lights.

Ostrica Canal enters the river at 21.7 miles AHP; the State-owned canal connects the river with Quarantine Bay and is described in chapter 7. On the north bank at **Ostrica,** a small village, are two deepwater oil transfer berths and oil storage terminals at 22.1 and 22.7 miles AHP, and an oil loading barge wharf at 23.1 miles AHP.

Buras is a small town and fruit shipping center on the south bank about 22.0 miles AHP. There are two oil transfer berths and a public wharf at Buras. A water tank is prominent. A marine railway can haul out craft up to 90 feet in length for hull and engine repairs, or storage.

Empire is a town on the west bank about 25.4 miles AHP. A tank and a church spire are prominent. **Empire Canal** leads to the Gulf. 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 29 miles AHP.

At **Daisy** about 30.3 miles AHP there is an oil transfer berth at a 300-foot barge moored off the north bank. **Homeplace** a small town on the south bank 33 miles AHP has several oil transfer and drilling mud loading berths.

Port Sulphur is on the west bank about 33.6 miles AHP. The loading towers, two tanks, and conveyor gallerys of the sulphur plant are very conspicuous. The deepwater wharf with 2 or 3 ship berths and the 900-foot barge wharf are equipped with sulfur and liquid sulphur handling equipment. Lights mark the wharf and an intake pier. There are oil handling berths on both banks of the river at **Nestor** about 35 miles AHP. The wharf on the east bank is marked by a privately maintained light.

Bohemia is a small village on the east bank about 38.7 miles AHP. State Route 39, a paved road, leads along the east bank 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 provisions can be obtained in the town. The court house clock tower, a water tank, and a micro-wave 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. An oil transfer wharf is at **Davant** on the north bank about 44.6 miles AHP. An oil transfer berth is at **Junior** about 47.3 miles AHP. A coal handling berth marked by lights and with a large unloading tower is on the north bank about 48.4 miles AHP. A 1,200-foot L-shaped coal loading wharf is on the south bank at **Myrtle Grove** about 49 miles AHP. The elevator and conveyor gallerys on the pier are conspicuous.

A chemical loading berth is on the west bank at **Oak Point** about 62.8 miles AHP. A seatrain wharf with 35 feet alongside is on the west bank about 64.6 miles AHP. The 150-ton loading gantry is conspicuous. **Belle Chasse** is on the west bank about 65.6 miles AHP. A molasses handling berth is at a 200-foot pontoon landing. A ferry crosses the river from Bella Chasse to **Scarsdale** on the east bank.

Port Nickel is on the east bank about 66.5 miles AHP. There is 330 feet of berthing space at the 50-foot T-head wharf and mooring dolphins. The unloading conveyor gallerys and the stack and buildings of the nickel plant are conspicuous.

Braithwaite, on the south bank about 68.8 miles AHP just above **English Turn,** has a large fertilizer plant with a large gray stack. There is a marginal wharf with 650 feet of berthing space with 50 feet alongside. A railroad spur of the Southern Railroad leads to the wharf.

Violet about 72.8 miles AHP is on the east bank 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 north bank about 75 miles AHP has a refinery with two floating pontoon wharves. The lower one has 350 feet of berthing space with 50 feet alongside and is used for handling petroleum and bunkering vessels. The upper barge wharf has 250 feet of berthing space with 9 feet alongside. The tall stack and cracking towers are prominent.

Harvey Canal (chart 497), about 85.3 miles AHP on the south bank at Harvey opposite New Orleans, and the Algiers Lock opposite Chalmette at 76.4 miles AHP connect Mississippi River with an extensive network of inland waterways west of New Orleans.

An overhead power cable crossing the river about 77.5 miles AHP has a clearance of 175 feet.

Chalmette on the north bank 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. The wharves have from 18 to 50 feet alongside and are used for handling petroleum, bunkering vessels, and unloading bauxite ore.

Chalmette National Monument, a tall white obelisk, is conspicuous close eastward of Chalmette slip.

Chalmette Slip indents the north bank of the river for about 1,500 feet about 78.5 miles AHP. There is about 2,900 feet of berthing in the slip at the general cargo, sugar handling, and lumber terminals, which have transit sheds with 600,000 square feet of storage space. The berths with 30 feet alongside have shipside and platform rail trackage and truck loading platforms.

The New Orleans General anchorage about 2 miles long is off the south bank of the river opposite Chalmette slip and the Quarantine Anchorage about 0.7 mile long is just above it. The Quarantine Station is on the south bank about 0.9 mile westward of Chalmette Slip.

Arabi, a suburb of New Orleans, is on the north bank just westward of Chalmette. There is a large sugar refinery, a large cotton compress and cotton storage warehouse and two ship repair firms. The 1,100-foot wharf of the refinery has a large transit shed and a pipeline for handling molasses. Just west of this 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.

About 0.7 mile above the sugar refinery wharf on the north bank is a 900-foot wharf with 30 to 32 feet alongside. The eastern half of this wharf is a ship repair berth and the western half is used for general cargo and receipt of foreign autos. The cotton compress wharf about 0.2 mile above this wharf is 1,060 feet long with 30 feet alongside. It has a transit shed with 150,000 square feet of storage space with truck ramps but no shipside trackage. Just above this wharf is the 900-foot wharf of a ship repair firm.

On the south bank opposite Chalmette and Arabi at **Algiers** are barge moorings, towing company wharves, the Quarantine Station wharf, 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 north bank about 80.3 miles AHP. The Gulf Intracoastal Waterway enters the river through the canal.

The vessel is now approaching the loop in the river that encompasses the city of New Orleans on three sides, and sees ahead the numerous tall buildings in the main part of the city, and the wharves of the port of New Orleans on both sides of the river.

Charts 1269, 497.—New Orleans is one of the largest cities on the Gulf and one of the largest ports in the United States. Located on both banks of the river about 96 and 102 miles, respectively, above the entrances to South and Southwest Passes, it is a natural gateway to and from the vast central and southern 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 sugar, molasses, bananas, coffee, sodium nitrate, creosote oil, jute, burlap, vegetable oils, logs, sisal, paper, chemicals, rubber, newsprint, petroleum products, asphalt, gypsum, iron and steel products, manganese, chrome and iron ores, lead, zinc, paints and pigments, coal tar products, phosphate rock, machinery, and foreign autos. The chief exports are petroleum products, lumber, grain and flour, cotton and other textiles, iron and steel products, paper, lard, tobacco, carbon black, molasses, syrup, rosin, salt, sulphur, chemicals, tallow, vegetable oils, soybeans, wood pulp, clay, scrap iron, aluminum, and machinery.

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 and friendship club 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 northward to Lake Pontchartrain which is connected to the river by the Inner Harbor Navigation Canal along the eastern 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 a part of New Orleans, **Gretna, Harvey,** and **Westwego.** Algiers is connected with New Orleans by two ferries and by the Greater New Orleans Highway Bridge. Several shipyards and a naval station are at Algiers; a large grain elevator is at Westwego.

New Orleans Harbor extends for nearly 15 miles along Mississippi River from Westwego and Southport on the northwest to Chalmette, 5 miles below Canal Street. Virtually all wharves parallel the river bank, and for 9 miles along the bank of the river there is an almost continuous quay. Transit sheds cover most of the wharf area. Modern handling devices suitable for the varied commodities entering the port are provided on the wharves and in the sheds. Almost all wharves have rail connections. Depths at the wharves range from 10 to 50 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 new 33-story International Trade Mart building on the waterfront in Eads Plaza at the foot of Canal Street. There is a large public grain elevator with 7,300,000-bushel capacity in the port on the north bank of the river in New Orleans about 4.5 miles above Canal Street. Another private grain elevator with 4-million bushel capacity is on the west bank at Westwego about 7.3 miles above Canal Street. Both elevators are capable of loading vessels at the rate of

20,000 bushels per hour. There is a new Tidewater Bulk Terminal on the north bank of the Mississippi River—Gulf Outlet Seaway Canal about 1.5 miles east 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 operated 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 the Public Wharf between the Stuyvesant Wharf and the Public Grain Elevator. There are two banana handling wharves and also container ship and seatrain terminals.

Channels are covered in the description at the beginning of this chapter. The main deepwater channels are in the river, on the Inner Harbor Navigation (Industrial) Canal, Chalmette Slip, and the Mississippi River—Gulf Outlet Seaway Canal. 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.

Anchorages.—Within the port limits vessels may anchor in the designated anchorages, or as directed by the District Engineer of the Corps of Engineers. They may berth at the wharves as directed by the Superintendent of Docks of the Dock Board, except at the few privately operated terminals.

Designated areas of anchorage at New Orleans are described in **202.195,** chapter 2.

Federal regulations for navigation of the river are given in **207.200,** chapter 2.

Dangers.—Submerged revetments are located on the river bottom on both sides in the port area; anchorage is prohibited in these areas which are shown on the chart.

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.—There are two rainy periods. The period of localized, scattered, summer showers lasts from mid-June to mid-September. Winter rains are generally slow, and continuous, lasting several days, and usually occur from mid-September to mid-March. Fog is infrequent, usually occuring in the winter months. See appendix for **New Orleans Climatological Table** and **storm warning displays.**

Pilotage is discussed under the general description of the river at the beginning of this chapter.

Towage.—Tugs up to 4,500 horsepower 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.

Customs.—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. New Orleans is a customs port of entry and marine documents are issued.

Immigration.—Immigration inspectors board vessels at the quarantine station or alongside wharves. The Immigration and Naturalization Service maintains a district office at New Orleans.

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 discription of the respective waterways which they cross.

Harbor Regulations.—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. Since the color might change after passing this light, the mariner should constantly check the color over the stern of his vessel until he sights the Gretna light. 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 hours. Tows should not proceed downstream with more than seven tons per horsepower; and further, terminal-operators and fleet-owners should observe extra precautions 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.

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 appointed by the governor of the State of Louisiana. 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,** established by Act of Congress, is owned and operated by the Board of Commissioners under rules and regulations issued by the Foreign Trade Zone Board, Washington, D.C.

The Port Director is in charge of operations and is assisted by two Deputy Port Directors, and a Superintendent of Docks. 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 new 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 ocean going 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 east and west banks downstream from the lock forebay to provide "ready" mooring areas for barges and tows awaiting lockage. These craft are under the direction and control of the lockmaster.

There is a port wide radiotelephone system—VHF-156.65 mc., which connects all terminals, bridges, tugs, pilots, and the yacht harbor with the Dock Board offices.

Wharves.—There are more than eight miles of wharves, with almost 6 miles of transit sheds with storage capacity of over six million square feet of storage space under control of the Board of Commissioners. There are also some privately owned and operated wharves. These fa-

cilities are located along the Mississippi River and the shores of the Harvey Canal and Inner Harbor Navigation Canal. Most of the facilities, including the Public Commodity Warehouse Wharf and the Foreign Trade Zone Wharf, are used for handling general cargo. In addition, at one terminal, trailers with general cargo are run onto end-loading vessels. Another terminal on the west bank at Belle Chasse about 18 miles below Canal Street handles the loading of railroad cars into seatrain oceangoing carriers. Several wharves are used for handling of oilfield supplies and equipment, and logs. Vessels may be fueled by tank barges while at the wharves.

All wharves are equipped with lift trucks for handling and stacking cargo. Molasses and alcohol are handled by pipelines beneath the wharves, directly from ships. Floating derricks, locomotive cranes, and most other handling devices up to a capacity of 300 tons are available as needed.

There are 37 general cargo wharves with 35,000 feet of berthage with transit sheds, 6 open cargo berthage with about 3,500 feet of berthage, and over 600,000 square feet of open storage, all under the control of the Dock Board. Most of the general cargo wharves have shipside rail trackage. There are two banana handling wharves with 800 feet of berthage. One, the Erato Wharf, on the west bank just below the Greater New Orleans Highway Bridge has travelling mechanical banana unloading towers, about 350 feet of berthage, and a transit shed with over 125,000 square feet of storage space. Desire Street Wharf, on the north bank 1.3 miles below Canal Street, the other banana handling facility, has 420 feet of berthage and a transit shed with 90,000 square feet of storage space. Both banana wharves have railroad spurs perpendicular to the river with platforms to facilitate the rapid loading of railroad cars. There are 6 ship repair berths with 3,700 feet of berthage which are owned by the Dock Board and leased to repair firms.

Perry Street Wharf, one of the newer of the Dock Board's general cargo terminals, is on the east bank of the river at Gretna, just above the Greater New Orleans Highway Bridge. The wharf has 1,000 feet of berthage, a transit shed with 160,000 square feet of storage space, over 90,000 square feet of open storage, shipside rail trackage on the apron, and platform level trackage in the rear of the shed. There is 50 feet alongside the wharf.

The new Tidewater Bulk Terminal on the north bank of the Gulf Intracoastal Waterway, about 1.5 miles east of the Inner Harbor Navigation Canal, has three ship berths. Travelling mechanical unloader towers can discharge from 900 to 3,000 tons of bulk materials such as sugar, gypsum, ore, phosphate rock, or other bulk cargoes per hour. The facility is equipped with a car dumper, conveyor galleries, weighing bins, storage sheds, and shipside rail trackage.

Stuyvesant Wharf on the north bank about 3 miles above Canal Street is owned and operated by the Illinois Central Railroad and is the largest privately operated general cargo terminal in the port. It has 4,500 feet of berthage and transit sheds with a storage capacity of over 600,000 square feet of storage space. About 700 feet of the wharf is leased by the Dock Board as a bulk meal handling facility, the first and only one of its kind in the port. In 1965, the lower part of this wharf was being rebuilt and modernized.

Poland Street Wharf, the U.S. Army Terminal, is on the north bank close westward of the entrance to Inner Harbor Navigation Canal. There is 1,700 feet of berthage with four berths with transit sheds and one open berth. The transit sheds have a capacity of 1,500,000 square feet of storage. There is open storage for 25,000 tons of cargo. There is a railroad yard at the terminal and sidings in rear of the sheds, and loading platform for trucks.

The terminal for the inland barge lines to the Mississippi, Warrior, and Alabama Rivers is on the Inner Harbor Navigation Canal just above the locks. Other private barge terminals and barge moorings are on the river above and below the city.

The public grain elevator, 4.5 miles above Canal Street, on the east bank of the river, with a 2,500-foot wharf, has a capacity of 7.3 million bushels and can accommodate three oceangoing vessels at any one time. There is also a sacking plant in a transit shed with 40,000 square feet of storage space on the wharf. There is also a privately owned grain elevator with a capacity of 4.1 million bushels on the west bank of the river at Westwego about 7.3 miles above Canal Street. The wharf is 1,200 feet long and there is a barge slip.

There are numerous private deepwater wharves at the oil terminals, and gypsum, chemical, and fertilizer plants along the river above and below the city.

Further detailed information about the port facilities may be obtained from the Port Series No. 20, 1958, The Port of New Orleans, published jointly by the Corps of Engineers, U.S. Army, and Maritime Administration of Department of Commerce.

The Inner Harbor Navigation Canal, also known as the **Industrial Canal,** offers deep-water connection between Mississippi River and Lake Pontchartrain, a distance of about 5 miles. The lock is 0.5 mile north 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-156.65 mc. North from the lock in 1964, the controlling mid-channel depths were 29 feet to the junction with Mississippi River—Gulf Outlet Canal, thence 31 feet to the Chef Menteur Highway Bridge, and thence 23 feet at the Seabrook Highway and Southern Railway bridges at Seabrook at the north end of the waterway.

Caution.—A submerged drainage line is reported crossing the Inner Harbor Navigation Canal just south of the Florida Avenue bridge; maximum permissable draft over the line is 30 feet.

About 0.7 mile north of the lock is a turning basin. Several bascule highway and railroad bridges cross the canal, with minimum width of 75 feet and minimum clearance less than 1 foot. The St. Claude Avenue highway bridge at the south end of the navigation lock has a bascule

span. The North Claiborne Avenue highway about 0.2 mile north of the lock has a vertical lift span with clearance of 41 feet down and 156 feet up. About 0.9 mile north of the lock, the combination Florida Avenue and Southern Railroad bridge has a bascule span with a clearance of 1 foot. An overhead power cable crossing close north of the bridge has a clearance of 132 feet.

The Mississippi River-Gulf Outlet Seaway Canal enters the Industrial Canal about 1.4 miles north of the lock and 2.0 miles from the Mississippi River.

About 1.5 miles eastward of the junction on the north bank of the Gulf Outlet Seaway is the Dock Boards new Tidewater Bulk Terminal. On the north bank about 5.5 miles eastward of the junction is a large National Aeronautics and Space Administration missile center. The power plant, buildings, and a water tank are very conspicuous. A basin in the north bank at the center is used for loading missiles on barges. There is reported to be 22 feet in the basin.

The combination Gentilly Road highway and Louisville and Nashville railroad bridge 2.4 miles northward of the lock has a bascule span with a clearance of 1 foot. The U.S. Interstate Route 10 highway bridge close northward 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 northward of this bridge has a clearance of 135 feet. Chef Menteur (U.S. 90) highway bridge 2.6 miles northward of the lock has a bascule span with a clearance of 5 feet.

The combination Seabrook Highway and Southern Railroad Bridge across the northern entrance of the canal, about 4.1 miles northward of the lock, has a bascule span with a clearance of 1 foot. In 1966 a new highway bridge was under construction close northward of the Seabrook bridge. It will have a bascule span with a design clearance of 45 feet.

The river entrance to the canal is marked by lights on both sides and by a 333° lighted range. The lake entrance is marked by a buoy along the east side. The canal provides an additional 10 miles of waterfront to the port of New Orleans with virtually constant water level. This affords additional facilities as well as sites for industrial development.

There are numerous industries along both banks of the Industrial 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.

There are three general cargo terminals on the canal. Galves Street Wharf on the west bank, just above the North Claiborne Avenue Bridge, has 2,400 feet of berthage, a transit shed with 476,000 square feet of storage, and 160,000 square feet of open storage. The Florida Avenue Wharf at the head of the turning basin, about 0.8 mile north of the navigation lock, has about 500 feet of berthage, a transit shed with 86,000 square feet of storage, and 24,000 square feet of open storage. There are also a shipyard, a cement plant, and a steel fabrication plant in the basin. A ship wharf in a basin on the east bank near the north end of the canal has about 900 feet of berthage and open storage of about 40,000 square feet for general cargo or storage of construction material.

There are a number of floating drydocks and marine railways at the shipyards on the canal. The largest drydock combination can lift vessels up to 250 feet in length and the largest railway can haul out craft up to 260 feet in length. Hull and engine repairs can be made and several of the yards build or convert large vessels. A marine railway at a boatyard on the east bank has a marine railway that can haul out craft up to 110 feet in length for hull and engine repairs, or storage. Gasoline, diesel fuel, water, and marine supplies can be obtained at the boatyard and at several other service wharves along the canal.

Port Charges.—About two-thirds of the improved waterfront at the port is operated by the Dock Board. A copy of the rules and regulations giving the port charges can be obtained from the board.

Supplies.—An unlimited supply of purified river water is available at all piers and wharves. This water, while excellent for drinking purposes, contains a small percentage of sulphate 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 banks of the river. Marine and ship supplies of all kinds are obtainable, and ice and provisions are plentiful.

Repairs.—New Orleans has numerous commercial plants which can haul out 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 has a capacity of 18,000 tons, a length of 554 over the keel blocks, and a width of 92 feet. It can lift vessels up to 635 feet in length. Also available are numerous other floating docks, small graving docks, and marine railways. The largest marine railway has a capacity of 1,000 tons and has hauled out vessels up to 300 feet in length. Marine repair plants are operated in connection with the drydocks, the larger plants having well equipped shops and other facilities necessary for complete repairs to wooden or steel vessels. There is a large shipbuilding plant at Avondale which builds all types of vessels up to 600 feet in length.

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.

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 on Lake Pontchartrain. There are covered and open berthage with electricity for over 900 craft up to 100 feet in length at the yacht harbor. There are two yacht clubs, several boatyards, and service wharves in the yacht harbor where gasoline, diesel fuel,

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water, ice, provisions, marine and yacht supplies, and ramps are available. Marine lifts and cranes can lift out craft up to 85 feet in length 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 Gulf Intracoastal Waterway.

Communications.—New Orleans is the terminus for seven trunk line railroads including the Gulf, Mobile, and Ohio, The Illinois Central, The Kansas City Southern, The Louisville and Nashville, The Texas Pacific–Missouri Pacific Terminal, 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.

More than 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 Misissippi 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 Warrior River. The barge-line terminals are on the Inner Harbor Navigation Canal, just above the locks and on both banks of the river above and below the city. There are inside freight routes on the Gulf Intracoastal Waterway out of New Orleans eastward to Mobile, Pensacola, Panama City, and Apalachicola, and westward 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 northwest of the center of the city is served by seven airlines, which offer scheduled service to all parts of the country and overseas destinations. New Orleans Lakefront Airport is on Lake Pontchartrain on the east side of the northern end of the Industrial Canal. Alvin Calender Field is a naval reserve training facility on the south bank of the river east 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.

Telephone, telegraph, and radio service is available, and radio and radiotelephone service through the New Orleans Marine Operator.

Charts 1269, 1050.—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 western 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 deepdraft 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. These channels were dredged to Federal project depth of 40 feet in June 1964. The channels are maintained. The centerline of the channel at the crossings are marked by lighted ranges, and 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 Donaldsonville—69.8 miles, Plaquemine—99 miles, and on the west 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, Plaquemine—98.8 miles, Port Allen Lock—115.8 miles, and on the east bank at Baton Rouge—117 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 Engineer, Corps of Engineers, New Orleans; limits and regulations are given in **202.195**, chapter 2. Temporary anchorages in the upper river are off the east bank at Destrehan and off the west bank at Burnside. The limits of the Baton Rouge anchorage are given in **202.195**, 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 yachts is not recommended because of the hazard of floating obstructions.

Cables.—Overhead power cables with a minimum clearance of 149 feet cross the river at Ninemile Point, 7.4 miles, one mile above the Huey P. Long Bridge at Bridge City—10.7 miles, at Montz—29.3 miles, at Lukeville—112.2 miles, and at Baton Rouge—119.7 miles, respectively, above Canal Street.

Ferries cross the river at Destrehan—22.3 miles, at Norco—27.1 miles, at Reserve—37.5 miles, at Lutcher—45.7 miles, at Donaldsonville—69.8 miles, at Baton Rouge—117.4 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.

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 Destrehan, Goodhope, Norco, and Baton Rouge to assist vessels in docking and undocking.

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 the river in 1965 above New Orleans follows.

The upper limit of the Port of New Orleans on the south bank of the river is at Ninemile Point 7.8 miles above Canal Street. The upper limit on the north bank is just below Harahan, 10.6 miles above Canal Street. **All mileage referred to on the upper river is in nautical miles above Canal Street (ACS).**

At **Avondale** on the south bank 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 in length. The yard has machine and fabricating shops, thermite welding facilities, and can turn out shafts and steel forgings up to 20,000 pounds. The yard has four floating drydocks, the largest of which is 200 feet long, 84 feet wide, and a depth of 12 feet over the keel blocks, and can lift a vessel up to 327 feet in length. The docks can be combined to lift larger vessels. The yard has a marine railway that can haul out vessels up to 110 feet in length. The yard has barges and facilities for gas freeing and tank cleaning.

There are barge moorings on both sides of the river at **Twelvemile Point,** 12.1 miles (ACS). On the south bank at 11.4 miles is the dock, and storage tanks of an oil and chemical exporting firm. Bunker C, diesel fuel, and supplies are available at the pontoon wharf of an oil company at **Point Landing** 11.9 miles (ACS).

Harahan is on the north bank at 12.2 miles (ACS). Fuel and some supplies may be obtained on call.

St. Rose on the north bank at 20.4 miles (ACS), has a large oil refinery and wharf.

The Cynamid Corporation and Lion Oil Company have plants and wharves on the south bank at 21.3 miles (ACS), and Monsanto Company has a large chemical plant and wharf at 21.7 miles (ACS), eastward of Luling.

Luling, on the south bank at 22.6 miles (ACS), has small industries and the large chemical plants and the oil company just referred to.

Destrehan, on the north bank opposite Luling, is the site of the large Bunge and St. Joseph grain elevators, and oil refinery, and a chemical plant. All four have large wharves. A vehicular ferry crosses the river between Luling and Destrehan.

On the west bank about a mile below the tank at **Hahnville** there is a prominent brick courthouse with clock tower. A shipyard has marine railways that can haul out barges up to 180 feet in length for general repairs.

Good Hope, on the east bank 26.5 miles (ACS), is the site of a large oil storage area. At **Norco,** on the north bank 26.9 miles (ACS), is General American oil refinery with wharves for two vessels. A ferry crosses the river 0.5 mile above Norco. A mile above Norco is the large Shell Oil chemical plant.

The **Bonnet Carre Floodway** is on the north bank 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 south 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 north side of the river near the Bonnet Carre Floodway; limits and regulations are given in **202.195,** chapter 2.

Taft, on the south bank about 28 miles (ACS), is the site of the new plant and wharf of United Phosphate Company, which was under construction in March 1965.

Two overhead power cables about 0.1 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 north bank 34 miles (ACS), is a truck-farming center and prosperous sugar section. About 1.3 miles above Laplace on the north bank at 35.3 miles (ACS) is the large DuPont refinery and chemical plant and wharf. The cracking towers and tanks are prominent.

Edgard, on the south bank about 37.4 miles (ACS), has a large brick church with twin towers and a tank, and about 0.7 mile westward is a large sugarmill with a tall white stack.

Reserve, 38 miles (ACS), has a large sugar refinery with two tall stacks and a wharf, and is the trading center and shipping point for a very productive sugarcane region. A ferry crosses the river from Reserve to Edgard.

Garyville, 42.4 miles (ACS), is a lumber town. A tank is prominent.

Gramercy, 45 miles (ACS), has a large aluminum reduction and chemical plant, and a sugar refinery. Berths are available at both plants. The unloading gantries on the ore pier, 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 here.

Vacherie, 48 miles (ACS), has a sugar mill with four stacks and a water tank. An oil loading berth is 0.5 mile above Vacherie on the south bank.

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 east bank. Across the river there is a large sugar mill with a tall stack. The Shell Oil Company's floating wharf is on the west bank at **Lauderdale** 61.3 miles (ACS).

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 Texas oil refinery and dock are on the east bank at 64 miles (ACS); privately maintained lights mark the dock.

At **Burnside,** on the east bank of the river 65 miles (ACS), is the Burnside Bulk Marine Terminal of the Greater Baton Rouge Port Commission that can handle

up to 4,800 tons of bulk cargo an hour. Bauxite, liquid caustic soda, alumina, raw sugar, phosphate rock, iron, manganese, and chrome ores, salt, coke, barytes, and other commodities in bulk are handled at the terminal. The main deepwater wharf is 800 feet long, with 40 feet alongside, has two unloader gantries each with a capacity of 1,000 tons an hour free digging, and a loader rated at 1,500 tons an hour. A bauxite handling wharf is close northward. The bulk terminal has the most modern equipment with conveyor belts to the car loading site and storage area. A tug is available for docking and undocking vessels. The terminal is owned by the Greater Baton Rouge Port Commission and leased to private operators.

Donaldsonville, on the south bank 70 miles (ACS), is a town at the former junction of the river and Bayou Lafourche. Just south of the ferry landing is a barge where boats may tie up to take on fuel and provisions which are trucked in. A vehicular ferry crosses the river to Darrow. A bulletin board and a river gage are on the south bank at Donaldsonville. There is a rice mill in the town and a church with twin spires and a tank are prominent.

Geismar, on the north bank 78 miles (ACS), has three large chemical plants. The three deepwater wharves of the plants are at about 77, 78, and 79 miles (ACS) on the east bank.

The **White Castle** ferry crosses the river to **Carville** about 83.7 miles (ACS). The U.S. Public Health Service Leper Colony and hospital is on the north bank at Carville.

The Gulf States power plant and wharf are on the east bank just below St. Gabriel about 88 miles (ACS). The floating wharf of the Shell Oil Company is at **St. Gabriel** on the east bank about 91.7 miles (ACS). The Willow Glen power plant is at **Sunshine,** on the north bank, 92.5 miles (ACS).

Plaquemine, on the west bank 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 sugar mills are in the vicinity. Dow Chemical Company has a large chemical plant and a deepwater berth for one vessel on the west bank about 100 miles (ACS).

An overhead power cable crossing the river at **Lukeville,** 112.2 miles (ACS), has a clearance of 150 feet.

Dravo Construction Plant is on the east bank about 113.5 miles (ACS). The steel pile wharf is about 450 feet long and the plant has two small drydocks.

Baton Rouge, the capital of Louisiana, on the east bank 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 west bank at Port Allen, the municipal barge dock on the east bank opposite Port Allen, and the Port of Baton Rouge Barge Canal Terminal in the **Devils Swamp** area on the east bank 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 manufacturing and fabricating, aluminum, food and staples, machinery, and transportation equipment. The principal shipments from the port include wheat, corn, sorghum, soybeans, animal feeds, tobacco, 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, sulphur, sodium hydroxide, alcohol, sulphuric acid, and newsprint.

At **Port Allen,** the northern end of the Gulf Intracoastal Waterway (Port Allen to Morgan City section) is connected with 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 450-foot white structure which dominates the area. There are several tall business buildings and the State University and stadium. The Baton Rouge–Port Allen highway bridge, under construction in March 1965, has a high-level fixed span with a design clearance of 135 feet.

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 196 miles (ACS), about 79 miles above Baton Rouge, and a 12-foot channel in the Baton Rouge Barge Canal for 2.5 miles. The channels are maintained and are well marked.

Anchorages.—Limits and regulations for the anchorage areas at Baton Rouge are given in **202.195,** chapter 2. Temporary anchorage for vessels awaiting berths are as prescribed by the District Engineer, Corps of Engineers, New Orleans.

Dangers.—A vehicular and passenger toll ferry crosses the river between Port Allen and Baton Rouge at 117.4 miles (ACS). An overhead power cable crosses the river about 119.7 miles (ACS). A combination Airline Highway (U.S. Route 190) and railroad bridge crossing the river 120.7 miles (ACS), about 4 miles above Baton Rouge, has a 620-foot fixed span over the channel with a clearance of 65 feet above high river stage (1927). This bridge is the limit of deepwater navigation on the river.

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 west bank at the entrance to Port Allen Lock.

Pilotage is compulsory on the river between Baton Rouge and New Orleans and to sea; see Pilotage information at the beginning of this chapter.

Towage.—Tugs are available at Baton Rouge, Burnside, Destrehan, Good Hope, and Norco.

Quarantine.—Quarantine services are provided by personnel from the New Orleans station. The U.S. Public Health Service maintains an outpatient office at Baton Rouge. There are a general hospital, and private hospitals in Baton Rouge.

Customs.—Baton Rouge is a port of entry and marine documents are issued. A customs officer from Baton Rouge usually attends the Bulk Marine Terminal at Burnside.

Immigration.—The Immigration and Naturalization Service maintains a port of entry at Baton Rouge for the arrival and departure of seamen in merchant vessels.

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 Greater Baton Rouge Port Commission owns and operates two general cargo wharves on the west bank at Port Allen. The lower wharf just below the new Baton Rouge—Port Allen high-level highway bridge is 1,400 feet long with 40 feet alongside. A 400-foot barge loading berth is at the lower end of the wharf. A 30-ton gantry crane and two mobile 10-ton cranes are on the 40-foot apron which has two shipside railroad tracks. The transit shed has 120,000 square feet of storage space. Two depressed tracks and a tailgate truck loading platform are at the rear of the shed. The upper wharf just above the bridge is 925 feet long with 40 feet alongside. The transit shed has 120,000 square feet of storage and two shipside railroad tracks are on the 40-foot apron of the wharf and two depressed rail tracks and tailgate level covered truck loading platform are at the rear of the shed. The 7½ million-bushel grain elevator below the bridge on the west bank has one ship berth and five loading spouts and facilities for unloading barges. There is a commodity warehouse with 75,000 square feet of storage space and an 11 million-gallon molasses storage facility at the general cargo terminal.

The Port Commission also maintains and operates a 300-foot barge loading dock with 10 feet alongside on the east bank opposite the Port Allen Terminal and a 400-foot barge loading dock with 12 feet alongside in the turning basin at the head of the 2.5-mile long Baton Rouge Barge Canal about 7 miles above the city. This wharf has marginal rail trackage on both sides and mobile cranes for loading and unloading barges.

There are private wharves at the oil refineries, one of which about 1.5 miles below the highway-railroad bridge has about 2,700 feet of berthing space with 40 feet alongside. Other wharves at the chemical and aluminum plants just below the bridge are 300 and 500 feet long and have 40 feet alongside. Other smaller wharves with 7½ to 10 feet alongside are at the chemical and cement plants on the east bank above the bridge. An oil handling berth 300 feet long with 50 feet alongside is on the west bank opposite Baton Rouge about 2 miles below the highway–railroad bridge.

Supplies.—Provisions, ice, water, gasoline, and diesel oil can be obtained. Vessels can receive bunker C fuel from tank barges while alongside the wharves, or at the oil terminal wharf about 1.5 miles below the highway–railroad bridge. Water is piped to the wharves.

Repairs.—There are two small drydocks at the shipyard on the east bank about 3.5 miles below the city, where there is a 490-foot wharf and tieup dolphins for barges. There is also a 750-foot floating repair wharf on the east bank at Baton Rouge. Above-water hull and engine repairs can be made to vessels, and cargo hold cleaning, gas freeing, and tank cleaning facilities are available in the port.

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 Pacific Railroads serve the area. Numerous truck lines serve the port and there is local and interstate bus service. Three airlines offer service at the Ryan Airport about 5 miles north 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.

Old River, about 64 miles above Baton Rouge and 181 miles above Canal Street, New Orleans, is a 6-mile long stream which formerly connected the Mississippi River with the Red and Atchafalaya Rivers. In 1963, a dam was constructed about a mile from its eastern entrance to prevent the Mississippi from flowing uncontrolled into the Atchafalaya Basin. An outflow channel with a control structure was built on the west bank 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 two miles long from the Mississippi to Old River about 1.4 miles west of the dam, thence 12 feet to the junction at **Barbre Landing** with the Red and Atchafalaya Rivers at AR Mile 0.0. The project was completed and the lock opened to navigation in March 1963. The lock is 1,185 feet long, 75 feet wide, and 11 feet

over the sill at mean low water Gulf. A highway bridge over the lock has a lift span with a clearance of 74 feet down and 116 feet up, at mean low water Gulf.

Atchafalaya River flows southward 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 1964, 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 sulphur, 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, and of a fixed highway bridge 40 feet at high water stage.

9. MISSISSIPPI RIVER TO SABINE PASS

Chart 1116.—From the delta of the Mississippi River to Sabine Pass, a distance of 250 miles, the coast has a general westerly 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 stretches of marshy ground.

The off-lying water is shoal for long distances from the beach and, except for the first 50 miles west of Southwest Pass, the 10-fathom curve is 20 to 35 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 to the eastward of Atchafalaya Bay are dangerous to enter except during fair weather. The channels change frequently due to storms, and local knowledge is generally necessary.

Calcasieu Pass is the first and only deep-draft channel from the Mississippi River westward to Sabine Pass. An extensive network of bayous and canals with depths of 2 to 9 feet covers the country for about 50 to 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 commerical 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 70 miles offshore.

Inside the 100-fathom curve from Southwest Pass to Sabine Pass the current sets westerly 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 1271, 1272, 1273.—From Southwest Pass to Barataria Pass, at the entrance of Barataria Bay, the shoreline is broken by numerous small and unimportant passes and shallow bays, seldom frequented except by small craft and canoes, and never approached by seagoing vessels.

Grand Pass, 10 miles northward 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, distillate, fuel oil, provisions, and some supplies are available. Hull and engine repairs can be made at a repair yard which has a machine shop and marine ways capable of hauling out boats up to 65 feet in length. Numerous fishing boats operate in the waters to the westward of the river, bringing their catch to the fish canneries at Buras. Rail, highway, and telephone communications extend to New Orleans.

Scofield Bayou, about 23 miles northward of Southwest Pass, provides an entrance from the Gulf to the lakes and bayous to the southward of, and through the Fasterling Canal to Buras. An entrance channel was dredged in 1957 and marked by privately-maintained daybeacons. A schooner wreck is just west of the channel. Local knowledge is required.

Empire is a small town on Doullut Canal and Empire Waterway about 3.5 miles northwestward 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 north of the lock and a microwave tower south of it are prominent.

The State-owned Empire Waterway Lock through the Mississippi River levee at Empire is 200 feet long, 40 feet wide, and 10 feet deep. The lock is in operation daily between the hours of 6:30 a.m. and 5:00 p.m.

Vessels should approach the Empire Waterway from the Gulf through the Empire Safety Fairway; see 209.135, chapter 2.

Federal project depth is 9 feet for the Empire Waterway from Doullut (Duluth) Canal through **Bayou Long, Bayou Fontanelle,** and the cut through Pelican Island to the Gulf of Mexico. Stone jetties protect the Gulf entrance. In May 1966, the controlling depth was 5 feet from the Mississippi River through Doullut Canal, thence 7 feet through Bayou Long, and Bayou Fontanelle, and thence project depths over the bar into the Gulf. The approach to the Gulf entrance is marked by a lighted bell buoy and the entrance off the jetties by a lighted buoy and a buoy.

Considerable commerce in seafood, shell, petroleum products, oil well supplies, clay, and 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 drawing up to 4½ feet

across the Mississippi Delta between Barataria and Breton Sound.

Marinas on Doullut Canal at Empire can provide gasoline, diesel fuel, water, ice, marine supplies, and open and covered berthage. Lifts can handle craft up to 22 feet in length for hull and engine repairs; ramps are also available. A municipal fishing boat harbor with berthage and lifts for hauling out shrimp boats was under construction in March 1965 on the canal west of the town. A machine shop is available in town.

Doullut (Duluth) Canal extends westward from Empire Lock to Adams Bay; a light is at the bay end of the canal. Depths of about 3 to 4 feet can be taken through the canal to the Gulf or to Barataria Bay. The route to the Gulf is across **Adams Bay,** which usually is marked by stakes, and thence through **Meyers Canal** and **Grand Bayou.** Somewhat less draft can be carried via Bayou Cook and Bastian Bay. To reach Barataria Bay, Grand Bayou is followed to the northward to its junction with the Freeport Sulphur Company Canal, which connects with Lake Grande Ecaille, and then with Barataria Bay.

Port Sulphur is a small town about 11 miles above Buras on the west bank of the river. **Freeport Sulphur Company Canal** extends from the river levee to **Lake Washington** and **Lake Grande Ecaille,** a distance of about 8 miles. Craft drawing up to 3 feet can pass through these lakes 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 **City Price** (chart 1271) leads to Grand Bayou, and thence either to the Gulf or to Barataria Bay. **Wilkinson Canal** at **Myrtle Grove** (chart 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 northwestward of Southwest Pass, is 1 to 2 feet deep. The bay is separated from the Gulf by **Bastian Island. Bastian Pass,** east of the island, is not navigable. **Grand Bayou Pass,** west of the island, is the main entrance to Bastian Bay and also to Grand Bayou. Federal project depth is 6 feet for the channel through the entrance bar of the pass. The daybeacon marking the west side of the passage leading into Bastian Bay also marks the east side of the passage to Grand Bayou.

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. Three feet can be carried to the canals north of Empire which lead to the river levee and to 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 north end of Bastian Bay, leads to Adams Bay and thence through Doullut Canal which connects with the Mississippi River. The shallow depths across the southern portion of Bastian Bay limit this route to about 2 feet on a favorable tide.

Chaland Pass is a shallow, unfrequented pass 3 miles west of Bastian Bay.

Quatre Bayous Pass, 5.5 miles east of Barataria Bay Light, is the entrance to **Bay Ronquille** and **Cat Bay.** The approach is marked by a lighted bell buoy and the west side of the entrance to the pass by a light. This pass and Grand Bayou Pass to Grand Bayou are the only passes east 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 northwest of the light at the entrance. A light is on the west side at the north 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 to the Freeport Sulphur Company Canal which connects with the Doullut Canal into the Mississippi River and other canals leading to the river levee and to the highway to New Orleans.

To enter Quatre Bayous Pass, approach the light from southeastward. Barataria Bay is entered by passing close eastward of the light and following the southwest 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 westward. The passage from Cat Bay into Barataria Bay is about 1 mile northwestward 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 settlements on the bay are Grand Isle and Manilla Village.

Charts 879, 1271, 1273.—Barataria Waterway extends in a northerly direction from the Gulf for about 34 miles through Barataria Bay to an intersection with the Gulf 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 Federal project provides for a depth of 12 feet in a dredged channel across the bar at Barataria Pass into Barataria Bay, thence in landcuts through Beauregard, Mendicant, and other islands on the west 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 December 1966, the controlling depth in the waterway

was 12 feet across the bar, thence 10 feet to a junction with the Intracoastal Waterway.

Barataria Pass is the main entrance to Barataria Bay. It is marked on the easterly 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 square slatted daymark on the parapet of Fort Livingston on the east 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 southeastward of the light, marks the approach to the dredged channel across the bar.

A leading light marks the channel through the pass on the bearing 311°. Power cables cross the pass between Grand Isle and Grand Terre Islands; the supporting towers are marked by lights. The cables are submerged at the channel, on the bearing of the leading light, and have a clearance of 35 feet elsewhere. A stone jetty extends 200 yards southeastward from the eastern tip of Grand Isle and is marked on the end by a light. To carry the best water into Barataria Pass, proceed through the dredged channel and follow the leading light into Barataria Pass.

Hard sand bars 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 heavy winds. Inside the bar, depths up to 12 feet extend northward as far as **Independence Island.** The tidal currents in Barataria Pass average about 1.4 knots.

Bayou Rigaud, on the north side of Grand Isle, is the approach to the town of Grand Isle, 4 miles west of Barataria Pass. A channel, part of the Barataria Waterway 12-foot Federal project, leads southwesterly 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 docks. In November 1965–June 1966, the controlling depth was 10 feet. Lights and buoys mark the channel.

A privately-marked channel, northward through Barataria Bay, leads between Queen Bess Island and Independence Island, and close to the westward of the light marking Shell Reef. Another privately-marked channel leads across Barataria Bay from the Freeport Sulphur Company Canal to Bayou St. Denis.

Former routes northward through **Grand Bayou, Little Lake, Turtle Bay, Harvey Cutoff,** and **Bayou Rigolettes** (see chart 1050) are little used as shoaling has occurred. The south entrance to Grand Bayou is marked by a light at Manilla Village on the east side of the entrance. Both Grand Bayou and Bayou St. Denis leads into Little Lake with a depth of about 3 feet. This depth can also be carried across the lake.

A passage eastward 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 eastward of Bayou St. Denis. Eleven miles in length, the canal leads to Myrtle Grove on the Mississippi River, but does not enter the river. The canal depth is about 3 feet. Other similar canals north 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 sulphur, oil well pipe and supplies, petroleum products, cement, sand and gravel, and machinery.

Grand Isle, the largest town in the Barataria Bay area, 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 Bayou Rigaud about 1.2 miles west of the entrance. See appendix for **storm warning displays.** Several oil companies have marine repair bases at which oil well structures and barges are built or repaired, a shipyard, and several service wharves, which were reported to have 3 feet alongside in March 1965. Floating cranes up to 250-ton capacity owned by oil companies were at the port in 1965. Many shrimp boats on the bayou and crew boats operate to the offshore oil wells from Grand Isle. There is a 20-ton travelift at the shipyard that can haul out craft up to 55 feet in length for hull and engine repairs. Gasoline, diesel fuel, water, ice, marine supplies, and open and covered berthage with electricity are available. The only docks are on Bayou Rigaud.

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.

Manilla Village is on the north side of the entrance to Grand Bayou near the northwest end of Barataria Bay. Gasoline and small quantities of some provisions can be obtained.

Note.—In the Barataria Bay area the name Grand Bayou appears on two bodies of water. The first is to the westward of Bastian Bay, and the second is off the northwest side of Barataria Bay.

Lafitte Village, on the east bank of the waterway about 29 miles above the entrance at the junction of Bayous Rigolettes, Dupont, and Barataria, is a small settlement with a small marina and an oil company base and wharf. There is a marine lift and brow at the wharf. Fuel and berthage are available at the marina. A paved highway along the east bank of the waterway connects with Lafitte, Crown Point, and New Orleans.

Bayou des Oise, locally known as **Goose Bayou,** enters Barataria Waterway about 1.6 miles north of the junction of the three bayous. State Route 30 highway bridge crossing the entrance to Goose Bayou has a 45-foot fixed span

with a clearance of 10 feet. A large marina at the bridge and in a slip close eastward of the bridge has a marine lift that can haul out craft up to 35 feet in length for hull and engine repairs, or storage. Gasoline, diesel fuel, water, open and covered berthage with electricity, and marine and yacht 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.

A large shipyard that builds and repairs barges, crew boats, and shrimp boats, is on the east bank of the waterway about 33 miles above the entrance. The largest marine railway at the yard can handle craft up to 80 feet in length for hull, engine, and electronic repairs. The yard also has a lift that can haul out craft up to 40 feet in length, as well as machine, wood, and metal shops, and welding equipment. Depths of about 15 feet are reported alongside the wharves.

Barataria, on the west bank and **Lafitte** on the east 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. 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 westerly 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 southwestward 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 trestle-bridge, now used as a fishing pier, has a fixed span with a width of 30 feet and a clearance of 14 feet. A new highway bridge, on the northeast side of the trestle, has a clearance of 14 feet. An overhead power cable crossing at the bridge has a clearance of 23 feet. The tidal current in Caminada Pass averages 1.5 knots.

Charts 1050, 1274.—Belle Pass was formerly the westerly and is now the only direct entrance into Bayou Lafourche from the Gulf of Mexico. The mouth of the pass is protected by stone jetties; lighted buoys and a light mark the entrance to the pass.

Vessels should approach Bayou Lafourche through Belle Pass Safety Fairway; see 209.135, chapter 2.

Pass Fourchon was formerly the easterly of two entrances to Bayou Lafourche from the Gulf. It is now closed.

Bayou Lafourche was formerly an outlet of the Mississippi River at Donaldsonville, 70 miles above Canal Street, New Orleans, but for purposes of flood prevention it was blocked off from the river by levee construction. From Donaldsonville, Bayou Lafourche extends in a southeasterly direction for 93 miles, emptying into the Gulf at Belle Pass, 19 miles southwestward of Barataria Bay Light.

The bayou varies in width from 75 to 150 feet. The Intracoastal Waterway crosses the bayou at Larose. Federal project depth is 12 feet through the jettied entrance at Belle Pass to Leeville, thence 9 feet to Golden Meadow, and thence 6 feet to **Napoleonville** about 79 miles above the entrance. In September 1966, the controlling depths were 12 feet in the bar and jetty channels, thence 9 feet to Leeville, thence 6½ feet to Golden Meadow, thence 6 feet to Galliano and Larose, thence 5 feet to Lockport, thence in March 1962, 5 feet to Thibodaux, and thence 3 feet for about 0.8 mile; above this point navigation is blocked by dead vegetation.

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 sulphur, sand and gravel, oil well pipe, machinery and supplies, caustic soda, chemicals, and general cargo.

Many bridges cross the bayou. The controlling width is 50 feet at the vertical-lift bridge at Thibodaux, and the controlling clearance is 59 feet up for the vertical-lift bridge at Raceland. **Drawspan regulations** for the bridges crossing Bayou Lafourche are stated in **203.245,** chapter 2. A highway bridge at Napoleonville has a 15-foot fixed span with a clearance of 5 feet.

Leeville, on the west bank about 11 miles above the entrance, has shrimp docks, a seafood cannery, oil company terminals and bases, and a small boatyard and marina with a lift that can haul out craft up to 25 feet in length for general repairs. The Southwest Louisiana Canal crosses the bayou at Leeville. Gasoline, diesel fuel, water, berthage, and limited supplies are available at Leeville.

A highway bridge at Leeville, 12 miles above the mouth, has a swing span with a clearance of 8 feet. The channel is through the west draw. The overhead power cable on the south side of the bridge has a clearance of 60 feet.

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.

Golden Meadows, 20 miles above the mouth, is the principal fishing settlement. There is a shipyard about 0.5 mile north of the pontoon bridge on the east bank that builds and repairs barges, crew boats and tugs, and has

two vertical lifts and a marine railway capable of hauling out craft up to 65 feet in length for general repairs. A machine shop is at the yard. Gasoline, diesel fuel, ice, water, and marine supplies are available. An overhead power cable crossing the bayou just off the town has a clearance of over 100 feet. A boatyard on the west bank about 1.3 miles above the pontoon bridge has two marine railways and can haul out craft up to 35 feet for general repairs.

Galliano, a town 23.5 miles above the entrance, has a pontoon bridge. Gasoline, diesel fuel, and supplies are available. There are a shipyard that builds steel tugs and two boatyards on the west bank within two miles north of Galliano. All have marine railways, the largest of which can haul out vessels up to 80 feet in length for general repairs. A pontoon bridge crosses the bayou about 29.4 miles above the entrance; this is 2 miles below Cut Off.

At **Cut Off,** a town 31.5 miles above the entrance, there is a pontoon bridge. A shipyard on the west bank has several marine railways that can haul out vessels up to 60 feet in length for general repairs. Gasoline, diesel fuel, water, ice, and limited supplies are available.

At **Larose,** a town about 34 miles above the mouth of the bayou, another pontoon bridge crosses Bayou Lafourche. The Gulf Intracoastal Waterway crosses the bayou at Larose. There are two wharves on the south bank west of the intersection. There are two shipyards at Larose. One on the south bank of the bayou just below the junction does hull, engine, and electronic repairs. The other on the east bank of the Intracoastal Waterway north of the junction does hull repairs only. There is a service wharf here also. Both yards have two marine railways, the largest of which can haul out craft up to 70 feet in length. Machine shop facilities and complete marine radio service are available. Fuel, water, ice, and marine supplies can be obtained. There is a shipyard on the north bank of the bayou just above the intersection that builds barges. An overhead power cable about 0.5 mile above Larose has a clearance of 68 feet.

Valentine, about 39 miles above the entrance, has a large sugar mill. A pontoon bridge crosses the bayou at Valentine. A shipyard that builds steel tugs is on the west bank about 2 miles above Valentine; marine railways are at the yard.

Lockport, about 44 miles above the mouth, is a town at the intersection of the Company Canal with the bayou. The highway bridge just below the intersection has a swing span with a clearance of 6 feet. A pontoon bridge crosses the Company Canal close northeast of the intersection and a vertical-lift bridge crosses the canal about 0.2 mile southwest of the intersection. The lift bridge has a clearance of 50 feet up and 5 feet down. There is a large shipyard and a boatyard at Lockport. The shipyard builds vessels, tugs, and barges up to 150 feet in length and has marine railways that can haul out 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. An overhead power cable across Bayou Lafourche, 0.5 mile above Lockport, has a clearance of 60 feet.

A pontoon bridge crosses the bayou at **Mathews** about 47 miles above the entrance. An overhead power cable 0.4 mile above the bridge has a clearance of 65 feet.

U.S. Route 90 highway bridge, crossing the bayou at Raceland about 4 miles above Mathews, has a vertical-lift span with clearances of 59 feet up and 7 feet down; overhead power cables near Raceland have minimum clearances of 62 feet.

Charts 1273, 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 western approach. Both the east and west entrances to the canal are marked by privately-maintained lights.

With a favorable tide about 3½ feet can be carried through Caminada Bay, the eastern approach, and about 3 feet across **Little Lake,** the westerly 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 1274.—Greys Canal, 3 miles south 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, 8 feet can be taken through a locally marked channel. Bayou Blue also joins Little Lake.

Havoline Canal, 7 miles south of Leeville, is a dredged cut with a reported controlling depth of 7 feet which extends from Bayou Lafourche into Timbalier Bay. The southwestern approach channel leading to the cut is marked by privately-maintained lights. Havoline Canal is open to the public without charge.

Timbalier and **Terrebonne Bays** 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 6 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. Numerous oil well structures are located within this area.

Lake Barre is northward of Terrebonne Bay. The general depths are 4 to 6 feet. **Seabreeze Pass** provides a passage marked by a light into Bayou Terrebonne and to **Lake la Graisse** at the northwest end of Terrebonne Bay; **Pass Barre** connects with Terrebonne Bay; and at the northeast corner of the bay, several passages lead to Lake Felicity.

Old Lady Lake is a shoal body of water between Lake Raccourci and Lake Barre and southward 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 north of Old Lady Lake. Many bayous and passes connect with adjacent bays and lakes. Most of the bayous to the east and north of Lake Felicity are used as oyster bedding grounds and, accordingly, contain numerous 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 entrances to Lake Felicity and Bayou Jean Lacroix are marked by lights and the channel across the lake is marked by buoys.

Lake Raccourci is a shoal body of water lying northward 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 in the vicinity of Caillou Island, **Brush Island,** and East Timbalier Island. Mariners should use the waters in this area only with local knowledge.

Secondary channels in Timbalier and Terrebonne Bays.—A channel marked by privately-maintained buoys, leads westward across Timbalier and Terrebonne Bays to Troiscent Piquets Bay and into Bayou Petit Caillou, southward to Cat Island Pass, or westward into Lake Pelto.

From the east and west channel crossing Terrebone and Timbalier Bays, a channel extends northeastward into Lake Raccourci passing through Philo Brice Islands northwest of the light and thence continuing eastward to the southwest 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 northward across the central portion of Terrebonne Bay to **Pass Barre,** which connects with Lake Barre. A depth of about 7 feet can be carried to Lake Barre.

The route to Bayou Terrebonne is through the southern entrance to Lake la Graisse. The channel through the lake is marked by lights and buoys and a depth of about 5 feet can be carried into the bayou. A second route by Bayou Terrebonne from Lake Barre through Seabreeze Pass is good for 4½ feet.

A route leads from Seabreeze Pass across Lake Barre, which is partly marked by privately-maintained lights and buoys into Lake Felicity, thence to Grand Pass Felicity, and across Lake Raccourci to Bayou Blue or Deep Bayou and thence through either Southwest Louisiana Canal or Greys Canal to Bayou Lafourche. A marked channel leads through Lake Chien to Bayou Jean Lacroix.

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 easterly end of Timbalier Island has been washed away and the west end built up to the westward a like amount. East Timbalier Island has built up especially to the westward all but closing Grand Pass Timbalier.

Grand Pass Timbalier, at the west end of East Timbalier Island, has been filling up and is little used. The channel is narrow and winding, and difficult to navigate; with local knowledge about 4 feet can be taken through the pass into Timbalier Bay. Timbalier Daybeacon, an abandoned lighthouse, is a white square tower about 56 feet high on a wooden dwelling on piles, on the west side of the pass. About 0.4 mile east-northeast of the abandoned lighthouse, part of the steel framework of a wrecked lighthouse projects about 10 feet above water.

Little Pass Timbalier, two miles westward 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 western branch being considered the safer and more generally used. It is reported that this pass is working westward.

Caillou Pass is a shallow passage between the north side of Timbalier Island and Caillou Island; local knowledge is advised.

Vessels should enter Terrebonne Bay through Cat Island Safety Fairway, referred to in the regulations as Caillou Pass Safety Fairway; see 209.135, chapter 2.

Cat Island Pass, 60 miles westward 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 16 feet in September 1966. Anchorage area inside the bay has depths of 12 to 21 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.

Charts 1274, 1050, 879.—Houma Navigation Canal extends in a northwesterly direction from above Cat Island Pass for about 8 miles across Terrebonne Bay, thence

in a land cut in a northerly direction for about 23 miles to an intersection with the Gulf Intracoastal Waterway about a mile below the city of Houma. The canal, dredged by the Parish of Terrebonne to a depth of 15 feet, is now maintained by the Corps of Engineers. In January–March 1966, the controlling depth in the dredged channel from above Cat Island Pass to the Intracoastal Waterway was 12 feet, thence 9 feet at the junction with 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 pontoon 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.

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 northward 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 August 1964, the controlling depth was 10 feet from the Intracoastal Waterway to its upper crossing of Houma Navigation Canal, thence 7 feet southward to its junction with Bayou Pelton.

A highway bridge crossing the bayou about 0.5 mile south of the Intracoastal Waterway has a vertical lift-span with clearances of 3 feet down and 73 feet up. An overhead power cable about 0.3 mile south 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. There is a large shipyard on the bayou.

Bayou Pelton, in 1964, had a controlling depth of 4½ feet from Bayou la Carpe to its junction with Bayou Grand Caillou. An overhead power cable crossing at the junction of Bayou la Carpe with Bayou Pelton just east of the Houma Navigation Canal has a clearance of 68 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. There is a large oil terminal and supply base on the east bank of the Intracoastal Waterway, and a large shipyard on Bayou la Carpe that builds steel vessels and barges up to 300 feet in length. The largest of two marine railways at the yard can handle craft up to 225 feet in length 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. Houma Air Force Base and airport are southeast of the city. Gasoline, diesel fuel, water, ice, berthage, and marine supplies of all kinds are obtainable.

Bayou Terrebonne is navigable to the town of Houma, 33 miles above its southern mouth. For the lower 4 miles of its course, the bayou flows through a long, narrow delta separating Lake Barre and **Lakes Jean Pierre and Saint Jean Baptiste.** At its southern end, Bayou Terrebonne empties into Pass Barre. From each of these are several entrances into the bayou. **Seabreeze Pass,** connecting Lake Barre and Lake la Graisse, crosses the northern end of the delta and provides the main entrance into the bayou from both Lake Barre and Terrebonne Bay.

The Federal project depth is 6 feet from Bush Canal to Houma. In September 1962, the controlling depth was 3 feet from Lake Barre Light through the delta to Seabreeze Pass, thence in October 1965, 7 feet to Bush Canal, thence 6 feet to the Intracoastal Waterway through Company Canal at Bourg, thence through the Intracoastal Waterway to the junction with Bayou Terrebonne, thence in April 1963, 4 feet westward in the bayou to the head of navigation at the site of a proposed dam at New Orleans Boulevard in Houma.

Below Seabreeze Pass a depth of about 3 feet can be carried in the bayou to Lake Barre Bar Light. Across this section, **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 buoys mark the entrances to the bayou from Lake la Graisse and from Lake Barre.

There is considerable barge traffic on Bayou Terrebonne 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 east 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 4 miles below Houma. At Bourg, 8 miles below Houma, a section of the **Company Canal,** known as **Bourg Canal,** furnishes a cutoff between the bayou and the Intracoastal Waterway, good for 6 feet in October 1965. 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 overheard cables with minimum clearance of 60 feet.

At **Lapeyrouse,** about 14 miles above the entrance, an oil company has a repair yard and construction camp. Marine ways and repair facilities are restricted to company and charted vessels.

At **Port Barre,** about 16 miles above the entrance, there are facilities for launching outboard motor boats.

At **Montegut,** about 20 miles above the entrance, there are boatyards with marine railways capable of hauling out craft up to 40 feet in length for general repairs; a machine shop is also available. 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. 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 45 feet and a clearance of 7 feet. A dock and a store are at the bridge. Fuel and some supplies can be obtained.

A highway bridge crossing the bayou at **Bourg,** about 25 miles above the entrance and just above the Bourg (Company) Canal, has a swing span with a channel width of 40 feet and a clearance of 5 feet. The highway bridge crossing Bourg (Company) Canal at Bourg has a vertical-lift span with clearances of 5 feet down and 50 feet up. Overhead power cables in the vicinity of the bridge have minimum clearances of 80 feet.

The highway bridge crossing the bayou at **Presquile,** about 27 miles above the entrance, has a vertical-lift span with a channel width of 45 feet and clearances of 3 feet down and 48 feet up; see **203.245,** chapter 2, for **draw-span regulations.** A highway bridge crossing the bayou at **Mechanicville** has a 40-foot vertical-lift span with clearances of 3 feet down and 47 feet up. The highway bridge just east of Houma has a swing span with a channel width of 40 feet and a clearance of 3 feet. An overhead power cable close west of the bridge has a clearance of 70 feet.

Bayou Petit Caillou empties into **Troiscent Piquets Bay** on the west side of Terrebonne Bay, about 5 miles north of Wine Island Pass. A light marks the south side of the passage between Terrebonne and Troiscent Piquets Bays. Off the mouth of the bayou the controlling depth is about 4½ feet. The controlling depth is about 6 feet to Cocodrie; thence 4 feet, in March 1966, to Boudreaux Canal, and thence 3 feet to its junction with Bayou Terrebonne.

Bayou Petit Caillou is 29 miles in length to its junction with Bayou Terrebonne 4 miles east of Houma. Several canals enter the bayou: Bush Canal leading to Bayou Terrebonne, and Boudreaux and **Robinson Canals** 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.

The lower portion of Bayou Petit Caillou is used considerably by local oystermen and fishermen. There is considerable commerce on the bayou in petroleum products, and oil well pipe casing, machinery, and supplies.

A highway extends south along the west shore to **Cocodrie,** 6 miles above the mouth of the bayou. There is an oil company base and wharf on the bayou at Cocodrie, and a fishing lodge and wharf on Rabbit Bayou about 1.6 miles above it, where fuel, berthage, a ramp, and some supplies are available.

Robinson Canal enters the bayou from westward 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 eastward about 2.3 miles above Robinson Canal. At **Boudreaux Canal,** 15 miles above the mouth, is a shrimp and oyster cannery.

There are three boatyards in the vicinity of **Chauvin.** Boats up to 60 feet in length can be hauled out for general repairs. One has a machine shop. Gasoline, diesel fuel, lubricants, water, ice, and provisions can be obtained at several places along the bayou.

Four drawbridges cross the waterway between the mouth and the junction with Bayou Terrebonne. The bridges with swing spans having a minimum width of 40 feet and minimum clearance of 4 feet, and the limiting clearances at the lift bridges are 3 feet down and 48 feet up. Overhead power cables crossing the waterway have minimum clearances of 60 feet.

The approach to Bayou Petit Caillou through Troiscent Piquets Bay has been described earlier in this chapter under Havoline Canal.

A channel from Bayou Petit Caillou through Boudreaux Canal, **Lake Boudreaux** and **Bayou Dulac** to Bayou Grand Caillou is marked with lights and daybeacons. 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 west of Cat Island Pass, and forms a passage between Wine Island and Isle Dernieres from the Gulf to Lake Pelto and Terrebonne Bay. The pass has depths of 7 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 west 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 eastward and the ebb westward.

Whiskey Pass forms another passage from the Gulf to Lake Pelto through Isles Dernieres. The depths are 4 to 5 feet at the north end of the unmarked 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 **Pas la Poule** which is good for a draft of 3 to 4 feet is marked by privately maintained buoys.

Lake Pelto, west of Terrebonne Bay and north 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 westward through Lake Pelto and **Caillou Boca** to Caillou Bay. The channel is marked by lights and buoys.

Charts 1050, 1274, 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 north and east of **Raccoon Point** at the western end of Isles Dernieres. An anchorage site with a depth of 7 to 8 feet is close inside Raccoon Point.

Coupe Colin (Western Pass), 3 miles east 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 north of Raccoon Point. **Bayou Grand Caillou Entrance Light 2 (29°09.6′ N., 90°57.8′ W.),** 17 feet above the water and shown from a red triangular daymark on a dolphin, about 1.3 miles southwest of the entrance, marks the entrance to the bayou. An approach channel is marked by unlighted buoys for 2.8 miles southwestward 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. Federal project depths are 5 feet from Bayou Dulac through Bayou Grand Caillou and Bayou Pelton to the intersection of Bayou la Carpe and the Houma Navigation Canal, and thence 10 feet from this point to the Intracoastal Waterway at Houma. In 1964, project depths were available from Dulac through Bayou Grand Caillou to Bayou Pelton thence 4½ feet through Bayou Pelton to the intersection of Bayou la Carpe and Houma Navigation Canal, and thence project depths to the Intracoastal Waterway at Houma.

State Highway 57 extends south along the east bank of Bayou Grand Caillou to below Dulac and connects with State Highway 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. The highway bridge over Bayou Dulac, at Dulac, has a swing span with a channel width of 41 feet and a clearance of 4 feet. Fixed bridges crossing Bayou Grand Caillou above that have a minimum horizontal clearance of 15 feet and vertical clearance of 1 foot.

There is considerable commerce on the bayou in seafood products, shell, petroleum products, clays and drilling mud, oil well pipe casing, machinery, and supplies, and industrial chemicals.

There is an oil company base and wharf at Dulac. A boatyard has two marine railways that can haul out craft up to 90 feet in length for hull and engine repairs. There are numerous shrimp docks, canneries, and ice plants on the bayou between Dulac and Boudreaux. 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 haul out craft up to 50 feet in length for hull and engine repairs. A machine shop is closeby.

Ashland Canal which connects Bayou Grand Caillou with Bayou la Carpe has a controlling depth of about 6 feet.

Grand Bayou du Large extends between **Caillou Lake** and Caillou Bay. Depths of 5 to 6 feet are off the south 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 months. There are several overhead cables crossing the bayou south 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, an improved highway, extends south along the east side of the bayou for about a mile below Falgout Canal. This section of the bayou is thickly populated and there are several places where gasoline and provisions are available. There is a small boatyard at **Falgout Cove,** just below Falgout Canal, with marine ways capable of hauling out vessels up to 25 feet in length for hull and minor engine repairs, and several facilities for launching outboard motor craft. Gasoline, diesel fuel, water, ice, and some marine supplies are available.

The highway drawbridges in the Theriot area have a minimum channel width of 20 feet and a minimum clearance of 3 feet. Usually, these bridges are left open. Above Theriot, the bayou narrows and is crossed by fixed bridges with little or no clearance and navigation is restricted to small craft.

Bayou du Large empties into **Taylors Bayou** which flows into the Gulf 4 miles west of Bayou Grand Caillou entrance. A privately-maintained daybeacon marks the mouth of Taylors Bayou.

Oyster Bayou, 13 miles northwestward 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 eastward. Through the bayou are several oyster reefs which usually are marked by pipes.

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 east side of the entrance.

The route across the south end of Fourleague Bay is marked by lights and by a line of closely-spaced daybeacons. Boats follow close along the east 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 east 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 1274, 1275.—Ship Shoal, lying about 10 miles southward of Raccoon Point, is about 32 miles long in a general east-and-west direction, 1 to 3 miles wide, and has depths ranging from 5 to 18 feet. For 6 miles of its length it has a depth of less than 12 feet. 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 be avoided best by using the lead or fathometer. Heavy rips have been reported about 15 miles southwest of Ship Shoal.

Oil drilling structures, marked by lights, are located on all sides of Ship Shoal up to 60 miles offshore and throughout the delta section. Wrecks and other obstructions, covered and unmarked, may exist on the shoal and in the approaches thereto; mariners are advised to exercise extreme caution.

Ship Shoal Abandoned Lighthouse (28°54.8′ N., 91°04.3′ W.), a 105-foot brown pyramidal skeleton structure enclosing a stair cylinder and a cylindrical dwelling on piles, is in 14 feet of water about 86 miles westward of Southwest Pass. Four quick flashing white lights mark the structure. A lighted whistle buoy is on the 10-fathom curve 18.5 miles southward of the daybeacon.

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.

Chart 1276.—Atchafalaya Bay is a large indentation in the coast of Louisiana 112 miles westward of Southwest Pass, Mississippi River. The bay is about 28 miles long in nearly an east-and-west 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 eastern 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 north shore of the bay northward 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 westerly side of the dredged channel. A radiobeacon and fog signal are at the light.

Southwest Reef Daybeacon, 6.5 miles west of Point au Fer Reef Light, is a black square pyramidal tower, 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 westward.

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 northerly direction from the Gulf to the mouth of the Lower Atchafalaya River. Federal project depth is 20 feet for the dredged channel from the 20-foot curve in the Gulf. In September 1966, the controlling depth was 12 feet to the mouth of the Lower Atchafalaya River. Depths in the river are about 22 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 northerly winds and extreme low tides.

A cut-off channel from the mouth of Lower Atchafalaya River westward 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 and are covered at high water, and accordingly constitute a danger to navigation.

Deer Island, on the east side of the Lower Atchafalaya River entrance, can be approached through a short dredged channel just southwest of the island. The channel has a depth of 7 feet.

Fog is most frequent during January, February, and March. Southerly winds bring it in and northerly 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. Northerly winds lower the water surface at Morgan City as much as 1 foot, and southeasterly 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 southward into the northeastern corner of Atchafalaya Bay; it is the outlet for an extensive system of southern 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 extends northward from Atchafalaya Bay about 20 miles to Sixmile Lake, and has a crooked channel with depths from 24 to 125 feet over widths from 300 to 600 yards with deepest water usually in midstream.

Bayou Shaffer is a deep water passage branching northeastward to Bayou Boeuf from Sweetbay Lake in the Lower Atchafalaya. An overhead power cable with clearance of 130 feet crosses Bayou Shaffer near the junction with Bayou Boeuf. The bayou serves as a cutoff for vessels bound eastward from Atchafalaya Bay to the Gulf Intracoastal Waterway.

Avoca Island Cutoff is a narrow channel joining Lower Atchafalaya River with Bayou Chene. The cutoff enters the east side of the river about 4 miles above the mouth. The controlling depth was 12 feet in July 1964.

Little Wax Bayou, which branches westward 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 eastward at Morgan City. The Intracoastal Waterway follows Lower Atchafalaya southward for 2.5 miles to Little Wax Bayou.

An alternate route of the Intracoastal Waterway, from Morgan City northward to Port Allen on the Mississippi River, and Bayou Grosse Tete, is described in chapter 12.

Charts 880, 881.—Berwick Bay is the section of the Lower Atchafalaya from Bayou Boeuf northward to Sixmile Lake. Morgan City is on the east bank of the bay and Berwick on the west bank.

Two bridges across Berwick Bay link Morgan City and Berwick. The Southern Pacific railroad drawbridge has a swing span with a clearance of 4 feet. U.S. Route 90 highway bridge has three 583-foot fixed spans with a clearance of 53 feet in the center span and 50 feet in the two adjacent spans. The centers of these spans are marked by green lights at night. Special regulations governing navigation through Berwick Bay in the vicinity of the railroad bridge are given in **207.240,** chapter 2.

Port of Morgan City is at the confluence of Atchafalaya River and the Gulf Intracoastal Waterway about 35 miles from deepwater in the Gulf of Mexico. The port limits include the eastern quarter of the Parish of St. Marys from 91°17.4′ W. to Bayous Boeuf and Chene, and from Six Mile 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 east bank 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, sulphur, salt, menhaden, and some agricultural in the raising of rice and sugar. The Young Memorial Vocational Training Center in the city trains young men in navigation, seamanship, marine and electrical engineering and related subjects. The training ship PELICAN STATE is based at Morgan City. There is a large ice plant and a cold storage plant in the city.

There are tugs up to 1,000 hp. operating out of Morgan City. An outpatient office is at Morgan City; the nearest U.S. Public Health Service hospital is at New Orleans, but there is a private hospital at Morgan City. Vessels are boarded by both Customs and Quarantine Officers at the various wharves along the waterfront. Morgan City is a **customs port of entry** and marine documents are issued.

See appendix for **storm warning displays.**

There are several ship building and repair yards in Morgan City and on Bayou Boeuf, one on Bayou Black at Avondale, and one at Patterson. Barges, tugs, crew boats, and shrimp boats are built. There are floating drydocks and marine railways, machine, and other shops at the yards. The largest floating drydock can haul out vessels up to 200 feet in length and barges up to 250 feet. Hull, engine, and electronic repairs can be made. A yard on Bayou Boeuf builds offshore oil well structures. The smaller yards build and repair tugs, shrimp and other fishing craft. There is a 250-foot floating crane and many smaller cranes at the yards. Gasoline, diesel fuel, water, ice, and marine supplies are available. There are no marinas in Morgan City and dockage is limited to the fueling piers, fishing company docks, and oil company docks.

Berwick, opposite Morgan City on the west bank of Berwick Bay, has several seafood plants; a fertilizer and chemical plant and a shipyard. The yard has marine railways and a floating drydock that can haul out a 165-foot vessel or barges up to 250 feet in length 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 west of the city at Patterson. Numerous truck lines operate out of the port.

Charts 880, 882, 1050, 1051.—Bayou Teche is a navigable waterway in southern Louisiana parallel to and 35 miles westward of the Mississippi River, meandering for about 120 miles northwesterly from its eastern end at Berwick Lock to its sources in St. Landrys Parish. Bayou Teche has been dammed off from Berwick Bay at Berwick Lock about 1.5 miles above Morgan City. The

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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 the bayou in seafood, shell, sugar, molasses, logs and lumber, petroleum products, building cement, sand and gravel, oilwell 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 and logs are shipped as far as Garden City.

The main State highway between New Orleans and Lake Charles follows the bayou through the principal towns.

A Federal project for Bayou Teche provides for a channel 8 feet deep from Berwick Lock to New Iberia, 47 miles, thence 6 feet for 15 miles to Keystone Lock, thence 6 feet for 30 miles to Arnaudville. In 1966–1967, the controlling depths were 9 feet from Atchafalaya River through Berwick Lock, thence 6 feet to New Iberia, thence 5½ feet to Breaux Bridge, about 77 miles above Berwick Lock, and thence about 5 feet to Arnaudville.

An overhead power cable with clearance of 60 feet crosses the bayou at **Idlewild** about 5 miles above Berwick Lock. **Patterson,** 6 miles above the lock, has a shipyard with a machine shop and four marine ways, and vessels up to 150 feet in length can be hauled out for general repairs. Diesel fuel and ice are available.

A highway bridge about 7 miles above Berwick Lock has a swing span with a clearance of 6 feet. 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 pontoon bridge is at **Avalon** about 10 miles above the lock.

Bayou Teche crosses the Wax Lake Outlet channel at **Calumet,** about 12 miles above Berwick Lock. Floodgates closed on both sides of Wax Lake Outlet during high water stages also closes the bayou to through traffic; opened width is 45 feet through the floodgates. The overhead power cable just east of the floodgate has a clearance of 60 feet. The east floodgate is closed to navigation. Local information should be obtained for alternate routes to Bayou Teche.

About 14 miles above Berwick Lock a highway bridge has a swing span with a clearance of 4 feet, and at **Centerville** about 17 miles above the lock there is a highway bridge with a swing span having a clearance of 4 feet.

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.

Hanson Canal is 20.2 miles above Berwick Lock; little used for navigation, it leads southward from Bayou Teche at Garden City, turns westward and enters and follows Bayou Portage to the Intracoastal Waterway in Bayou Bartholomew; the controlling depth is about 5 feet. Near the junction of the canal and Bayou Teche there is a lock 937 feet long, 26½ feet wide, and 5 feet deep; three bridges with fixed channel spans having a minimum width of 29 feet and clearance of 6 feet; overhead pipelines with clearance of 7 feet; and overhead power cables with clearance of 35 feet.

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,** southwest of Franklin, leads into Bayou Portage and connects with the Intracoastal Waterway at Bayou Bartholomew and had a controlling depth of 4 feet in July 1966. There is a highway bridge crossing the canal with a swing span having a clearance of 7 feet. Overhead power cables crossing the canal have a clearance of 60 feet.

At the town of Franklin a highway bridge with a swing span has a clearance of 2 feet. An overhead power cable just north of the bridge has a clearance of 60 feet.

A highway bridge with a swing span having a clearance of 8 feet crosses Bayou Teche, 22.5 miles above Berwick Lock. A privately owned pontoon bridge is about 3.5 miles above the highway bridge. The railroad bridge that crosses the bayou about 26.5 miles above the mouth has a swing span with a width of 49 feet and a clearance of 4 feet. A highway bridge with a swing span having a clearance of 6 feet crosses the bayou 27 miles above the lock. A pontoon bridge is about 2 miles above the highway bridge. Several more bridges with swing spans cross the bayou between 31.1 and 48.1 miles above the lock; minimum clearance is 4 feet. Between Franklin and Jeanerette several overhead power cables cross the bayou; least clearance is 50 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.

A guy cable near **Olivier** that has a clearance of 68 feet can be removed for vessels requiring greater clearance; 24 hours advance notice must be given the Orange Grove Sugar Company, Inc., New Iberia. The highway bridge that crosses the bayou at Olivier about 50 miles above Berwick Lock has a swing span with a clearance of 5 feet.

Between Jeanerette and New Iberia there are several overhead power cables that cross the bayou; least clearance is 50 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, several small manufacturing industries, and is a supply center for the oil development of the surrounding area. There is a hospital at New Iberia.

Several highway bridges with swing spans and one with a bascule span cross the bayou at New Iberia; least clearance is 4 feet.

The **Port of New Iberia** is located 5 miles south of New Iberia, on the Commercial Canal which connects with the Intracoastal Waterway through **Rodere Canal,** the **New Iberia Southern Drainage Canal, Wilkins Canal,** and Bayou Carlin. The canal is 125 feet wide and in March 1965, was reported to have a controlling depth of 12 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 north of the Intracoastal Waterway and is about 8.5 miles from Weeks Bay and about 35 miles from deepwater in the Gulf. There are two slips at the port and a small turning basin, all of which are reported to have been dredged to 18 feet. The principal industries located in the port area are shell, grain, cement oil well rig construction, machinery and supplies, a pipe coating firm, and shipbuilding. There are loading and docking facilities at the public dock and at the public boat slip about 0.5 mile south of the public dock. Boat stalls and sheds are available. Gasoline and water are obtainable at the port. A shipyard builds and repairs tugs and barges, and a boatyard has marine ways capable of hauling out vessels up to 70 feet in length for general repairs.

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. Overhead power cables with a clearance of 65 feet cross Commercial Canal at two places.

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. Overhead power cables crossing the bayou between New Iberia and Loreauville have a least clearance of 60 feet.

A shipbuilding plant on the west bank above **Loreauville,** about 8 miles above New Iberia, constructs steel and aluminum hull tugs, crew boats, and barges up to 100 feet in length. In an emergency they can haul out boats up to 40 feet in length for hull 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. Several overhead power cables cross the bayou between Loreauville and Keystone Lock; least 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. 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.

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.

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 **203.245,** chapter 2, for **drawspan regulations.**

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; overhead power cables, about 50 feet.

The Lower Atchafalaya River leads northward from Berwick Bay through Stouts Pass to Sixmile Lake. The marked channel northward through **Sixmile Lake** and **Grand Lake** is part of the Atchafalaya River navigation project discussed in chapter 12.

Wax Lake Outlet, the deep drainage canal south-southwestward 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 southward of Bayou Teche. An overhead power cable about 150 yards south of these bridges has a clearance of 60 feet.

Chart 1276.—Little Wax Bayou, branching westward 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 northern end of the bayou has been straightened by dredged cuts to form the route of the Intracoastal Waterway westward 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 western part of the bay.

Charts 1051, 1276, 1277.—Marsh Island, on the south side of Vermilion Bay and west 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 south point of the island. The foul area should not be entered without local knowledge. **Shell Keys,** a low group of small islands 3 miles south-southwest of **Mound Point,** the southernmost point of Marsh Island, are only about 2 feet high.

Trinity Shoal lies about 25 miles southward of Southwest Pass, Vermilion Bay, and 60 miles 285° from Ship Shoal Abandoned Lighthouse. The shoal is about 20 miles long in a west-southwesterly and east-northeasterly direction, and has depths of 11 to 18 feet. It is fairly steep-to on its southern side, the 5- and 10-fathom curves being distant only about 1 and 5 miles, respectively. In calm weather Trinity Shoal can be discerned by a difference in the color of the water; in stormy weather it is indicated by a choppy sea. Owing to its greater depth, the sea does not break so heavily on Trinity Shoal as on Ship Shoal.

Trinity Shoal is marked off the south end of its southwesterly part by a lighted whistle buoy moored in 10 fathoms.

Vessels should approach Southwest Pass through Southwest Pass Safety Fairway; see 209.135, chapter 2.

Southwest Pass extends between the western 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. A buoyed approach channel, dredged to 12 feet in 1965, leads across the bar. Although not difficult to enter, the pass may be difficult to recognize and local assistance is advised.

East Cote Blanche, West Cote Blanche, and **Vermilion Bays** together make up a large body of water extending west-northwestward from the northwest side of Atchafalaya Bay, and are separated from the Gulf by Marsh Island. This water area has a length of about 32 miles, with widths varying from 5 to 15 miles, and depths averaging from 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 northwest shore in West Cote Blanche Bay, and on **Terrapin Reef.**

Boats bound from Atchafalaya Bay to East Cote Blanche Bay generally use **Morrison Cutoff,** which is between **Point Chevreuil** on the east and **Rabbit Island** on the west. 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 northeast 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.

Cote Blanche Island, on the northerly side of West Cote Blanche Bay, is about 70 feet high, presenting on the bay side a reddish-yellow steep bluff. **Ivanhoe Canal,** westward of the island, connects West Cote Blanche Bay with the Intracoastal Waterway. The canal is marked by aids, and has a privately maintained fog signal at the bay entrance. **Cypremort Point,** in Vermilion Bay, is the site of a large summer resort. There are several private slips dredged into the banks. Gasoline, diesel fuel, water, and ice are available. Private mooring slips are available. State Route 319 connects the point with the town of **Cypremort.**

Weeks Island, 204 feet high, is east of **Weeks Bay,** the northeasterly extension of Vermilion Bay. The Intracoastal Waterway passes close along the west side of the island. Two water tanks and the mine buildings make prominent landmarks from the bays; salt is mined on the island. There are rail and highway connections to **Baldwin** on Bayou Teche. A large oil field is on the north side of Weeks Island.

Avery Canal (chart 882) leads northwestward from Vermilion Bay to a junction with Bayou Petite Anse at the Intracoastal Waterway. The entrance is marked by lights and daybeacons. Federal project depth is 7 feet in Avery Canal. In November 1966, the controlling depths were 5½ feet over the bar in Vermilion Bay and 7 feet in Avery Canal.

Bayou Petite Anse has a Federal project depth of 9 feet from the Intracoastal Waterway for about 5.3 miles northward to the fixed highway bridge at the northern end of Avery Island. The controlling depth in the bayou was 4 feet in November 1966. The channel is marked by buoys.

Avery Island is eastward of Bayou Petite Anse, and has a water tank and 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 southward as Avery Island.

About 2.8 miles above the Intracoastal Waterway, **Bayou Carlin** branches northwesterly from Bayou Petite Anse for about 2.5 miles to a junction with Bayou Tigre and Delcambre Canal. **Delcambre Canal** continues northward to **Lake Peigneur.** Bayou Carlin and Delcambre Canal have a Federal project depth of 9 feet for 6.6 miles to Lake Peigneur. In November 1966, the controlling depth was 6½ feet.

Delcambre is on Delcambre Canal, 2 miles south of Lake Peigneur, and is the fishing center for Iberia Parish. There are several seafood processing plants and public wharves at the town. There are two shipyards with marine ways capable of hauling out vessels up to 72 feet in length. 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 Texas and New Orleans railroad bridge has a clearance of zero feet down and the State Route 14 highway bridge has a clearance of 44 feet up. 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 oil piling and other obstructions.

Bayou Tigre is a tortuous and shallow waterway extending from Bayou Carlin to **Erath,** navigated only by small craft at high tide. Four bridges cross this section of the bayou; minimum width is 15 feet, and the bridge with a fixed channel span has a clearance of 3 feet.

Privately-maintained lights and daybeacons in Vermilion Bay mark the entrance channel into **Boston Bayou** about 7.3 miles southwestward of Avery Canal.

Vermilion River, also known as **Bayou Vermilion** and so marked at the bridge crossings, flows from the northward and crosses the Intracoastal Waterway and enters Vermilion Bay through the **Vermilion River Cutoff** (chart

882). A Federal project provides for an 8-foot channel from Vermilion Bay through Vermilion River Cutoff to the Intracoastal Waterway, and thence 9 feet in Vermilion River to Lafayette. In June 1966, project depths were available from the bay to the Intracoastal Waterway; thence in August 1965, project depths were available in Vermilion River for about 19 miles from above the Intracoastal Waterway to the highway bridge at Abbeville, thence 8½ feet for another 3.8 miles, and thence 6½ feet to Pinhook Bridge, about 2 miles below Lafayette. The entrance shoals rapidly after dredging and may be difficult to enter during the winter months when strong winds from the north lower the water in the bay. Lights mark the eastern side of the entrance channel in Vermilion Bay. Mariners are advised that strong currents may be encountered in the river.

A channel, privately maintained and marked by buoys, leads across Vermilion Bay from Southwest Pass to the entrance to Vermilion River Cutoff.

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 is on Vermilion River just north of the Intracoastal Waterway. Several offshore oil well terminals and bases, a fish packing plant and wharf, boat club, and several marinas and boatyards are here. The largest marine railway in the area can handle craft up to 50 feet in length for hull and engine repairs; lifts are also available. Floating cranes up to 250-ton capacity, lifts and marine railways are available for hauling out barges for repairs at the oil company bases. Gasoline, diesel fuel, water, ice, marine and yacht supplies, and open and covered berthage are available. Depths of 5 to 14 feet were reported alongside the berths in 1965.

An overhead power cable with a clearance of 75 feet crosses the river about 2.7 miles above the Intracoastal Waterway.

About 3.2 miles above the waterway, on the west bank, there is a shipyard that builds and repairs tugs, party boats, and barges. The yard has three floating drydocks; the largest is 220 feet in length and can haul out craft up to 250 feet in length for hull and engine repairs. The yard has machine, joiner, and welding shops and a 15-ton mobile crane. 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. An overhead power cable at the town has clearance of 71 feet. About 2 miles above Bancker, an overhead power cable with a clearance of 65 feet crosses the river near the town of Rose Hill.

Perry is a small village about 16 miles above the waterway. State Route 82 highway vertical-lift bridge at Perry has a clearance of 10 feet down and 5 feet up. A shipyard on the west bank just below the bridge has marine ways capable of hauling out tugs and crew boats up to 85 feet in length and 7 feet in draft for general repairs. Marine supplies, ice, and water are available; 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.

On the west bank about 18 miles above the waterway there is a service wharf where tugs and crew boats obtain fuel and supplies. Gasoline, diesel fuel, water, and some supplies are available. On the west bank about 18.5 miles above the waterway is a shipyard that builds and hauls out for repairs wooden and steel crew boats and tugs, and steel barges up to 200 feet in length. Just above the yard the Southern Pacific railroad bridge has a swing span with a clearance of 8 feet.

Abbeville, about 19 miles above the Gulf Intracoastal waterway, is the seat of Vermilion Parish. There are grain elevators, grain driers, warehouses, and several rice mills. 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 two hospitals 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. U.S. Highway 167 and State Routes 14 and 82 pass through the city.

Woodlawn Highway Bridge crossing the river about 27 miles above the waterway has a swing span with a clearance of 13 feet. 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.

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.

Pinhook Highway Bridge about 2 miles below **Lafayette** and about 39.5 miles above the waterway has a swing span with a clearance of 12 feet; see **203.245**, chapter 2, for **drawspan regulations**.

Lafayette, about 42 miles above the Gulf 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 raising. 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 east side of the city. Two bridges cross the bayou at Lafayette; U.S. Route 90 highway bridge has a fixed span with a clearance of 13 feet. A small marina on the east bank just below the bridge has a 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 bayou is at the railroad bridge. The Southern Pacific railroad bridge about 200 yards above the highway bridge has a fixed span with a clearance of 21 feet.

Freshwater Bayou Canal, a new waterway connection between the Gulf of Mexico and the Gulf Intracoastal Waterway, was under construction in 1967. The canal will extend from the 12-foot contour in the Gulf through a dredged channel and a landcut to Freshwater Bayou, thence through Schooner Bayou Cutoff to a junction with the Intracoastal Waterway about a mile west of Intracoastal City. There will be a salt water barrier lock near the Gulf entrance 600 feet long, 84 feet wide, and 16 feet deep. Federal project depth is 12 feet. In 1965, the controlling depth was 10½ feet from the Intracoastal Waterway through Schooner Bayou Cutoff, thence project depths were available to about 6.5 miles below the Intracoastal Waterway, the end of the completed project to-date.

Schooner Bayou (chart 883) empties into the extreme western 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 October 1965, the controlling depth from the Intracoastal Waterway through Schooner Bayou Cutoff and Schooner Bayou to the Schooner Bayou Control Structure was 10½ feet. **Warren Canal, Isle Marrone Canal,** and **North Prong-Schooner Bayou** connect Schooner Bayou with the Intracoastal Waterway to the westward of Vermilion Lock. In March 1964, the controlling depth was 7 feet in North Prong. **Schooner Bayou Canal** is crossed by a highway bridge 3.3 miles east of White Lake. The bridge has a swing span with a clearance of 6 feet. An overhead power cable close westward 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 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 salt water 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 eastward or westward can bypass the floodgates by going through North Prong-Schooner Bayou into the Intracoastal Waterway southeastward 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 1964–October 1965, the controlling depth was 7½ feet from Schooner Bayou Control Structure to White Lake, thence 3 feet through White Lake, Grand Lake, and connecting canals to Mermentau River.

White Lake is 12 miles long, 6 miles wide, and has depths of 4 feet or more over a mud bottom. The east entrance from the lake is marked by a light and the west entrance by a daybeacon, both aids being on the north side of the channel. The course across the lake passes about 0.5 mile off the point in the middle of the north shore of the lake. The channel is not marked.

Approach the east entrance with the line of the Schooner Bayou Canal in range ahead. The channel is narrow and the spoil bank on the south side is marked by stakes. At the west end of the lake, pass about 10 to 15 yards south 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 in depth. On the west side of this lake an earth dike extends along the north 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 southeast end of the lake, the entrance from Collicon Lake leads within 5 to 10 yards along the south 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 easterly 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 northward, and about the same distance off **Umbrella Point,** the second point to northward. From Umbrella Point, pass about 0.25 mile east of Grassy Point, and when beyond this point haul to westward and pass well off the easterly 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 eastward, follows the river for about a mile and exists to westward. The river channel is deep.

A network of canals south from Schooner Bayou to Cheniere au Tigre and west to Pecan Island have been dredged through the marsh. **Sixmile Canal,** a 1.5 mile passage, leaves Schooner Bayou about 1.5 miles east of Schooner Bayou Control Structure and extends southward to Freshwater Bayou Canal. **Belle Isle Bayou** enters Freshwater Bayou Canal about 5.3 miles southward of Schooner Bayou.

Freshwater Bayou and **Louisiana Fur Company Canal** enter Freshwater Bayou Canal from the westward about 10 miles southward of Schooner Bayou. Louisiana Fur Company Canal leads northwestward for about 1.7 miles thence west and north for about 5 miles to the private facilities at a large oil field south of Pecan Island.

Other accesses to this network of canals is through **Deepwater Bayou** which enters Vermilion Bay about 1.5 miles south 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 Island, west 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 west end of Belle Isle Lake.

Cheniere au Tigre, 4 miles south of Belle Isle, is a wooded ridge about 3 miles long with its east end on the Gulf Coast. The 12-foot elevation on the ridge is the highest natural elevation in the locality.

Pecan Island, south of White Lake, is a long, wooded ridge about 10 feet high. **Pecan Island,** a village on the south end of **Pecan Island Canal,** has a few stores with limited supplies. Gasoline may be obtained by portage. A Federal project provides for a channel 5 feet deep from White Lake to Pecan Island. The controlling depth across the bar is about 1 foot. A light shown from a black triangular slatted pile structure marks the northern entrance of the canal. A small cattle-loading pen and ramp are near the head of the canal.

Charts 1051, 1278.—Mermentau River empties into the Gulf of Mexico 86 miles westward of Atchafalaya Bay Entrance and 12.5 miles eastward of Calcasieu Pass. The entrance channel shifts frequently and should be approached with caution. From the Gulf, the Mermentau leads eastward through Lower Mud Lake and Upper Mud Lake, thence northward into the southwesterly side of Grand Lake, out of the north 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 September 1965–November 1966, the controlling depths were 5½ feet over the bar to the Intracoastal Waterway at the north end of Grand Lake, thence 8½ feet to the junction of Bayous Nezpique and des Cannes.

In the Mermentau River below Grand Lake, a drainage canal 13 to 15 feet deep and more than 100 feet wide was dredged in 1947. The lock was abandoned in 1951; dikes that prevent the inflow of salt water have gates that are opened for passing boats.

Numerous aids mark the channel in the Mermentau River north of the Intracoastal Waterway. Ranges and daybeacons mark the lower part of Lake Arthur and buoys mark the upper part. Near the center of the lake, the channel passes through a constriction known as **The Narrows.**

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 west of Grand Cheniere an overhead power cable with a clearance of 72 feet is on the south side of State Route 82 highway bridge which has a swing span having a clearance of 13 feet; about 1 mile west of Grand Cheniere, 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. Overhead power cables cross the river just above Lake Arthur; least clearance is 52 feet.

At Mermentau, the Southern Pacific railroad bridge with a swing span that has a clearance of 10 feet and U.S. Route 90 highway bridge with a fixed channel span having a clearance of 29 feet. 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 vessel shall be made rigid abreast or astern of the barge.

Grand Cheniere, a small settlement on the east bank 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 northwest 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 is on the west bank of Mermentau River just below the railroad bridge. There are slips with barge loading facilities, open storage for oil well pipe casing and supplies, rail facilities, and a 3,600-foot airstrip. There is a shipyard that builds tugs, crew boats, and barges. Two marine railways at the yard can haul out craft up to 250 feet in length for general repairs. Mobile cranes up to 30 tons capacity, machine, metal, welding, and joiner shops are at the yard.

The town of **Jennings** is about 4 miles west of the port. It is an important agriculture center in raising of rice, livestock, and is the center of natural gas production in southwestern Louisiana. Production of fertilizer and cement from sea shell is also important. A hospital is in the town. The Southern Pacific Railroad and bus lines serve the town.

From the head of Mermentau River, Bayous Nezpique and des Cannes were navigable for depths and distances as follows; Bayou Nezpique, 16 feet for about 6.1 miles in November 1966, thence in 1963, 14 feet for about 5.2 miles, thence 4 feet for about 11 miles: Bayou des Cannes, 10 feet for about 4.7 miles and thence 4½ feet for about 2.6 miles, in 1963.

Interstate Route 10 twin highway bridges and State Route 97 highway bridge which has a swing span with a channel width of 40 feet and a clearance of 8 feet cross Bayou Nezpique northeast of Jennings; see **203.245,** chapter 2, for **drawspan regulations.** An overhead telephone cable at the bridge has a clearance of 39 feet.

Bayou des Cannes is crossed at **Evangeline** by the twin fixed spans of Interstate Route 10 about 4 miles

above the mouth and about 7.4 miles above the mouth by a highway bridge with a 45-foot fixed span with a clearance of 1 foot.

Bayou Plaquemine Brule empties into Bayou des Cannes about 1 mile above Mermentau River. A Federal project provides for a 6-foot channel from the mouth of Bayou Plaquemine Brule for about 16 miles to the town of **Crowley.** In January 1964–November 1966, project depth was available. The principal commodities carried on the bayou are shell and rice. There is a large rice mill and elevator at Crowley.

A ferry crosses the bayou southwest of **Egan.** The Southern Pacific railroad crossing the bayou north of **Midland** has a swing span with a channel width of 47 feet and a clearance of 7 feet; **drawspan regulations** are given in **203.245,** chapter 2. A cable ferry crosses the bayou north of **Estherwood.** Overhead power cables crossing the bayou have a least clearance of 50 feet.

Chart 591.—Calcasieu Pass, the outlet of Calcasieu Lake, is about 98 miles westward of Atchafalaya Bay entrance and 78 miles eastward of Galveston entrance. It is the first and only deep-draft channel west of the Mississippi River and east 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 two tall micro-wave masts 2.5 miles east of the pass are very conspicuous from seaward.

Vessels should approach Calcasieu Pass through the Calcasieu Pass Safety Fairway; 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 revised 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. Route 90 bridge. In 1967, dredging was in progress to bring the river channel and the outer extension of the bar channel to project depths. See Notice to Mariners and latest editions of charts for controlling depths.

A lighted whistle buoy marks the outer end of the dredged channel. A lighted **351°49.5′** range leads across the bar between the jetties and into the pass.

Caution.—The **Sea Buoy (Calcasieu Pass Lighted Whistle Buoy 1)** is in **29°36′20″ N., 93°18′27″ W.** Shipmasters are cautioned against mistaking the Sea Buoy for Sabine Bank East End Lighted Whistle Buoy 1, which is 9.8 miles farther to the south, or for Sabine Pass Approach Lighted Whistle Buoy 6, which is 3.5 miles southwestward of the Sea Buoy.

Anchorages.—Large vessels should anchor in the Calcasieu Pass Fairway Anchorages northward and westward at the head 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 two to three miles east of the pilot boarding stations.

Dangers.—Seaward of the jetties, a moderate to strong current sweeps across the channel, normally setting in a westerly direction, however, strong westerly 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 west side of the entrance channel and outer channel except within a mile north and south of Calcasieu Channel Lighted Buoy 11, which area, the Lake Charles Pilots say, has been left clear for the inner Pilot Station No. 1.

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 east and southeast winds and clear with northerly or west winds.

Pilotage is compulsory for all foreign and U.S. vessels under register in foreign trade. Pilotage is optional for U.S. coastwise vessels over 100 tons, who have on board a pilot licensed by the Federal Government. The pilots can be called on radiotelephone on 2738 kcs., and on VHF-156.6 mc. Incoming vessels, or their agents, should notify the Lake Charles Pilots Association in advance of their estimated time of arrival at one of the following designated places, where the pilot will board as requested.

Station No. 1, for vessels drawing 35 feet or less.—In the entrance channel within 2 miles of Calcasieu Channel Lighted Buoy 11 (29°38.8′ N., 93°19.5′ W.).

Stataion 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. At least 12 hours' advance notice is required at these stations.

Vessels are taken to and from Lake Charles day or night. The pilot boat is painted white with the name CALCASIEU PILOT in black on the bow and stern, flies

the code flag P, and is equipped with radiotelephone. The pilot boat is berthed at the south end of Monkey Island just inside the pass, where the pilots maintain a 24-hour lookout.

Pilots can be obtained on advance notice by radiotelegraph or radiotelephone through the Port Arthur Marine Operator to the Lake Charles Pilots Association. Telephone: Lake Charles 436-0372, or HE 3-6296, or through the ship's agent.

Cameron, the seat of Cameron Parish, is a fishing village on the eastern shore of Calcasieu Pass 2.5 miles above its entrance. The village has several shrimp-packing houses, and two large fish-oil plants. Gasoline, diesel fuel, water, ice, and some marine supplies are available.

Small craft may find dock space or can anchor in the bend of the river near Cameron in depths from 12 to 30 feet. An auto ferry crosses the ship channel northwest of Cameron. Another smaller auto ferry connects Cameron with **Monkey Island** formed by the river and the ship channel, crossing the river at Cameron. An overhead power cable with clearance of 84 feet crosses the river at Cameron.

See appendix for **storm warning displays.**

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 entrances at either end is 5 feet, but the bottom is so soft that slightly greater drafts can drag through. A row of piles marks the west side of the channel across the lake. Along the southern end of the lake is an old revetment, partly submerged, extending about 1.5 miles.

Grand Lake, a summer resort on the northeast side of Calcasieu Lake, has boat landings with depths of 2 to 4 feet alongside.

Hackberry, on the northwest side of the lake, is an oil drilling center. Both towns have highway connection to Lake Charles.

Chart 592.—Calcasieu River and Ship Channel.— Northward of Calcasieu Pass, the ship channel cuts across points of land along the west side of Calcasieu Lake to a junction with the Calcasieu River at **Choupique Island.** The channel is straight and is well marked by lights, buoys, daybeacons, and a lighted range at the northern end.

Calcasieu River empties into the northern part of Calcasieu Lake. Three miles above the mouth of the river, the Intracoastal Waterway leads to the eastward, and 2 miles farther, at the west end of **Devils Elbow,** the ship channel connects with the river and at the same place, the Intracoastal Waterway leads to the westward through **Choupique Cutoff.**

Northward of the intersection with the Intracoastal Waterway, the ship channel follows the natural channel of Calcasieu River to the north side of **Moss Lake,** thence bypassing the river through a land cut about 1 mile long to the westerly 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 south end of **Coon Island;** thence, the eastern or right fork for about 1.5 miles to the port docks at Port of Lakes 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 west bank of the Calcasieu River just north of its junction with Choupique Cutoff, is the site of a shipbuilding company which has marine ways that can haul out vessels and barges up to 200 feet in length for general repairs. The yard builds tugs and crew boats, and barges up to 200 feet in length. The yard has metal, joiner, machine, and welding shops, a mobile crane, and tank cleaning and oil barge services.

Haymark Terminal, Vincent Landing, and **Rose Bluff** are sites of extensive oil refining, storage, and shipping on the Calcasieu River below Port of Lake Charles.

A highway bridge at the northern 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 south 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 westward from Rose Bluff Cutoff, is crossed by a highway bridge 1.9 miles above the cutoff. The bridge has a 37-foot removable span with a clearance of 2 feet. About 3.7 miles above the cutoff State Route 108 highway bridge crossing the bayou 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 8 feet; **drawspan regulations** for the bridges are given in **203.245,** chapter 2. 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 eastward from Calcasieu River just south of Port Lake Charles deep-water 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 bayou has marine ways and a basin with covered berthage. Vessels up to 40 feet in length can be hauled out for general repairs. The controlling depth in the bayou was 5½ feet to the first bridge in August 1965.

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 westward off the northwest 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 east bank of Calcasieu River and the north bank of Contraband Bayou. It is the only major port in Western Louisiana. The principal im-

ports are vegetable oils, petroleum, steel products, Chilean nitrate, barite and other ores, fertilizer, and paint pigments. The major exports are dried milk, rice, flour, 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 east bank 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 south of the city and two private airports. McNeese State College is here. Interstate Route 10, and U.S. Route 90, the main east-west highways, pass through the city and U. S. Route 165 and 171 lead north out of the city.

Towage.—Several towing companies maintain offices at the Port of Lake Charles. Tugboats are available for harbor, intracoastal, coastwise, and ocean towing. Divers are available.

Quarantine.—Vessels are boarded by quarantine officers at any of the docks within the port limits. Hospital facilities are available at Lake Charles. The nearest U.S. Public Health Service outpatient clinic is at Port Arthur, Texas.

Customs.—Vessels are boarded by customs officers at the dock. The Customs Service maintains an office at the Port of Lake Charles, a port of entry, and marine documents are issued.

Immigration officials board vessels at any dock within the port limits. The Immigration Office is in the Federal Building.

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 northern end of Calcasieu Lake northward to Westlake.

Wharves.—There are 9 deepwater general cargo berths and one coke handling berth, all with 40 feet alongside, at the Port of Lake Charles Terminal. There are six transit sheds at the berths with 500,000 square feet of storage space equipped with sprinkler systems and one berth with open storage space of 100,000 square feet. The aprons of the wharves are doubled tracked and there are depressed tracks at the loading platforms in rear of the sheds.

There are 14 storage warehouses at the terminal with over 300,000 square feet of storage space for rice, nitrates, and other like commodities. There is a bagging plant at the terminal. The warehouses have rail trackage and truck loading platforms at the ends. There are storage tanks for storage of creosote and coconut and other vegetable oils. The large coke handling plant on Contraband Bayou at the east end of the terminal has bulk handling equipment and storage bins for 150,000 tons of petroleum coke. The port has a large rock grinding facility on the west bank just below U.S. 90 highway bridge for grinding phosphate rock for fertilizer and barite ore for drilling mud. There are numerous berths at the oil terminals and fertilizer and chemical plants along the river and on Coon Island and Clooney Island loops. The port has modern cargo handling equipment. Cargo is usually handled by the ships' tackle at the general cargo berths.

Supplies.—Bunker fuel is obtainable, by prior arrangement, at the numerous oil terminals along the river or by barge at rates of 2,000 to 2,500 barrels per hour. Fresh water is piped to several wharves. Marine hardware, supplies, and provisions are available.

Repairs.—Shipyards and marine railways in the Port of Lake Charles area are at Calcasieu Landing and Contraband Bayou. There are no large drydocks for hauling out deepwater vessels, but minor above-water hull and engine repairs can be made. Large drydocks are available at New Orleans, Beaumont, and Galveston.

Communications.—The Southern Pacific, Missouri Pacific, and Kansas City Southern Railroads serve the city. Eastern Airlines, Trans-Texas Airways, and Trans Air Lines have scheduled service from the Municipal Airport. Several buslines and motor freight lines serve the city. Over 50 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 eastern shore. The river channel extends along the western side of the lake.

Facilities are very limited for small boats. Two piers on Lake Charles have covered storage for about 50 boats. A small pier on the south side of the lake has gasoline, diesel fuel, and facilities for docking a few small boats and skiffs. 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 west bank of the Calcasieu River about 2 miles above the port docks. U.S. Route 90 highway bridge that crosses the river and the northern 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 north 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 west draw openings are protected with fender systems; any craft navigating the east draw opening does so at its own risk. About 0.2 mile above these bridges there is an overhead power cable with clearance of 110 feet. About 6.6 miles above Westlake is an overhead power cable with clearance of 136 feet, and about 7.5 miles above Westlake there is the Southern Pacific railroad bridge which has a swing span with a clearance of 7 feet.

West Fork of Calcasieu River branches westward about 6.5 miles above Westlake. Overhead power cables cross the fork about 3 miles above Calcasieu River, and a cable

ferry and an overhead power cable cross the fork about 4 miles above the river. In 1967, a vertical-lift highway bridge, with a proposed clearance of 14 feet down and 50 feet up, was under construction across the fork about 4 miles above the river; when completed the bridge will replace the existing cable ferry.

Houston River branches westward from the West Fork of Calcasieu River. About a mile above the mouth an overhead cable with a clearance of 61 feet crosses 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 a clearance of 6 feet. See **203.245,** chapter 2, for **drawspan regulations.**

English Bayou branches eastward from the Calcasieu River about 7.5 miles above Westlake. U.S. Route 171 highway bridge with a swing span having a width of 45 feet and a clearance of 2 feet crosses the bayou about 1 mile above its mouth; see **203.245,** chapter 2, for **drawspan regulations.**

At **Moss Bluff,** about 10 miles above Westlake, U.S. Route 171 highway bridge with a vertical-lift span has a clearance of 10 feet down and 45 feet up.

In August 1965–November 1966, Calcasieu River had a controlling depth of 23 feet for about 2.5 miles above Westlake, thence 13 feet to Moss Bluff.

Chart 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 westward 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 south of Calcasieu Pass, marks the eastern end of Sabine Bank.

A lighted bell buoy about 2.2 miles eastward of Sabine Bank Light marks the west side of a 1.5-mile wide passage through the bank. A lighted whistle buoy marks the east side of the passage, known locally as **Hole in the Wall,** the most used passage through the bank; its 32-foot depth may be reduced as much as 3 feet during northers. There are a number of oil well platforms on the eastern part of the bank. They are lighted.

To the southward 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 26-foot shoal about 12 miles southeastward of Sabine Bank Light. These shoals lie near the track line of vessels making the passage through Hole in the Wall from the southeastward.

Northward 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

Chart 1116.—Sabine Pass and its connecting channels comprise an extensive system of deep water routes leading inland as far as Beaumont and Orange, Texas. From Sabine Pass the coast follows a general west-southwesterly direction for 50 miles to Galveston Entrance. Except in the eastern part, deep water extends fairly close inshore. The coast is low and devoid of prominent features, with the exception of High Island. Off the coast, Heald Bank has depths of 25 to 35 feet and constitutes a danger to deep-draft 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 has 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 517, 1279.—Sabine Pass, 244 miles westward of Southwest Pass, Mississippi River, and 50 miles east-northeasterly 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 northward from the Gulf.

Prominent features.—The most prominent objects seen when approaching Sabine Pass are the east jetty light, the pilot depot and the dredging range towers. Also prominent are the 998-foot (KBMT) television tower, entrance range lights, the oil and water tanks west of Sabine Pass, the tall hotel buildings, and a stack at Port Arthur. At night the television tower lights can be seen for a considerable distance.

Sabine Pass East Jetty Light (29°38.7′ N., 93°49.4′ W.), 67 feet above the water, is shown from a red square skeleton structure on piles on a concrete block at the south end of the jetty. A fog signal is at the light and a bell buoy is about 0.2 mile southward of the light.

Sabine Pass radiobeacon is on the west side of the pass at the site of the former Coast Guard lifeboat station about 1.5 miles from the shore end of the jetty. About 0.5 mile above the radiobeacon on the opposite side of the pass is an abandoned lighthouse, a black-and-white horizontally banded 81-foot tower. Sabine Pass Coast Guard station, and the Captain of the Port are at the site of the old quarantine station on the west bank 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 Sabine Pass Safety Fairway or the coastwise 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 southerly direction from shore. The general depths between jetties, outside the channel, are 8 to 16 feet. Federal project depths are 37 feet in the outer bar channel, thence 36 feet through the jetty channel, thence 40 feet to and through Port Arthur Canal, thence 36 feet to and in East and West turning basins at Port Arthur, and thence 36 feet in the channel in Taylor Bayou connecting West basin with Taylor Bayou turning basin. Dredging is in progress to bring the channels and turning basins to a revised project depth of 42 feet in the outer bar channel, and 40 in the jetty channel and turning basins. See Notice to Mariners and latest editions of charts for controlling depths.

Sabine Pass Lighted Whistle Buoy 1 (29°36.2′ N., 93°48.5′ W.), the sea buoy, is on the west side of the entrance to the bar channel, about 2.5 miles southward of Sabine Pass East Jetty Light. A lighted **337°18′** range and three buoys mark the bar channel. A lighted **347°19′** range and lighted and unlighted buoys mark the channel through the jetties. 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 northwesterly about 6 miles to Sabine Lake. The bottom outside the channel for the most part is soft, and vessels can touch without injury. Lighted ranges and lighted aids mark the channel through Sabine Pass and Port Arthur Canal to Port Arthur.

Anchorages.—Deep-draft 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 westward 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 east side of Sabine Pass Channel opposite the town of Sabine Pass; see **202.196**, 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.—Sabine Bank and the offshore oil well structures are the principal dangers when approaching Sabine Pass. In 1965, shoaling to 3 feet less than charted depths was reported eastward of the jetties and, in 1964, depths of from 11 to 25 feet were reported up to 7 miles west-southwestward of the jetties. A dumping ground with a wreck containing explosives and a spoil area is westward of the bar channel. 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 north to easterly winds, a southwesterly to westerly current will be found off the entrance, frequently with a velocity of 1 knot and sometimes as much as 2 knots. Following southerly and southwesterly 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.—The waters are navigable throughout the year. Gulf storms may occur from July to October.

See appendix for **Port Arthur Climatological Table** and **storm warning displays.**

Pilotage is compulsory for all foreign vessels and U.S. Vessels under register in foreign trade. Pilotage is optional for coastwise vessels who 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 west bank at the inner end of the west jetty. The Sabine Pilots take vessels to and from Port Arthur, Beaumont, and Orange. The pilot boat, usually on watch off the seaward end of the jetties, is painted black with white housing, and flies the code flag P. It will come out to vessels making a signal. The pilot boat, depot, and the Port Arthur office are equipped with radiotelephones, VHF, Channel 12, and guard 2738 kcs. All of 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: phone (Beaumont) RA 2-1141, or (Port Arthur) Yukon 5-8847, or through the ship's agents.

Towage.—Vessels usually proceed without assistance through the pass to Port Arthur. Towboats and ocean-going tugs are available at Port Arthur. The towboat companies are equipped to perform wrecking and salvage operations. The tugs are equipped with radiotelephones.

Quarantine.—The quarantine station is at Port Arthur, Texas, and vessels subject to visitation are boarded at the docks.

An outpatient clinic of the U.S. Public Health Service is located in the Post Office and Customhouse at Port Arthur. There are three hospitals in the city.

Customs.—Vessels are boarded upon arrival at berth. Headquarters of the Customs Service is in the Post Office and Customhouse at Port Arthur. Port Arthur and Sabine are ports of entry and marine documents are issued at Port Arthur.

Immigration.—Inspectors board vessels upon arrival at berth. The Immigration Office is in the Post Office and Customhouse.

Texas Bayou, on the west side opposite the abandoned Sabine Pass lighthouse, has facilities for small craft to dock and obtain gasoline, diesel fuel, water, and ice. Fuel, water, ice, and a ramp are available at the old Coast Guard station wharf at the radiobeacon.

Sabine is a village on the west shore of the pass, about 5 miles above the outer end of the jetties. The southerly 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 west shore of the pass about 1.5 miles north of Sabine. Shrimp boats base here.

Sabine Lake has an average depth of about 6 feet in its 15-mile length. At the southern end, where it empties into Sabine Pass, the depth is 4 feet. A highway bridge over the southern end has a swing span with a clearance of 9 feet. The lake is of little commercial importance and 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 southwestern part of Louisiana, empties into the southeastern part of Sabine Lake, directly east of Port Arthur. The entrance to the bayou is marked by a pile. The dredged channel leading to the entrance has filled to the lake bottom level. The controlling 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 western shore of Sabine Lake. Lights and lighted ranges mark the channel to Taylor Bayou.

Port Arthur, an important shipping center, is on the west shore of 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 southwestern 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 Porth 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 several wharves with depths ranging from 10 to 38 feet. Just inside Taylor Bayou are two adjoining turning basins. An oil company has 3,000 feet of docking space on the east side of the easterly basin. At the upper end of the basin are general cargo facilities, including extensive warehouses and sheds, and a total docking space of 6,500 feet in two slips. The grain elevator has a capacity of 3,500,000 bushels. Along the north side of the western basin is a berthing facility for one large vessel. There is a coke loading berth with loading tower. The present wharves are owned and controlled by the various oil companies and the Kansas City Southern Railroad.

A third turning basin is about a mile farther up the bayou. The port is served by adequate rail and highway connections.

Supplies.—Provisions and general supplies can be obtained at the numerous stores 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 docks. Small boats can secure gasoline, oil, water, and supplies along the city waterfront of the Sabine-Neches Canal.

Repairs.—There are two shipyards on the west bank of Sabine-Neches Canal at Port Arthur. The yard, 0.8 mile southwesterly of the highway bridge, has three floating drydocks with a maximum capacity of 4,200 tons and can haul out vessels up to 300 feet in length. The second yard, 4 miles northeasterly of the highway bridge, has a floating drydock and two marine railways; vessels up to 260 feet in length can be hauled out. Barges up to 300 feet in length can be hauled out. Both yards have machine, electrical welding, and carpenter shops, and make general repairs. A 250-ton floating crane is available in the port.

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 airlines. The Jefferson County Airport is northwest 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. Across Taylor Bayou above the turning basin are two adjacent drawbridges with a minimum width of 38 feet and a clearance of 5 feet; see **203.245,** chapter 2, for drawspan regulations. Timber trestles carrying overhead pipelines have 20-foot wide bays and clearances of about 5 feet. In 1966, a fixed bridge was under construction between the existing drawbridges; proposed clearance is 45 feet at the center.

Overhead power cables crossing the bayou have minimum clearance of 30 feet. About 1.7 miles above the bridge is a lock with a length of 200 feet, width of 30 feet, and a depth of 10 feet over the sills; see **207.185,** chapter 2, for navigation regulations.

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, northeasterly to the mouth of Neches River, thence easterly through the open water of the northerly part of Sabine Lake to the mouth of Sabine River. The Federal project depths are 36 feet to the mouth of Neches River; thence 30 feet to the mouth of Sabine River. Dredging is in progress to bring the channels to a revised project depth of 40 feet. See Notice to Mariners and latest editions of charts for controlling depths. Lights, lighted ranges, and buoys mark the canal.

A highway drawbridge crossing the canal at Port Arthur has a bascule span with a clearance of 10 feet. The bridge will not be opened if winds are 35 knots or stronger. In 1967, a fixed highway bridge crossing the Sabine-Neches Canal 1.3 miles south of the highway drawbridge was under construction; authorized vertical clearance is 136 feet.

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 533.—Neches River empties into Sabine Lake from the northwestward and extends in a ship canal 18.5 miles to Beaumont. A Federal project provides for a 36-foot channel to a 34-foot turning basin at Beaumont, thence 30 feet to the Bethlehem Shipyards. Dredging is in progress to bring the river channel and turning basin to revised project depths of 40 feet. See Notice to Mariners and latest editions of charts for controlling depths. Lights, ranges, and buoys mark the river.

Rainbow (State Route 87) highway 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.

On the west bank, at the turn from the canal into the Neches River, there are several basins in which there are a yacht club, a marine service wharf, a shipyard, and a boat club. The yard builds and repairs barges and operates a tank cleaning, and ship bunkering barge service. Gaso-

line, diesel fuel, water, and some supplies are available at the service wharf.

An oil-transfer wharf with 30 feet alongside is on the south bank of Neches River about 0.5 mile west of the bridge. In a long slip, close westward of the wharf that extends about a mile southward from the river, there are two marinas and boatyards. Gasoline, diesel fuel, water, ice, marine supplies, and open and covered berthage are available. There was reported to be 5 feet in the slip in 1965. The largest marine railway can haul out craft up to 50 feet in length for hull and engine repairs or storage.

Port Neches, on the river 5 miles above the mouth, is an important oil refining and chemical center. Three private oil-handling terminals have a total berthing space sufficient for five ships with depths from 30 to 48 feet alongside. Petroleum products, asphalt, and roofing materials are exported. There are rail and highway connections with Port Arthur and Beaumont. There is a layup berth where a ship-repair firm does above water hull and engine repairs to ships and barges. There is a wharf and a ramp, where gasoline and water are available.

The marsh island north 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 eastern Texas, and the home of Lamar State College of Technology. Petroleum, petrochemical, and shipbuilding and repair are the principal industries. Commerce is principally in petroleum products, chemicals, cotton, molasses, wheat, flour, rice, synthetic rubber, shell, newsprint, paper pulp, cement, dry and liquid sulphur, 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 west 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 northward of Deer Bayou. Moorings spaced about 175 feet apart on concrete deadmen are on the northeast 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.

A highway and two railroad bridges cross the improved channel above the turning basin at Beaumont. The first, the Kansas City Southern, is a vertical-lift structure with a clearance of 13 feet down and 147 feet up. The second, the Southern Pacific railroad bridge, has a bascule span with a clearance of 12 feet. The U.S. 90 highway bridge has a fixed span with a clearance of 44 feet.

Three overhead power cables with a clearance of 182 feet cross the river between the fixed bridge and Beaumont.

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.—Tugboats are available at Beaumont.

Quarantine.—Vessels subject to visitation are boarded at the docks. The nearest U.S. Public Health Service outpatient clinic is at Port Arthur; hospital facilities are available at Beaumont at three public and four private hospitals, and several clinics and infirmaries.

Customs.—The Customs Service maintains an office in the Federal Building. Beaumont is a port of entry and marine documents are issued.

Immigration.—The Immigration Service maintains an office in Port Arthur.

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. The Port Authority operates a beltline railroad connecting the terminals with the four trunk railroads serving the city.

Wharves.—The Port of Beaumont general cargo wharves under control of the Port Authority are on the east side of the city on the protruding point on the north bank of the turning basin. On the south bank, at the east entrance to the turning basin, there is a 3-million bushel Port Authority grain elevator with a 600-foot marginal wharf. Close westward of the elevator is a new general cargo wharf with 543 feet of berthing space. There are 10 deepwater ship berths in all, with about 5,000 feet of berthing space, at the Port Authority terminals. All are of the marginal quay type with wide concrete aprons double tracked. The steel and concrete transit sheds on the wharf have over 400,000 square feet of storage space with inside the shed rail trackage, and truck-loading platforms in rear of the sheds. There is about 250,000 square feet of open storage space at the terminals. Warehouses in the rear of the transit sheds have about 160,000 square feet of storage space. There is a 60-ton diesel-powered traveling gantry crane on the south apron of the terminal north of the turning basin, and four other locomotive-type cranes of from 40 to 75 tons capacity under Port Authority jurisdiction. The transit sheds and warehouses are equipped with modern sprinkler systems, and a security watch is maintained at all hours. The Port Director and Superintendent of Docks have offices at the north terminal. The 75-ton floating crane is available at the shipyard.

Along the river below Beaumont are extensive petroleum-handling terminals, the largest ones being facilities of the Mobil Oil and Sun Oil Companies, 1 and 5 miles, respectively, below the turning basin.

Warehouse facilities at the port provide ample storage for general cargo, cotton, and cold storage.

Supplies.—Numerous stores in Beaumont stock provisions, general supplies, and marine hardware. Water of good quality is available at the municipal wharves and at most of the wharves along the river. Bunker C and diesel oil are available at four of the oil terminals along the river; the maximum rate is 7,000 barrels per hour. Fuel can also be supplied by barge at the wharves.

Repairs.—A shipyard on the west side of the river above the railroad bridges builds offshore oil well drilling towers and barges up to 500 feet in length. The yard has a 15,000-ton floating drydock that can lift a vessel up to 640 feet in length for hull and engine repairs. The yard has two gantry cranes that can lift up to 110 tons. The yard has complete machine, welding, pipe, joiner, and metal shops and a 75-ton floating crane is available. The yards equipment can handle most any repair work on wooden or steel vessels. Iron works in the port can handle any kind of foundry or machine work.

Small-craft facilities.—There is a marina and boatyard on Old River, south of **Smith Island,** in the bend below the turning basin. The marine railway can haul out craft up to 55 feet in length. A boatyard at the mouth of **Brakes Bayou** has a marine railway that can haul out craft up to 50 feet in length for hull and engine repairs. There is a marina just above U.S. 90 highway bridge. Gasoline, diesel fuel, water, ice, marine supplies, and covered or open berthage are available at the marinas.

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, emptying into Neches River 9 miles above Beaumont, 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 east side of the bridge has a clearance of 47 feet. Highway and railroad bridges 6.8 miles above the mouth at Voth, Texas, have a minimum channel width of 32 feet and clearance of 15 feet.

Sabine River empties into Sabine Lake from the northward. **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, corn meal, treated timbers and lumber, naval stores, carbon black, steel products, chemicals, petroleum products, alcohol, shell, rubber, powdered milk, and general cargo. Shipbuilding and oil production are the most important industries at Orange.

Channels.—The section of the 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. Vessels drawing 10 feet can be taken 10 or 15 miles above Orange.

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 at Orange, thence 25 feet in the channel around 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.

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.

See appendix for **storm warning displays.**

Pilotage is covered at the beginning of this chapter.

Towage.—Tugs of up to 1,200 hp. are available at Orange.

Quarantine.—Vessels subject to quarantine are boarded at the docks. The nearest U.S. Public Health Service outpatient clinic is at Port Arthur. There are two hospitals in Orange.

Customs.—Orange is a port of entry but marine documents are not issued. Vessels are boarded at the docks.

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 on the wharf 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.—The Port of Orange wharves are on the west side of the Orange Municipal Slip about 2 miles below the city. A modern wharf with five ship berths has 2,400 feet of berthing space. Transit sheds on the wharf have 285,000 square feet of covered storage, and there is 40,000 square feet of open storage available. Depressed tracks are in the rear of the sheds. A paved highway leads to the wharf. In March 1965, a depth of 32 feet was reported alongside. A layup berth is adjacent to the northwest. An oil-handling berth is on the west bank of the channel around Orange Harbor Island just above the lower shipyard.

Supplies.—Provisions and some marine supplies are available. Water of good quality can be obtained either at the municipal wharf or along the riverfront in town. Bunker C and diesel oil are available by barge or truck

from Port Arthur. Small craft can obtain gasoline, diesel fuel, water and some marine supplies at the wharves in Orange.

Repairs.—There are three shipyards at Orange that build vessels, offshore oil rigs, and barges up to 400 feet in length. The largest yard on Orange Harbor Island and on the east bank of the channel around the island has two floating drydocks, a pontoon dock, and a marine railway. The largest drydock of 3,500 tons capacity, 350 feet long and 64 feet wide between wing walls, can lift a vessel up to 375 feet in length. Another shipyard is on the end and the east bank of the point east of the island. The third yard, on the west bank of the channel below the island, has an 1,100-ton floating drydock and two marine railways that can haul out vessels and barges up to 200 feet in length. All three yards have machine, metal, welding, paint, and joiner shops and can carry out above water hull and engine repairs to any size vessel.

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. 90) passes north of the city and State Route 87 connects with Port Arthur over the Rainbow Bridge.

Cow Bayou is a crooked stream flowing into Sabine River 4 miles above Sabine Lake. A Federal project provides for a 13-foot deep channel from Sabine River to a turning basin at the highway bridge at **Orangefield.** In April 1966, the controlling depth in the channel and basin was 11 feet. A draft of 4½ feet can be carried for about 15 miles above the turning basin. Below the basin, two highway bridges over the bayou have swing spans with a clearance of 8 feet; see **203.245,** chapter 2, for **drawspan regulations.** The highway bridge at the upper end of the turning basin at Orangefield has a fixed span with a clearance of 7½ feet. Overhead power and telephone cables at the second bridge (State Route 87) have a clearance of 72 feet. An overhead power cable 0.5 mile west of the bridge has a clearance of 63 feet. An overhead power cable at the Orangefield bridge has a clearance of 72 feet. Overhead power cables 0.5 mile above Orangefield have clearances of 37 feet.

In the side-channel, in the second loop below State Route 87 highway bridge, there is a marine railway that can handle craft up to 60 feet in length for general repairs. There is a shell-handling wharf on the first loop below the bridge. Gasoline and oil are available at the bridge.

Adams Bayou empties into Sabine River 1.5 miles above Cow Bayou. A Federal project provides for a channel 12 feet deep to the first fixed highway bridge. The controlling midchannel depth in the improved portion was 11 feet in August 1965. The highway bridge has a fixed span with a clearance of 11 feet. Just below the bridge is a shipyard with two marine ways capable of hauling out vessels up to 100 feet in length for general repairs. Shell-handling docks are at the bridge. Below the bridge is a yacht basin with covered storage facilities for yachts up to 45 feet long, and open storage for yachts 65 feet in length. Gasoline, diesel fuel, and water are available. Topside and engine repairs are made. Halfway between the Sabine River and the fixed bridge is a large plant of the Dupont Chemical Company; its docks are not available to the public.

Chart 592.—Lake Charles Deepwater Channel, a part of the Intracoastal Waterway, enters Sabine River 0.7 mile above Adams Bayou and extends eastward for 22 miles to the Calcasieu River at a point 13 miles below Lake Charles; in February 1963, the controlling depth was 14 feet. Lake Charles is described in chapter 9.

The Intracoastal Waterway route continues along Sabine River and the Sabine-Neches Canal; see chapter 12.

Chart 1280.—High Island, a small settlement on the mainland about 30 miles westward 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 northward, are two 132-foot towers for a transmission line crossing the Gulf Intracoastal Waterway.

There is a wharf on the west side of the highway bridge over the Intracoastal Waterway. Gasoline, diesel fuel, water, and provisions can be obtained in the town which is a terminus of the Santa Fe Railroad. A long fishing pier extends into the Gulf.

Rollover Pass, about 6.5 miles west-southwestward of High Island, is a shallow inlet from the Gulf into East Bay, which only the smallest of outboard craft use in smooth weather. The pass is bulkheaded with steel piling. The village of **Gilchrist** is on the pass. There is a pier at the inner end of the west bank of the pass and covered boat sheds. Gasoline, water, ice, and a ramp are available at a filling station on the pass. A long fishing pier extends into the Gulf 0.2 mile eastward of the pass.

Heald Bank, lying 34 miles eastward of Galveston and 27 miles offshore, is nearly 5 miles long in a northeast and southwest 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 southeastward. 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 southwestward of the bank. In 1965, a vessel reported striking a submerged object about 5.6 miles southeast of the buoy. Another lighted whistle buoy, about 11 miles southwestward of the bank, marks a 33-foot spot.

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 southwestward direction was observed; a northerly 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 westward direction.

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Chart 1282.—Bolivar Peninsula, southwest of High Island, extends to the Galveston Bay Entrance. The land is low with few prominent features. An abandoned lighthouse, a white and black horizontally banded conical tower 116 feet high, is on the southern 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 by these obstructions.

Galveston Entrance.—Vessels should approach Galveston Bay through Galveston Safety Fairway, or the coastwise Safety Fairway; see 209.135, chapter 2.

Charts 518, 519, 1282, 886, 152–SC.—Galveston Bay is a large irregularly shaped shallow body of water on the coast of Texas about 285 miles westward from Southwest Pass and 690 miles westward from Dry Tortugas. The bay is about 30 miles long in a general north-northeast and south-southwest 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. Northward of Red Fish Bar the bay is known as the Upper Bay and southward as the Lower Bay. The northeastern 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 north jetty extends to Bolivar Peninsula and the south jetty extends to the north end of Galveston Island.

Galveston Harbor is the name generally applied to the larger deep-water area between the jetties extending westward between Bolivar Peninsula on the north and Pelican Island and Galveston Island on the south. On the south and west it connects with the ship channels to Galveston, Texas City, and Houston. **Bolivar Roads** is the western part of the harbor.

Galveston occupies the entire width of the eastern end of **Galveston Island.** The wharves are built along Galveston Channel on the north side of the city, and the south side fronts upon the Gulf from which the city is protected by a concrete seawall 17 feet high. Though widely known as the major seashore resort in the southwest, Galveston is essentially and primarily a place of maritime commerce and industry.

The principal industries consist of shipping, oil refineries, boat building, and repairing, grain elevators, machine shops, cotton compresses, nail and wire plant, tin smelter, food processing, meat packing, fishing, dairying, and agriculture. There is a large modern airport and the Texas Maritime Academy is located in Galveston.

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, sulphuric acid, alcohol, caustic soda, industrial chemicals, liquid and dry sulphur, stone and gravels, ores and concentrates, lead, zinc, copper, aluminum, and bituminous coal, and general cargo.

Both foreign and domestic commerce are extensive, the principal exports are cotton, grain, flour, rice, sulphur, fertilizer chemicals, and metals. The main imports are bananas, 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. In February 1967, the midchannel controlling depth was 12 feet.

Pelican Island, an artificial island with a dike along the southern side, protects Galveston Channel from northers. A Coast Guard buoy depot and a large shipyard are on the island.

Prominent features.—Approaching the entrance to Galveston Bay, among the first objects sighted on a clear day will be the 240-foot grain elevator on the Galveston Channel at 28th Street, the numerous hotels and motels along the seawall, and the tall hotel on Pleasure 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 eastward near the coast will first sight High Island, and those approaching from southwestward will probably first sight the hotels, a long seawall, and then the grain elevator.

Galveston Jetty Light (29°19.7′ N., 94°41.5′ W.), 91 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 south jetty. A fog signal and radiobeacon are at the light. The station also provides special radio-direction-finder calibration service; see Light List for operational information.

Galveston Bay Entrance Channel Lighted Whistle Buoy 1 (29°18.6′ N., 94°38.1′ W.), the sea buoy, is 3.4 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.

Channels.—The Federal project provides for an Entrance Channel and an Outer Bar Channel both dredged to 42 feet from the Gulf to about two miles west 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. A lighted whistle buoy 3.4 miles off the jetties marks the channel entrance. The

channels are well marked by lighted buoys and a lighted entrance range.

Anchorages.—Vessels may anchor off the bar in the **Galveston Safety Anchorages** just inshore of the intersection of the Galveston Safety Fairway with the Coastwise Fairway; see **209.135**, chapter 2, for limits and regulations. Suitable anchorage may be had north of the realigned Inner Bar Channel west of the spoil areas, and also south of the realigned channel. 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 berth at the 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 cluster of three are within an area from 0.6 mile northeast to 1.5 miles east-northeastward of the sea buoy. Vessels picking up a pilot should take care in avoiding the area. A spoil bank is southward of the Outer Bar Channel and an extensive shoal area is southward 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. Galveston is connected with the mainland by three parallel causeways 1.75 miles long, crossing the Intracoastal Waterway at the southwesterly end of Galveston Bay; see chapter 12 for clearances.

Tides and currents.—The diurnal range of tide at Galveston Bay Entrance at the south 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 east and southeast. A strong wind blowing steadily from the north 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. Easterly or southeasterly winds may cause a continuous flood current between the jetties at the entrance for a period of a day or more, and westerly or northwesterly 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.

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.

Weather.—The prevailing winds are northerly from November to March, throughout which time northers occur frequently. These gales, although occasionally blowing with a velocity of over 35 knots, are not dangerous to vessels anywhere close to the coast, as they blow offshore and the sea is not heavy; the Weather Bureau warning of their approach gives vessels ample time for preparation. From April to October the prevailing winds are southerly, and hurricanes occur occasionally; these are dangerous to shipping near the coast because the wind is onshore. Hurricanes of marked violence at Galveston have occurred as follows: September 1875, September 1877, September 1900, August 1915, and September 1961. The wind attained a velocity of 87 knots in August 1915.

See appendix for **Galveston Climatological Tables** and **storm warning displays.**

Pilotage is compulsory for all foreign vessels and U.S. vessels under register in foreign trade. Pilotage is optional for coastwise vessels who have on board a pilot licensed by the Federal government. The Galveston-Texas City pilot boat is painted black and flies the code flag P. It is equipped with VHF radiotelephone and also maintains watch on 2738 kcs. The call sign is WB-3658. The sound and visual signals are four long blasts on the whistle, or flashes on the signal light.

The Houston pilot boat is painted gray and flies the code flag P. It is equipped with VHF radiotelephone and also maintains watch on 2738 kcs. The radio call sign is WC-6250. The sound and visual signals are two long and three short blasts on the whistle or flashes on the signal light.

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 on advance notice by wire, radio, or radiotelephone to the Galveston-Texas City Pilots, Galveston (phone: SO 2-9597); to the Houston Pilots at Galveston (phone: SO 2-2011) or at Houston (phone: MI 5-2441); or through the ship's agents.

Towage.—Towboats and seagoing tugs are available at Galveston.

Quarantine.—The quarantine station is located in the Customhouse. Vessels are boarded at the docks from 6 a.m. to 6 p.m., and will be boarded at any other hour when requested by the vessel's agent, and may be boarded at anchorage if the vessel remains at anchor more than 24 hours.

A Public Health Service hospital is located in Galveston. The medical school and hospital of the University of Texas, and other hospitals, are in the city.

Customs.—Vessels are usually boarded at the docks, but may be boarded at anchorage if a vessel remains at anchor more than 24 hours. The Custom Service maintains an office in the Customhouse. Galveston and Port Bolivar are ports of entry; marine documents are issued at Galveston.

Immigration.—Vessels are usually boarded at the dock, but may be boarded at anchorage if the vessel remains at anchor more than 24 hours. The Immigration Office is in the Post Office Building.

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.—All shipping terminal facilities are located on the city waterfront along the south side of Galveston Channel.

Almost all of the facilities are owned and operated by the Board of Trustees of The Galveston Wharves, a city-owned corporation; their properties extend along the central portion of the city waterfront for about 2 miles and include 32 piers and wharves with total berthing space for 40 ships.

Practically all piers and wharves have transit sheds, there being 30 shipside warehouses with a total storage space of about 4½-million square feet. All have rail and highway connections, and nearly all have shipside tracks. The port has a total storage capacity of 10-million square feet.

The port facilities have been especially developed for the efficient handling of cotton, grain, surphur, sugar, molasses, ore, and bananas, as well as general merchandise. Numerous cotton warehouses with compresses are located near or on the waterfront. Galveston Wharves Elevator B, an electrically operated concrete grain elevator, has a capacity of 6-million bushels, with a sacking plant in connection. The other grain elevator, owned and operated by the Continental Grain Company, has a 1½-million bushel capacity. The larger elevator unloads barges at the rate of 12,000 bushels per hour. Vessels can be loaded at the rate of 120,000 bushels per hour. On one pier there are three electrically operated banana conveyors. There are special facilities for handling sulphur on piers 34 and 35 with storage capacity for 38,000 tons of sulphur and a loading rate of 1,150 tons per hour, which is privately operated. A municipally-owned bulk handling facility is on pier 14. It has a revolving gantry unloading crane with a capacity of 540 tons per hour free digging. There is storage for 19,000 tons of sulphur at the facility which has a loading rate of 400 tons per hour. The Galveston Wharves operate six locomotive type diesel cranes, five of which are of 30-tons and one is of 50 tons capacity. The wharves are served by a 50-mile municipally-owned terminal switching railroad. A 50-ton stiff-leg floating crane is available at the port. There are seafood handling and sand and gravel handling berths.

Supplies.—Provisions and supplies including marine hardware are available. Water for boiler use or drinking may be obtained at all piers. Several companies furnish bunker C fuel and diesel oil from either trucks or barges. The maximum capacity is about 3,000 barrels per hour.

Repairs.—On Pelican Island a ship repair and drydock firm has three floating drydocks; the largest one has a lifting capacity of 15,000 tons. Vessels up to 650 feet in length can be hauled out. A derrick barge of 50-ton capacity can be hired. 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.

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 east of pier 9, are two boatyards with marine ways, the largest of which can haul out vessels up to 300 tons, 100 feet in length for general repairs. A machine and carpenter shop operates in connection with the yard.

Salvage.—Tugs, lighters, pumps, derricks, diving equipment, and other facilities are available for wrecking and salvage operations.

Small-craft facilities.—There is a marina, yacht club, and yacht yard in the basin about 400 yards eastward of pier 9. The marina is protected by a concrete breakwater and has three piers with covered berthage for 300 craft; each berth has electrical, telephone, and water connections. The slips were reported to have been dredged to 25 feet. There is open berthage for about 100 craft on the inside of the breakwater and the inshore bulkhead. The yacht yard at the inner end of the basin has a lift that can haul out craft up to 50 feet in length for hull, engine, and electronic repairs, or dry open or covered storage. Gasoline, diesel fuel, water, ice, marine and yacht supplies, and berthage with electricity are available in the yacht basin. There is a surfaced ramp. A light on the end of the breakwater marks the entrance to the yacht basin. A mooring area is northward of the marina.

Communications.—Almost 100 steamship lines provide service to all ports of the world and several barge lines operate along the Gulf 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; Burlington; Gulf, Colorado, 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 west side of Galveston Bay about 7 miles northwestward from Galveston, is a privately-owned port of considerable commercial importance. It has exten-

sive 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, sulphuric acid, industrial chemicals, scrap iron, and fertilizer. A 23-foot storm levee has been constructed around the city.

Prominent features.—The Texas City Dike which extends about 4.5 miles into Galveston Bay, three elevated tanks in the port area, the seatrain unloading gantry crane, and the numerous cracking towers of the oil refineries and chemical plants are conspicuous.

Channels.—Texas City Channel extends from deep water in Galveston Harbor 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 36 feet in the channel and basin. Dredging is in progress to bring the channel and basin to a revised project depth of 40 feet. See Notice to Mariners and latest editions of charts for controlling depths. The channel is marked by a lighted range.

Texas City Canal, a private industrial canal, with a controlling depth of 29 feet in 1965, extends southward and westward for about 2 miles to a turning basin. The channel is marked by a lighted range and three lights.

Texas City Channel is protected by Texas City Dike on the northward. The dike is earth-filled, protected by stone revetment, and is about 4.5 miles long. It is 900 feet north of the channel at the eastern end and about 2,300 feet north at the western end. The wharves are protected by a large spoil bank, known as **Snake Island,** extending along the east side of the turning basin.

There are fish camps at the inner end and along the north side of Texas City Dike where fuel, water, ice, ramps, and boat rental are available. A paved highway leads to the outer end of the dike to a protected yacht basin and marina at the outer end on the north side. Gasoline, diesel fuel, water, ice, marine and yacht supplies, open and covered berthage with electricity, and a ramp are available at the marina. A 3-ton fork lift can haul out craft up to 22 feet in length for hull and engine repairs, or dry open or covered storage. A 600-foot 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 northwesterly to a landing and small-boat basin at the inshore end of the dike. The channel has a controlling 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 southward from the Texas City Channel to the Intracoastal Waterway through the lower Galveston Bay.

Towage.—Vessels usually proceed without assistance from the bar to Bolivar Roads. Tugboats are available at Texas City for docking, undocking, and shifting.

Quarantine.—The quarantine station is located in the Customhouse at Galveston. Vessels are boarded at the dock.

The nearest Public Health Service hospital is at Galveston. There is a county and a private hospital in Texas City.

Customs and **Immigration** officers are located in the Customhouse in Galveston. Texas City is a port of entry; marine documents are issued at Galveston.

Wharves.—The Texas City port facilities are privately owned. There are three slips in the main part of the harbor and additional tanker and chemical handling berths at the bulkheads between the slips. There are six tanker berths one of which can handle vessels up to 1,000 feet in length and drawing 40 feet. There are two chemical handling berths, a seatrain loading berth with a 125-ton gantry tower, a containerized freight handling berth with a loading gantry crane, and three barge docks. The burned out hulk of the yacht NORMAHAL is lying on its side at the head of the north slip. The tugs berth at the bulkhead of the main slip.

There are shell, oil, and chemical berths on the north side of the Texas City Canal at the western end.

Communications.—The Texas City Terminal Railroad makes connection with the six trunk line railroads serving the city. They are: Gulf, Colorado, and Santa Fe; 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 1282.—**East Bay** is a large and shallow bay extending eastward about 16 miles from the southern end of Galveston Bay and lying northward of Bolivar Peninsula. The depths in the bay range from 2 to 7 feet. **Hanna Reef,** a chain of low sand islands and shoals, lies east 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 northeast of the upper part of Galveston Bay. Depths in the bay proper range from 7 to 9 feet. Extensive oil-drilling operations are in progress in the Red Fish Bar, Houston Point, and Trinity Bay areas. Numerous oil well structures and derricks are visible to the eastward of the Houston Ship Channel. The derricks are moved as soon as wells are brought in or abandoned. In the northern and western part of the bay between Trinity River and Umbrella Point, there are numerous pipes, piles, and abandoned oil wells which constitute a menace to navigation. Mariners are advised to keep clear.

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 northern 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 northeasterly from Houston Ship Channel to **Smith Point,** thence follows the easterly shore northward 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.

Double Bayou, 8 miles northeast of Smith Point, flows into Trinity Bay and is used mainly by oil and fishing interests. The entrance channel is marked by lights and daybeacons along the south side of the channel. Federal project depth is 6 feet from Trinity Bay to the mouth of the bayou. In January 1967, the controlling depth was 4 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 small marine way at Double Bayou can haul out boats up to 30 feet in length. Owners must arrange for their own repairs. A bridge crosses East Fork, 5 miles from the junction of the bayou.

Anahuac Channel, a 6-foot Federal project, leads from deep water in the upper part of Trinity Bay to Anahuac and **Browns Pass,** and is the entrance channel to Trinity River. The channel is marked by lights and intermediate aids. In July 1966, project depths were available to Anahuac. Mariners should be on the lookout for floating logs.

Anahuac is a town at the northeastern end of Trinity Bay, opposite the mouth of Trinity River. There is a depth of 5 feet at the small landing used mostly for loading shells. 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 northeastern end of Trinity Bay. Entrance to the river is through Anahuac Channel and Browns Pass, and not through Trinity River Channel. In August 1966, the controlling depth was 9 feet from the mouth of the river at Anahuac through Browns Pass to the sulphur plant at **Moss Bluff** about 10 miles above the mouth. From there, a draft of 2½ feet can be carried upriver to Liberty, except where snags and sand bars obstruct traffic. Sulphur is moved by barge from Moss Bluff to Galveston Bay. A highway bridge with a fixed channel span having a clearance of 65 feet crosses the river about 6 miles above Anahuac.

In the open waters of Trinity Bay about 2 miles westward of Anahuac Channel, a 0.5-mile long overhead power cable with a clearance of 29 feet is strung in a northwest-southeast direction on poles about 200 feet apart.

Off **Houston Point,** a small dredged channel with a depth of about 6 feet 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 west side of the basin. Several privately-maintained fixed white lights mark the east side of the channel and a fog signal is at the outermost light.

Charts 1282, 588.—Cedar Bayou is a crooked stream flowing in a southerly direction into the northwestern corner of Galveston Bay, 2.5 miles east of Morgan Point and 25 miles north of Galveston.

The principal commerce is in crude oil and shells, handled mostly in barges. A channel with Federal project depth of 10 feet, protected by submerged jetties at the entrance to the bayou, has been dredged across the flats from Houston Ship Channel to the first bend above the mouth of the bayou. In January 1967, the controlling depth was 8 feet from Houston Ship Channel to the first bend above the mouth, thence 5 feet for 1.7 miles, in August 1966.

The Cedar Bayou entrance channel across the flats is marked by two lights and intermediate aids. A light marks the offshore end of the submerged jetty on the north side of the entrance. About a mile inside the entrance between the jetties, the bayou is crossed by Interstate Route 10 highway bridge having a bascule span with a clearance of 13 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 **Ilfrey Island** and the mainland has a 13-foot fixed span with a clearance of 8 feet. Only very small craft use the cutoff.

Shallow **Tabbs Bay** is at the northwestern end of Galveston Bay, and contains numerous oil well structures and overhead power cables.

A channel from Houston Ship Channel follows the western end of **Hog Island** and Tabbs Bay to **Baytown** on the north shore; an overhead power cable crossing the channel about 0.6 mile from the entrance has a clearance of 44 feet. **Goose Creek,** on the north side of Tabbs Bay, is navigable for craft drawing up to 5 feet to a highway bridge 2.8 miles above the entrance. The bridge 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 12 feet. An overhead power cable at the second highway bridge about 2.2 miles above the entrance has a clearance of 38 feet.

Barbour Cut, opposite Hog Island, extends about 1.2 mile westward from the Houston Ship Channel to a turning basin near the head of the cut. In 1966, the controlling depth in the channel was 14 feet to the turning basin, thence depths of 20 to 24 feet in the basin. The basin provides excellent shelter for vessels up to 150 feet in length.

Several private commercial wharves and an oil terminal are in the cut. Two yacht basins have covered and open storage facilities for 175 yachts up to 75 feet in length. The larger marine railway can haul out vessels up to 65 feet in length. Both yards make general repairs; the larger yard has machine and carpenter shops. Available supplies include gasoline, diesel fuel, water, ice, open

and covered berthage, marine hardware, and yacht supplies.

Charts 519, 152–SC, 1282.—Morgan Point is on the northwest end of Galveston Bay on the western side of Houston Ship Channel. **La Porte,** a town 2 miles southwest of Morgan Point, has rail and highway connections with other parts of the state.

From Morgan Point southward to **Red Bluff** are resort hotels and summer homes with numerous boat landings along the shore. The Houston Yacht Club is 1.5 miles north of Red Bluff. The club maintains an entrance light 400 yards off the south jetty and a **219°** lighted entrance range. The entrance light is 50 feet southeast of the centerline of the channel. The basin at the club is protected by two jetties. Gasoline, water, ice, open and covered berthage with electricity, a ramp and an electric hoist are available. A wrecked barge, awash at low water, lies 1.5 miles off Red Bluff.

Bayport, a new industrial complex and deepwater shipping port was under construction in 1965 by the Harris County Houston Ship Channel Navigation District. The initial phase provides for a 10-foot dredged channel from Houston Ship Channel close southward of Atkinson Island to the shore about 0.5 mile southeastward of the Houston Yacht Club Basin, thence westward in a land cut to a turning basin at the present State Highway 146. The project will be developed over a period of 20 years to a ship channel 36 feet deep with a turning basin of the same depth with piers and liquid and dry cargo handling and storage facilities. In 1966, the controlling depths were reported to be 12 feet in the channel and turning basin; one barge berth had been completed in the basin. The channel is marked by privately maintained buoys.

Clear Creek empties into the west side of Galveston Bay 20 miles northwestward of Galveston; 2 miles above its mouth the creek broadens into shallow **Clear Lake,** 2.5 miles long. A Federal project provides for a channel 7 feet deep from Galveston Bay to the county highway bridge at **League City,** and a side channel from the mouth of Clear Creek northward along the bayshore for about 0.6 mile to **Seabrook Island.** In October 1966, the controlling depth was 5 feet in Clear Creek to the County Highway Bridge at League City. In November 1966, in the Seabrook Channel, the controlling depth was 7 feet to the head of the project at Seabrook.

Vessels drawing up to 9 feet can pass on an average tide to a yacht basin at the lake entrance. The entrance channel is marked by an entrance light and fog signal range; both range lights are visible from seaward but when entering, a building obscures the rear range light for a considerable distance.

At the entrance to Clear Creek, an overhead power cable has a clearance of 99 feet, and adjacent State Route 146 highway and The Southern Pacific railroad bridges, one a bascule and the other a swing, have minimum width of 60 feet and clearance of 6 feet; see **203.245,** chapter 2, for **drawspan regulations.** An overhead power cable at the bridges has a clearance of 100 feet. About 6 miles above the entrance, overhead power cables have a clearance of 55 feet.

Seabrook is a town on the north side at the entrance to Clear Creek, and is headquarters for fishing and pleasure boats. **Kemah** is a town on the south side of the entrance to Clear Creek. Gasoline, diesel fuel, water, and provisions can be obtained on the waterfront at both towns.

There are four large yacht basins, and numerous marinas and boatyards. There are marine railways, stiff-leg cranes, travelifts, and portable and fixed lifts. Craft up to 150 feet in length can be hauled out for hull and engine repairs, or dry open or covered storage. Electronic repairs can be made. Open and covered berthage with electricity, and marine and yacht supplies are available. The shrimp and fishing wharves and seafood packing plants are along the waterfront eastward of the bridges.

See appendix for **storm warning displays.**

A privately-maintained channel 3 miles southeastward of Kemah leads to a small dock at the headquarters of an oil company. The entrance is marked by fixed lights and a lighted range. In October 1956, the controlling depth was 6 feet.

Dickinson Bayou empties into **Dickinson Bay,** a small indentation in the western side of lower Galveston Bay, between **April Fool Point** and **Miller Point,** about 13 miles northward of Galveston. The Federal project provides for a channel 6 feet deep through Dickinson Bay and Dickinson Bayou to the railroad bridge at Dickinson. The entrance channel is marked by lights and intermediate aids, and in July 1966, the controlling depth was 6 feet to **Dickinson,** a small settlement about 7 miles up the bayou.

There are marinas and boatyards on Dickinson Bay at April Fool Point, **Factory Bayou,** and a basin about 0.4 mile west of the bayou. Gasoline, diesel fuel, water, ice, marine and yacht supplies, ramps, and open and covered berthage with electricity are available. There are cranes up to 15 tons capacity that can lift out craft for hull and engine repairs or storage.

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 11 feet. The adjacent Southern Pacific railroad bridge has a swing span with a channel width of 45 feet and a clearance of 8 feet. Overhead power and telephone cables at the bridges have a minimum clearance of 56 feet. There are marinas just above the bridges on the north bank, and a small boatyard that has a marine railway that can haul out craft up to 40 feet in length for hull and engine repairs or storage. Gasoline, diesel fuel, water, ice, some supplies, and a surfaced ramp are available. 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 is a shallow unimportant lagoon south of Dickinson Bay.

Charts 1282, 518, 519, 588, 589, 590, 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 northwest 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 northeast side of the channel. The channel through the bay is marked by lights, lighted ranges, buoys, 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.

North of Bolivar Peninsula, spoil banks on both sides of the channel extend northward 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 westward to Dickinson Bayou. Another gap, 500 feet wide and 6 feet deep, opens westward about 2.8 miles above Red Fish Bar. Along the east side of the channel north of Red Fish Bar, two openings through the continuous spoil bank permit passage into the northwestern 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, has a project depth of 8 feet in a dredged cut for about 1.6 miles east of Houston Ship Channel. In July 1966, project depths were available. 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 westward to the new Bayport harbor project. In 1966, the controlling depth was reported to be 12 feet in the channel and basin. The channel is marked by privately maintained 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 south of Morgan Point this dike is relatively high and is known as **Atkinson Island.** In 1964, 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 southward of Morgan Point and eastward of Houston Ship Channel. The entrances to the basin are eastward of Morgan Point and 1.3 miles southward of the point. Barge moorings spaced 175 feet apart are on the east side of the basin.

From Morgan 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 Lynchburg. There are no bridges across the ship channel, but 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 Morgan Point Cut and another one between **Pasadena** and Galena Park.

Charts 588, 589.—Morgan Point, 23 miles northwestward 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 Morgan Point, is the site of the Humble Oil Refineries and is the shipping port for their products. The oil company has three concrete wharves, one 600 feet long and two 400 feet long; a barge wharf 250 feet long, and several smaller barge wharves. In 1966, depths of about 40 feet were reported alongside the large wharves, and 16 to 22 feet alongside the barge wharves. A Deputy Collector of **Customs** is stationed here to facilitate entries and clearances.

Two overhead power cables crossing the river about 0.3 mile above the Baytown piers have a minimum clearance of 162 feet. The transmission towers are prominent.

About 1.5 miles above the Baytown piers, a privately-maintained channel leads in a southwesterly direction from the main ship channel along the northwest and 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 589, 590.—San Jacinto River branches northward from the ship channel at **Lynchburg,** 8 miles above Morgan 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. 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 south side of the channel 9 miles above Morgan 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.

An overhead power cable crossing the river about 500 yards above the TEXAS has a clearance of 165 feet.

About 0.7 mile above the TEXAS on the north bank, San Jacinto Terminal slip extends about 0.6 mile westward. Depths of about 25 to 32 feet are in the slip. An 1,800-foot long concrete wharf is on the north bank of the slip. The terminal, formerly an ordnance depot, has several warehouses and additional open storage space.

On the south bank opposite the San Jacinto Terminal slip, is a large deepwater basin with depths of about 24 to 36 feet. A long finger pier is at the head of the basin.

In 1965, a 6 million-bushel grain elevator, general cargo wharves, and warehouses were under construction in the basin.

There are chemical and liquid cargo handling wharves on the south bank above the deepwater basin in **Tucker Bayou** and at the mouth of **Patrick Bayou.**

Chart 590.—Boggy Bayou Basin is a tanker loading terminal on the south side of the channel about 3 miles above Lynchburg.

On the south bank about a mile west of Boggy Bayou, there is a chemical plant and barge wharf which is marked by lights. Port Houston Shipyard on the north bank about 1.3 miles above Boggy Bayou builds large chemical carrying barges.

Greens Bayou, enters the main ship channel from northward at a point 5.2 miles above Lynchburg. A Federal project provides for a 36-foot channel to about 0.3 mile above the entrance, thence 15 feet for about 1 mile, and thence 12 feet for about 1.1 miles to the end of the project. The 15- and 12-foot sections of the project are presently being dredged. Depths of 33 feet were available in the completed section of the project in August 1965. Above this point the bayou is navigable for drafts of 8 to 10 feet for about 5 miles, thence drafts of 4 to 5 feet for another 5 miles.

The bayou is crossed by several bridges with fixed channel spans having a minimum clearance of 23 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 Navigation District's bulk materials handling plant is on the east bank of the bayou just inside the enrtance; in 1965, depths of 33 feet were alongside. A shipyard and floating drydock are at the mouth of the bayou on the west side of the entrance.

The large Ethyl Corporation chemical plant and barge wharf are on the south bank, opposite Greens Bayou. Adams Terminal wharf and slip is about 0.3 mile west of it. There is about 1,000 feet of deepwater berthing on the channel and 570 feet on the west bank of the slip reported dredged to 34 feet. Bulk-handling equipment, heavy lift equipment, and large storage yards and warehouses are at the terminal. A gypsum plant and barge wharves are westward of it. In 1965, a new oil-handling berth was under construction on the north bank opposite Adams Terminal.

The Sheffield Steel Mill and wharf are about a mile above Greens Bayou on the north bank. The basin off the wharf was reported dredged to 40 feet in 1965. On the south bank about 1.4 miles west of Greens Bayou is the large Olin-Mathieson chemical plant with a 1,000-foot deepwater wharf and a barge wharf close eastward of it.

Between the steel mill and **Hunting Bayou** are two large oil refineries and chemical plants. The Warren Petroleum slip on the east side of the entrance has an oil handling berth on each side.

Cottonpatch Bayou, about 0.2 mile above Hunting Bayou on the south bank, has a shell-handling wharf and plant and a shipyard at the head. Close westward of Cottonpatch Bayou on the south bank is the General Petroleum Plant and wharf.

Washburn Tunnel crosses under the river 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 south bank close eastward of the tunnel.

About 1.1 miles above Hunting Bayou on the south bank is the Champion Paper and Fibre plant and barge wharf. The Texas Oil refinery plant and slip is on the north bank at Galena Park. Close westward of it is the General American Tank and storage plant with three ship and barge berths for handling and storage of liquid cargoes of petroleum, chemicals, molasses, and vegetable oils. The basin off the berths was reported to have been dredged to 40 feet in 1965.

The Houston Light and Power Plant is on the south bank opposite the Texas slip. An overhead power cable crossing the river at the plant has a clearance of 187 feet.

The Sinclair Refining plant and slip are on the south bank about 0.5 mile above the powerplant. There are deepwater ship and barge berths on the ship channel and in the slip for oil handling and bunkering, with depths of 30 to 34 feet alongside.

The Gulf Oil refinery and wharf are on the north bank opposite and close westward is the Goodpasture four million bushel grain elevator and wharves. The elevator is one of the most prominent landmarks on Houston Ship Channel. In April 1965, the basin at the channel was reported to have been dredged to 40 feet. A 450-foot slip was being dredged on the west side of the elevator and the channel wharf and basin extended to the eastward to provide additional loading berths.

Clinton Island Turning Basin on the south bank close eastward of Sims Bayou has been dredged to 40 feet.

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 21-foot fixed span with a clearance of 20 feet. An overhead power cable crossing at the bridge has a clearance of 46 feet. A shell-handling wharf is on the north bank just below the bridge.

The U.S. Gypsum Plant and wharf are on the north bank opposite the entrance to Sims Bayou. The 580-foot deepwater and barge berths have unloading cranes and belt conveyors to storage warehouses with covered storage for 40,000 tons of bulk materials.

Manchester Terminals, one of the largest privately-operated general cargo terminals on the Houston Ship Channel, is on the south bank close westward of the mouth of Sims Bayou. The marginal wharf is 1,520 feet long with 30 to 34 feet alongside. The apron has a single track with depressed tracks and loading platforms in rear of the transit sheds. Transit sheds and warehouses at the terminal have over one million square feet of storage space. Close westward of the terminal are the slip and ship and barge berths of the Signal Oil and Gas Company.

A large cotton compress and storage warehouses are on the north bank opposite Manchester Terminal. The Southern Pacific Railroad Terminal slip and wharf is close

westward of the compress. The wharf has about 1,275 feet of berthage for three ship berths but the terminal is now mostly used for storage. A large cement plant is at the head of the slip and barge wharves on the east side of the slip.

The wharf of the Tennessee Coal and Iron Division of U.S. Steel is close westward of the Southern Pacific Terminal. The wharf is used for unloading barge loads of steel.

The U.S. Army Ordnance Dickson Gun Plant is on the north bank of Houston Ship Channel about a mile above Sims Bayou. The plant is now inactive and the Coast Guard Office of the Captain of the Port and the Naval Reserve Training Center are located here. The submarine CABRILLA is moored at the Navy wharf. The area north of the ship channel between the navy wharf and the Steel Company wharf is foul. **Fidelity Island** is a group of rocks awash in the middle of the area.

The Navigation District's Manchester general cargo terminal and the Continental Grain Company 2-million bushel grain elevator is on the south bank just above Upper Clinton Bend and about 1.3 miles above Sims Bayou. In addition to general cargo and grain handling the terminal has facilities for handling and storage for over one million gallons of chemicals and edible oils and 15 million gallons of molasses. The terminal has bulk materials handling equipment, oil handling, and bunkering facilities at a wharf close west of the general cargo terminal. The main wharf has 1,000 feet of berthing space and the bulk-handling berth about 250 feet. The Lone Star Cement plant and barge wharf is close westward of the terminal.

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 landings for pleasure craft, unloading rigs for sand and shell, boat repair yards, machine shops, material yards, and other facilities. The controlling depth in October 1966, was 8 feet from the easterly entrance to the Cypress Street Bridge, and thence 8 feet to the upstream junction with the ship channel. A highway bridge to Brady Island over the bend, 0.2 mile south 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 south of the bridge.

Shipyards on Brady Island and on Harrisburg Bend have marine ways capable of hauling out vessels up to 270 feet in length, 60 feet in width, and 18 feet draft. General repairs are made on all types of vessels, but the yards specialize in work on towboats, barges, and small craft. Machine shops are nearby. Gasoline, diesel fuel, water, and provisions are available.

Brays Bayou, branching off the western entrance to Harrisburg Bend, is a center for laying up and repairing pleasure craft and tugs. There are storage yards and a shipyard with a 30-ton stiff-leg crane. 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 October–November 1966, had controlling depths of 8½ feet for 1.3 miles, thence 7 feet for 2.2 miles, and thence 3½ feet for another 1.3 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 25 feet for the bascule, swing, and vertical-lift spans, and 21 feet for the fixed spans; see **203.245,** chapter 2, for **drawspan regulations.** Numerous overhead 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 West and Southwestern United States. Houston is a university center with 11 colleges and universities; among which are University of Houston, Rice University, Texas Southern University, Baylor University, and 7 other private and public colleges, all in Metropolitan Houston. It has a large medical center with 16 participating institutions and medical organizations. The new Harris County Astrodome Stadium is located in the city.

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 Morgan 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, Barbour 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 sorgums, 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 several privately owned grain elevators in the port with a capacity of 2 to 6 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 Morgan Point is less than 1 foot. At Houston there is practically no periodic tide but the waterfront is greatly influenced by the winds.

See appendix for **Houston Climatological Table** and **storm warning displays.**

Towage.—Towboats are available at Morgan Point and Houston.

Quarantine.—Vessels subject to quarantine inspection are boarded at the dock.

A Public Health Service outpatient clinic is in Houston. and a Public Heatlh Service hospital is in Galveston. Many private hospitals are also available in Houston.

Customs.—Houston is a port of entry and marine documents are issued. A deputy Collector of Customs has an office in the Federal Office Building and suboffices in the United tStaes Appraisers Stores, 7300 Wingate Street, and at Baytown. Vessels are boarded at the dock.

Immigration.—The Immigration Service maintains of fices in the Federal Office Building.

Harbor regulations.—The **Board of Navigation and Canal Commissioners,** known as the **Port Commission,** manages, governs, and controls the **Harris County Houston Ship Channel Navigation District.** The Port Commission publishes brief extracts from Harbor Regulations which include parts of the City Code and the U.S. Code of Federal Regulations applicable to the port. A copy of these regulations is handed to the Master of each arriving vessel by the pilot when he boards.

The regulations are enforced by the **General Manager,** known as the **Port Director,** whose offices are in the Port Commission Building at 1519 Capital Avenue; phone CA 5-0671. 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.—The public terminals, owned and operated by the Port Commission, are around the upper turning basin at the head of the channel and extend down the channel as far as Brady Island; and also includes the bulk materials handling plant on Greens Bayou, and the new Bayport Ship and Barge Terminal and industrial area now under development on Galveston Bay near Red Bluff. There are over 35 ship berths at the public terminals with a total of over 19,000 feet of berthing space. Most have transit sheds with double-tracked aprons and depressed tracks and truck loading platforms in or at the rear of the sheds at the public wharves, and over 1 million square feet of open storage space. Additional general cargo wharves were under construction in 1965 on the north bank at the bend opposite Brady Island. The 6-million-bushel public grain elevator at wharves 14 and 15 can deliver over 80,000 bushels per hour to two vessels berthed at the facility. It has shipside conveyor galleries, rail car dumpers, hopper scales, and truck dumpers; mechanical grain trimmers are in use at the elevator.

Gantry, locomotive, and other cranes up to 60 tons are at the public terminals; floating cranes up to 300 tons are also available in the port. A fixed 75-ton stiff-leg derrick is at the Long Reach Terminal.

The Bulk Materials Handling Plant, owned and operated by the Port Commission on Greens Bayou, has a 650-foot wharf, a 10-ton unloading gantry tower and a loading gantry tower with automatic trimmer, and each with a capacity of 1,000 tons per hour for ores or other dry bulk materials. Belt conveyors lead from the towers to the car and truck loading and unloading facilities and storage bins. The facility has car and truck dumper pits, and rail track and truck scales. A 600-foot layup berth is adjacent to the main wharf.

There are several privately-operated steamship terminals at Manchester, and Clinton Park with over 10 ship berths in all. Transit sheds and warehouses with about 4 million square feet of storage space are available at the terminals. In 1965, a grain elevator was under construction in a newly dredged ship basin on the south bank close eastward of Tucker Bayou. A bulk handling facility with a 200-ton per hour unloader and a 400-ton per hour loading conveyor system is at Adams Terminal.

Most of the wharves handle general merchandise and several are equipped with conveyors, cranes, fork lifts, and other mechanical equipment for handling cargo. Some are equipped with pipelines for handling molasses, liquid chemicals, or vegetable oils. All wharves have fresh water connections and most have connections for oil bunkering.

The many private wharves at the industrial plants and slips along Houston Ship Channel and the bayous from the upper turning basin to Morgan Point can berth over 40 vessels.

Barge terminals in Greens Bayou and Buffalo Bayou can berth about 24 vessels.

Numerous companies operate warehouses in the port with a total of about 8 million square feet of dry storage and about 2 million cubic feet of cooler and freezer space. There are four large cotton compresses and many cotton warehouses in the port.

A sea-land service operates into the Port of Houston with coastwise vessels shipping truck-van cargo from the east coast. A seatrain loading facility at Texas City carries rail cars to Edgewater, New Jersey.

Supplies.—Provisions and general supplies of practically any kind can be obtained at Houston. Fresh water is piped to all wharves and piers.

Vessels can secure bunker oil through pipelines on the public wharves at the turning basin, and at Houston compress wharves while loading or discharging cargo, or at wharves of oil companies on Houston Ship Channel. Numerous companies furnishing fuel oil in or near Houston have oil barges for bunkering.

The principal **small-boat facilities** are on Harrisburg Bend, Brays Bayou, and Barbour Cut. Gasoline, diesel fuel, water, provisions, and supplies are available at Brays Bayou, Barbour Cut, and Houston.

Repairs.—A shipyard at Greens Bayou has a drydock

with a lifting capacity of 12,000 tons and can haul out a vessel up to 550 feet in length for general hull and engine repairs. The marine ways at the port are used for repairs to barges, small towboats, and such craft up to 1,000 tons and 300 feet in length. These ways are located in Brays Bayou, on Brady Island, Greens Bayou, and in Barbour Cut. Houston has machine shops, foundries, and welding plants capable of handling most repairs to hull or machinery above the waterline.

No firms in Houston make an exclusive business of wrecking and salvage, but harbor tugs, derricks, and barges are available when required. Divers and other equipment can be obtained on short notice from Galveston or Beaumont. Two 250-ton floating cranes, and numerous smaller floating cranes from 4 to 75-ton capacity are available in the port. Fixed and mobile cranes at the various terminals have capacities from 10 to 70 tons.

Communications.—The **Port Terminal Railroad** which connects with all terminals in the port is owned by the Navigation District. It is 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 Southern Pacific, Missouri-Pacific Santa Fe, Missouri-Kansas, and Texas, Fort Worth and Denver, and the Rock Island Railroads. Over 120 steamship lines offer cargo service from Houston to 250 world ports, and some 90 tanker operators serve the port.

Over 12-million 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 35 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 International Airport.

Charts 518, 1282, 886, 887, 152–SC.—From Galveston Entrance to San Luis Pass, a distance of 27-miles, the Gulf coast trends in a general southwest-by-west direction. The southwestern 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.

West Bay is a shallow body of water which extends 16 miles southwestward from the southwestern part of Galveston Bay, between Galveston Island and the mainland. The bay proper is of no commerical importance.

Offatts Bayou extends from off the south side of West Bay to the southwest limits of Galveston. The entrance channel leaves the Intracoastal Waterway about 0.3 mile west 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 out of Galveston.

The controlling depth is about 3 feet in the dredged 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. Daybeacons mark the channel into Offatts Bayou; controlling depth is about 7 feet.

There are two boatyards at Teichman Point and several marinas in Offatts Bayou. The largest marine railway can haul out craft up to 65 feet in length for hull and engine repairs or dry open or covered storage. Gasoline, diesel fuel, water, marine supplies, open and covered berthage with electricity, ramps, and fixed lifts up to 4 tons are available. A fill for Sixty-First Street, Galveston, forms the upper limit of the basin. It is about 2.5 miles above the mouth of the bayou.

Chocolate Bay is an arm extending about 5 miles northwestward from the western end of West Bay. The Intracoastal Waterway crosses the mouth of Chocolate Bay. A barge assembly basin with mooring buoys, is on the southerly side of the Intracoastal Waterway on the north side of Alligator Point, the eastern entrance point to Chocolate Bay; depths of about 16 feet are reported in the basin. The basin is intended only for the temporary mooring of barges.

Chocolate Bayou empties into the head of Chocolate Bay from the northward and is reported navigable for about 10 miles to a highway bridge near the town of **Liverpool.**

A Federally maintained channel dredged to 10 feet, by private interests, extends northward for about 7.3 miles from the Intracoastal Waterway to a basin at the Monsanto Chemical Company Plant. In July 1966, the mid-channel controlling depth was 7 feet. The channel is buoyed. Shell barges and pleasure and fishing craft follow the natural channel to a highway bridge about 10 miles above the mouth of the bayou. There are shell handling docks at and just below the highway bridge, near the town of Liverpool.

The new State Highway 1371 bridge was under construction in 1967, about 0.6 mile above the mouth of the bayou. The bridge will have a fixed span with a design clearance of 50 feet at the center. An overhead telephone cable crossing the bayou about 7 miles above the mouth has a clearance of 50 feet.

There are yacht basins with marine railways and marinas on the bayou between the chemical plant and the bridge. The largest marine railway can haul out craft up to 50 feet in length for hull and engine repairs or dry open or covered storage. Gasoline, diesel fuel, water, marine supplies, open and covered berthage with electricity, ramps, and lifts are available. An overhead power cable crosses the bayou about 7 miles below the bridge.

The principal commodities carried by barge on the bayou are shell, naval stores, petroleum products, industrial chemicals, and coal tar products.

Scholes Field, the airport for Galveston, is on the south 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 west of Scholes Field. The homes along the Gulf shore on the western half of Galveston Island are all raised on piles and are very distinctive.

Jamaica Beach is a resort about 8 miles west of Scholes Field. On the bay side many lagoons have been dredged to provide waterfront homesites. A marked channel reported dredged to 6 feet leads from West Bay to a boat basin at the northern end of the lagoon. There is a marina at the basin with a 300-foot dock, and ramp. Fuel, water, open and covered berthage with electricity, and some supplies are available. The resort is the site of the Karankawa Indian burial ground.

Sea Isle is a resort about 5.5 miles east of San Luis Pass. An entrance channel reported dredged to 6 feet leads southward from the bay to three boat slips or lagoons. The entrance channel is marked by a flashing red light, pile daybeacons with pointers, and a lighted entrance range showing fixed green light on diamond slatted daymarks. A marina in a basin at the inner end of the westernmost lagoon has gasoline, water, ice, open and covered berthage with electricity, and a ramp. There is 2,000-foot pier on the bay side which is lighted at night.

Bay Harbor is a resort about 4 miles eastward of San Luis Pass. An 8-foot dredged channel leads southward to a boat basin of the same depth on the north shore of the island. A lighted entrance range showing fixed red light from a red slatted diamond daymark on the front and a fixed green light from a green slatted diamond daymark on the rear, and pile daybeacons mark the entrance channel.

San Luis Pass, an unmarked channel 0.2 mile wide and 9 feet deep, leads westward from the Gulf and passes between the shoals southward from Galveston Island and eastward from **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 light draft craft.

In 1965, a highway bridge was under construction across San Luis Pass. The bridge will have a fixed channel span with a design clearance of 29 feet.

Off the northeast side of San Luis Island there are depths up to 25 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 west side of San Luis Island.

A depth of 7 feet can be carried from San Luis Pass to the west side of San Luis Island, thence southward in Cold Pass to **Moodys Island** and westward for a short distance into Christmas Bay; a draft of 4 feet can then be taken to and through **Bastrop Bay.** Privately maintained aids mark the channel through 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 I. W. Mile 637.7 to the railroad bridge at Mims, Texas. Land cuts eliminate the bends in the bayou and bypass Cox Lake. Controlling depth is about 7 feet. Total length of channel from I. W. to railroad bridge is about 4.7 miles; bridge has a 24-foot removable span with clearance of 11 feet.

Hoskins Mound is an oil and sulphur field about 3 miles northwest of Bastrop Bay. A tall concrete stack and a water tank show prominently from offshore.

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 south end of Christmas Bay leads into and through **Drum Bay** and thence southwesterly to a connection with the Intracoastal Waterway. This channel is used only by small fishing craft with draft of 2 to 3 feet.

11. SAN LUIS PASS TO THE RIO GRANDE

Chart 1117.—From San Luis Pass to the entrance to Matagorda Bay at Pass Cavallo, the coast trends for 80 miles in a general southwest-by-west direction. From Pass Cavallo it curves gently southwestward for 100 miles to latitude 27° N., where the trend is south; thence it curves gently a little east of south 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 southwestward 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.

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 west side of the Gulf of Mexico between Tampico and Corpus Christi is a northward 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 westward toward the coast and the possibility of being carried inshore by such current should be guarded against. The grounding of a vessel at a location 9 miles southwest of Aransas Pass was reported caused by strong westward currents which accompanied winds from the north and northeast.

Charts 1283, 887, 152–SC.—Freeport Harbor, lying 40 miles southwestward of Galveston entrance, is the harbor for the towns of **Freeport, Brazosport,** and **Velasco.** 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 at Brazosport and the smoke rising from the stacks are prominent. An elevated bridge and a tall tank also are outstanding. On closer approach, the Brazos River Light and the water tanks in Freeport and Velasco can be identified. At night the glow from the many lights at the chemical plant and the obstruction lights on the radio towers at Freeport and Velasco are conspicuous.

Brazos River Light (28°56.7′ N., 95°18.5′ W.), 98 feet above the water, is shown from a square pyramidal skeleton tower enclosing a stair cylinder painted brown below the gallery and black above.

Vessels should approach Freeport Harbor through the Freeport Safety Fairway; 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 Brazos 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 docks at Freeport and Velasco.

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 river anywhere the depth is suitable; however, swinging room for large vessels is limited.

Dangers.—About 6 miles southwestward 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. A lighted whistle buoy marks the southeast end of the shoal.

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. The Missouri-Pacific railroad bridge, with a swing span having a clearance of 11 feet, crosses the river at Freeport about 1 mile above the head of the project; see **203.245**, chapter 2, for **drawspan regulations.** A highway bridge that has a fixed channel span with a width of 36 feet and a clearance of 20 feet is about 0.3 mile above the railroad bridge.

An overhead power cable just above the Stauffer turning basin has a clearance of 63 feet. An overhead power cable at Velasco 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 westward, with a countercurrent near the beach, largely influenced by the direction of the wind. The bar is rough with an easterly 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 Brazosport turning basin. Large vessels are difficult to turn in the smaller upper turning basin.

See appendix for **storm warning displays.**

Pilotage is compulsory for all foreign vessels and U.S. vessels under register in foreign trade. Pilotage is optional for coastwise vessels who 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 the name BRAZOS PILOT in white letters on the bow, white superstructure, and flies the code flag P. The pilot boat is equipped with radiotelephone—2738 and 2182 kcs, and VHF (Channel 12). Pilots can be obtained by prior arrangements through the ship's agents.

Quarantine inspection is made at the dock by Public Health Service officials from Galveston. The nearest Public Health Service hospital is in Galveston. Freeport has two hospitals.

Customs and Immigration.—Freeport is a port of entry. Customs inspectors maintain an office at Freeport. Immigration officials come from Houston and Galveston when needed.

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 westward of the west 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.

Wharves.—Brazos Harbor Terminal Wharf is on the north side of the turning basin at the head of Brazos Harbor Channel. The main deepwater wharf is 1,250 feet long with 36 feet reported alongside. There are two transit sheds on the wharf with 120,000 square feet of storage space and 5 acres of improved open storage space. The apron of the wharf is double tracked. Cargo is handled by ship's tackle. A 40-ton crawler crane and fork lifts and other mechanical equipment are available. A 250-foot barge wharf is at the northwest corner of the basin: 36,000 square feet of storage space is available.

There are a number of other wharves from the entrance to the Stauffer turning basin. A dock on the south side of the turning basin at Brazosport has rail connections with a shuttle chute for loading sulphur. The berthing space is about 500 feet with depths of 35 feet alongside. In **Big Bend,** an oil dock on the southwest side has berthing space for two large tankers, and a chemical plant on the northeast side has berthing space for two ships and four barges. These facilities are not open to the public.

Supplies and repairs.—Gasoline, diesel fuel, water, ice, provisions, and supplies are available, but no bunkering facilities for large ships. Shipyards have marine ways, machine and carpenter shops, and the largest marine railway is capable of hauling out vessels up to 115 feet in length. All yards make general repairs. There are three small boatyards on the Intracoastal Waterway near the entrance to the channel.

Small-craft facilities.—Small craft can find excellent protection in the river at Freeport. Numerous small docks are along the waterfront. Just downstream from the railroad bridge there is a yacht basin with limited accommodations for boats up to 50 feet in length. Two small marinas are located on the Intracoastal Waterway near the fixed bridge. Gasoline, water, and limited accommodations are available at each.

Communications.—The Missouri-Pacific Railroad serves the Brazosport and Freeport area. Numerous truck-lines operate from the port and buslines offer frequent service to Houston and other points. An air taxi and charter service is available. Good paved roads and highways radiate to all poinits.

Chart 1283.—Brazos River enters the Gulf through the diversion channel about 6 miles southwest of Freeport

Harbor entrance. Due to 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 waterway.

Overhead power cables having a minimum clearance of 44 feet cross Brazos River between the waterway and the highway bridge about 4 miles above the waterway. The highway bridge has a swing span with a clearance of 15 feet; see **203.245,** chapter 2, for **drawspan regulations.** 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, respectively, above the waterway; minimum clearance of the fixed channel spans is 33 feet at low-river stages, 20 feet at high-river stages.

San Bernard River flows into the Gulf 3.5 miles southwestward from the mouth of Brazos River. San Bernard River is obstructed at the mouth by a shifting sand bar 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 waterway. The Federal project depth is 9 feet. In February–March 1966, the controlling depth was 9 feet for 0.5 mile above the Intracoastal Waterway, thence 7 feet for 22.5 miles to the head of the completed project.

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.

Between the waterway and the upstream limits of the improvement, San Bernard River is crossed by draw and fixed bridges; the minimum clearance is 15 feet. A cable ferry crosses the river about 11 miles above the Intracoastal Waterway. Limiting clearance of overhead cables is 38 feet.

Cedar Lakes, East Matagorda Bay, Caney Creek, Live Oak Bayou, Old Gulf, Colorado River, and Matagorda are described in chapter 12.

Charts 1284, 888, 889.—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.), 90 feet above the water and shown from a black conical tower on **Matagorda Island,** about 1.5 miles west of Pass Cavallo, marks the approach to Matagorda Bay.

Pass Cavallo, 108 miles southwestward of Galveston Entrance, and alternate 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 which 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.

Fishing and shrimp boats drawing up to 5 feet use the pass under favorable conditions, but strangers are warned not to enter without local knowledge. Information on bar conditions can be obtained by radio from the Coast Guard station which is located on the Intracoastal Waterway about a mile west of Port O'Connor.

Inside the bar, the channel, marked by lights, extends along the eastern shore to Matagorda Island, passing about 0.5 mile east of Saluria and Big Bayous, and thence off the Port O'Connor jetties into the open waters of the bay.

Pelican Island, marked by a light, and generally shoal areas lie along the east side of the pass. There is a passage with a depth of 9 feet or more through these shoals in a northeasterly direction, from off Saluria Bayou. This channel is particularly subject to change. The ruins of West Shoal Lighthouse along the south side of this passage are submerged and marked on the north side by a lighted buoy. A daybeacon marks the north side of the passage. The ruins of old East Shoal Lighthouse, about 0.3 mile to the northeastward of the daybeacon, are submerged and chartered as a sunken rock. These obstructions are to be avoided.

Vessels should approach Matagorda Bay through the Matagorda Safety Fairway; 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, and a light is off the south jetty. The Federal project provides for a depth of 38 feet through the Sea Bar Channel, thence 36 feet in 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 Entrance Lighted Whistle Buoy (28°23.1′ N., 96°17.0′ W.), 2.5 miles southeast of the jetties marks the 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 fairway; see 209.135, chapter 2. With northerly winds or smooth sea, fair anchorage is available in 4 to 12 fathoms.

Good anchorage for small craft may be found on the west side of the pass 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 are: **Chocolate Bay,** with depths of 3 feet; Lavaca Bay, on the east side to the north 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.

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 Cavallo. 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. In the landcut through Matagorda Peninsula, it is reported to be very strong especially on the runoff of the ebb after strong southerly winds. The current in Matagorda Ship Channel may attain a velocity of over 3.0 knots. Daily predictions of the tidal current may be found in the Tidal Current Tables, Atlantic Coast.

A **pilot** is available and will meet vessels off the sea buoy on prior notice to the Port Director, Port of Port Lavaca-Point Comfort Wharves, or by arrangements through the ship's agents.

Halfmoon Reef extends about 3 miles off **Palacios Point,** the southwest point of the tongue of land extending between the eastern and northern 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 north of Palacios Point, is a small shallow bay on the northeast side at the center of Matagorda Bay. A Federal project provides for a main channel with a depth of 12 feet 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, and a channel connecting them to the main channel; project depth in the turning basins and connecting channel is 12 feet. In June 1966, project depths were obtained in the main channel, turning basins, and connecting channel. Buoys, lights and daybeacons mark the main channel; two breakwaters protect the harbor entrance.

Palacios, a fishing and farming community, is on the west side of Tres Palacios Bay. An elevated water tank in the town, a similar tank at Camp Hulen, and a smaller tank at the airport show prominently from the bay.

Palacios has a seafood cannery and 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 two motor freight lines serve the town. State Route 35, the main coastal highway passes through the town.

See appendix for **storm warning displays.**

The East and West 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 boat basin for small pleasure craft is on the north side of the town. The dredged entrance channel has a controlling depth of about 4 feet. The larger of two shipyards can haul out vessels up to 105 feet in length. General repairs are made and machine shop facilities are available. Gasoline, diesel fuel, water, ice, marine supplies and berthage are available.

Carancahua Bay, 6 miles west of Tres Palacios Bay, is a shallow, unimportant body of water frequented only by a few small boats. Depths of 3 feet are in the entrance with somewhat greater depths inside. 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.

Lavaca Bay, an arm of Matagorda Bay at its northwestern corner, has a general depth of 5 to 7 feet with several reefs near the head of the bay. Dredged channels, marked by aids, lead to the important facilities. Federal projects provide for a 12-foot channel from Matagorda Ship Channel off **Gallinipper Point** to the City Harbor in the Lynn Bayou Turning Basin at Port Lavaca, a distance of about 3.5 miles; a side channel of the same depth from about 1.2 miles above the entrance to Port Lavaca Channel leading southwestward for about 1.4 miles to two basins at the **Harbor of Refuge** southward of the city; and a 6-foot channel from about 2.3 miles above the entrance to Port Lavaca Channel leading northward through Lavaca Bay to the entrance to Lavaca River and through the river to Red Bluff, a distance of about 17.5 miles.

In January 1967, the controlling depths were 8 feet in Port Lavaca Channel and 10½ feet in Lynn Bayou Turning Basin; thence 8½ feet in the Harbor of Refuge Channel and 10 feet in the turning basin. Project depths were obtained in the channel through Lavaca Bay to the mouth of Lavaca River, thence to Red Bluff, in August 1966, and in July 1965, respectively.

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 southwest end of the causeway has been retained as a fishing pier. An overhead power cable crossing Lavaca Bay about 500 yards northwestward of the causeway has a clearance of 69 feet over the channel. State Route 616 highway bridge having a removable span and Missouri-Pacific railroad bridge having a swing span cross Lavaca River near its junction with the Navidad in the vicinity of the towns of **Vanderbilt** and **Lolita.** The railroad bridge has a clearance of 12 feet; see **203.245,** chapter 2, for **drawspan regulations.** An overhead power cable with a clearance of 65 feet crosses the river near Lolita.

Keller Bay, an arm on the east 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 east 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.

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Port Lavaca, on the western shore of Lavaca Bay, is a city in a fishing, farming, and growing industrial area. See appendix for **storm warning displays.** The municipal harbor is under the jurisdiction of the Port Commission and a **harbormaster** administers the local regulations. Several small boat basins with depths from 6 to 9 feet are maintained along the waterfront by local fishing, dredging, and oil companies. Gasoline, diesel fuel, water, ice, provisions, and some marine supplies are available. Three shipyards, two with marine ways, are equipped to make general repairs. The larger yard has marine ways capable of hauling out vessels up to 85 feet in length.

Port Lavaca and Point Comfort have been designated a **Customs port of entry.**

Port O'Connor is a small settlement at the southwestern end of Matagorda Bay north of Pass Cavallo.

The town is approached via the Intracoastal Waterway route between two jetties which extend into the bay. Mariners are cautioned to keep in the channel between the jetties; shoal areas with rocky bottom lie outside the channel. Along the Matagorda Bay shore 0.4 mile northwest of the jetties are the piles of an old pier. Numerous docks and slips for shrimp boats and pleasure craft are along the north 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.

See appendix for **storm warning displays.**

Charts 1285, 890, 891.—Espiritu Santo, San Antonio, Mesquite, and Aransas Bays are a series of shallow bodies of water extending southwesterly along the coast for a distance of 50 miles from Pass Cavallo to Aransas Pass, separated from the Gulf by Matagorda Island and **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 eastern part of the bay a dredged ferry channel extends from the waterway southward to a military base on Matagorda Island. The channel is marked by lights, daybeacons, and buoys. In March 1964, 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 north side of the south island. **Steamboat Pass,** 1.5 miles to the north, 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.

Northward 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 east, and **Hynes Bay** on the west. **Goff** and **Schwings Bayous** flow into Mission Lake.

Guadalupe River empties into the northern end of San Antonio Bay. A depth of about 2 feet can be carried from the bay into the north 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 Federal project provides for a channel 9 feet deep from the Intracoastal Waterway, northwesterly along the east side of San Antonio Bay, to and through Guadalupe Bay, thence through cuts along the east side of Mission Lake and Green Lake, and thence in a dredged cut inland to a turning basin and small boat harbor at the **Port of Victoria** about 6 miles below the city of **Victoria.** In November 1965–January 1967, the controlling depth from the Intracoastal Waterway to the end of the completed project to date was 7 feet; a distance of about 30 miles. About 25 miles above the Intracoastal Waterway, the Missouri Pacific railroad lift bridge was under construction; proposed clearances are 22 feet down and 50 feet up. In 1967, dredging was in progress to complete the project to the Port of Victoria.

About 5.3 miles above the Intracoastal Waterway, a Federal project channel leads eastward from the main channel to Victoria to a turning basin at the town of Seadrift; project depth in the side channel and basin is 9 feet. In January 1967, project depths were available in the channel and basin.

A private channel about 0.3 mile southward of the channel to Seadrift, marked by stakes, leads to a marina in a basin at Swan Point. Gasoline, water, open and covered berthage, and a ramp are available at a lighted pier in the basin. A depth of 6 feet is reported in the channel.

About 12 miles above the Intracoastal Waterway, a privately dredged channel which had a controlling depth of 9 feet, reported in 1965, leads to a basin at a large chemical plant at Long Mott.

State Route 35 highway bridge crossing the channel just below Green Lake and about 15 miles above the Intracoastal Waterway has a fixed span with a clearance of 50 feet.

Seadrift is a small fishing and farming community on the northeast shore of San Antonio Bay, and has highway and rail connections. There are shrimp docks, seafood processing plants, and a service wharf in the basin. Gasoline, diesel fuel, water, and some provisions are available. North of Seadrift, a boat repair yard has marine ways capable of hauling out boats up to 30 feet in length for general repairs.

Long Mott is a small town on Mission Lake that has railroad and highway connections to the interior. There is a large chemical plant in the town.

Mesquite Bay lies between **Ayres Reef** and **Third Chain of Islands,** and is of no commercial importance except for fish and oysters. A large hunting club is located on Matagorda Island opposite the southeast 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 eastern end of Aransas Bay across Carlos Bay into Mesquite Bay.

Cedar Bayou, separating Matagorda Island from St. Joseph Island, leads in a southerly direction from the southeast corner of Mesquite Bay toward the Gulf. A bar has closed the outlet to the Gulf.

Charts 1285, 892.—Aransas Bay, 15 miles in length and 3 to 4 miles in width, is used extensively as a shrimping ground. The Intracoastal Waterway crosses the bay, and opposite Rockport turns westward to and through Redfish Bay; at the turn, the channel of the former route of the Intracoastal Waterway continues to Lydia Ann Channel. A privately maintained channel near Blind Pass, at the southeast end of the bay, is marked by a lighted range. The periodic tide throughout the bay has a diurnal range less than 0.5 foot, the variation in water level depending principally on the wind. Many piles along the south 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 northward, is the site of considerable hunting and sport fishing, but commercial fishing is prohibited. There are no communities on the bay. 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. Limited quantities of gasoline are available at two small landings along the west shore.

A privately maintained channel, marked by daybeacons on the east side, leads to two oil loading docks about 0.8 mile east of the north end of the Copano Bay causeway. The channel has a controlling depth of about 6 feet. A privately marked channel branches off from this channel for about 1.1 miles eastward to lagoons at **Neptune Harbor.** Berthage and a ramp are available.

A yacht basin near the north end of the causeway at Lamar has storage facilities for boats up to 36 feet in length. There is a marine way capable of hauling out vessels up to 30 feet in length. Owners must arrange for their own repairs. A privately maintained and marked channel to the basin had a controlling depth of 6 feet in 1964. Gasoline, diesel fuel, water, ice, marine supplies, open and covered berthage, and a concrete ramp are available in the basin.

Copano Bay, a northwesterly extension of Aransas Bay, is used principally as a center for hunting and sport fishing. No commerical 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 south of **Redfish Point,** inside the bay on the south side at the entrance. Storm anchorages for drafts up to 3 or 4 feet may be had in the southern end of the bay in the small bight at the northeast corner of **Port Bay.** Slightly greater draft can find good protection in the extreme northeast 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 bascule span with a width of 42 feet and a clearance of 11 feet. In 1966, a causeway and bridge were under construction parallel with, and close eastward of the existing structure.

Mission Bay, on the north shore of Copano Bay, is of no importance; only small skiffs can enter.

Bayside is a small resort town on the northwestern shore of Copano Bay. A large hotel shows prominently from the bay. Highway and telephone communications are available.

Aransas River, emptying into the northwestern end of Copano Bay, is shallow and navigable only for small craft of 1 foot or less. A 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 west side at the south end of the bridge. Gasoline, water, ice, open and covered berthage, and 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, berthage, and lodging are available.

Fulton is a small village on the west shore of Aransas Bay. A Federal project provides for a basin 8 feet deep protected by a dike and breakwater, and a channel 8 feet deep from the basin to that depth in Aransas Bay. In August 1966, the controlling midchannel depth was 7 feet in the entrance channel and 5½ feet in the basin. The Aransas County Navigation District No. 1 has constructed a commercial fish harbor and yacht basin with a protecting seawall and depths to accommodate drafts of 10 feet. There is a fish packing and freezer plant. Berthing and storage facilities are available. The **harbormaster,** who is in charge of berth assignments and ship movements, has offices at the harbor and in Rockport. A **speed limit** of 5 m.p.h. within the harbor is in force. Numerous shrimp boats and trawlers base in the harbor. There are three marinas, and a small shipyard has a 20-ton travelift and marine ways which can haul out craft up to 37 feet in length for general repairs. Steel or wooden hull vessels are built and repaired and machine shop repairs are available. The yard has covered slips available for boats

up to 32 feet in length. Gasoline, diesel fuel, water, ice, open and covered berthage, ramps, lifts, and some marine supplies are available.

Key Allegro, a resort center built on filled-in marshland, is about a mile south 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 west side of the key. The north channel has a reported depth of about 6 feet. 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 southern entrance channel has a reported depth of about 4 feet. Privately-maintained lighted range, lights, and daybeacons mark the southern channel. The marina has open and covered berthage, concrete ramps, and a 2-ton hoist. Gasoline, diesel fuel, water, ice, and marine and yacht supplies are available.

A side channel branching off from the southern Key Allegro Channel leads westward to a boat basin at a State park on the long sandspit that extends eastward from Rockport Harbor. The reported depth in the channel is about 3½ feet. The channel is marked by stakes. Ramps and slips are at the park.

Rockport is a commercial fishing and resort town on the west shore of Aransas Bay. A water tank shows prominently from Aransas Bay. A spoil bank area exends along the northwest 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. Federal project depth is 9 feet for an entrance channel and basin in the harbor. In August 1966, the controlling midchannel depth was 9 feet in the entrance channel, thence 7½ feet in the basin.

To enter, pass about 50 yards east of the approach light and head directly toward the light on the seawall at the basin entrance. The channel is marked by buoys on the west side.

See appendix for **storm warning displays.**

In the basin are excellent facilities for yachts and other craft. The marine laboratory of the Texas Game and Park Commission is at the north end of the basin. The basin is about 0.3 mile in length and protected by a concrete seawall. Inside is open and covered berthage space for more than 100 yachts of all sizes, and several covered piers. The harbormaster, who has charge of berth assignments and ship movements, has his office at the northeastern end of the basin. A **speed limit** of 5 m.p.h. within the harbor limits is in force.

Gasoline, diesel fuel, water, ice, and marine and yacht supplies are available. Two repair yards and a marina are in Rockport. A vertical lift is available to haul out vessels up to 110 feet in length for general repairs. The yard builds steel tugs, trawlers, and shrimp boats up to 100 feet in length. About 1 mile south of Rockport is another privately-owned shipyard, operated only for repairing company tugs and barges; however, this shipyard will haul out other craft up to 100 feet in length 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 is a commercial basin off the Intracoastal Waterway about 2.5 miles southward of Rockport Harbor. There are two slips in the basin and berthage along the bulkhead of the basin and in the slips. There is about 12 feet in the entrance and 10 to 11 feet in the basin. A shipyard here builds steel tugs and trawlers. Gasoline, diesel fuel, water, ice, covered berthage and ramps are available.

Palm Harbor is a yacht basin in a dredged slip 0.3 mile long off the Intracoastal Waterway about 1.5 miles southward of Cove Harbor. A depth of 6 feet was in the basin in April 1965. Gasoline, water, ice, open and covered berthage, marine supplies, and a ramp are available at the basin.

Lydia Ann Channel, along the northeast side of Harbor Island, connects the south 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 east side of the channel east 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 523, 892, 1286.—Aransas Pass, 154 miles southwestward of Galveston Entrance and 113 miles northward 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 St. Joseph Island on the north and Mustang Island on the south. Directly opposite the inner end of the pass is **Harbor Island,** which separates Aransas Bay from Corpus Christi Bay.

Two jetties extend into the Gulf from St. Joseph and Mustang Islands. In the bend in the north jetty are several spurs, now submerged, whose ends are marked by three buoys. Small craft are cautioned not to pass between these buoys and the northeast jetty. There are three submerged spurs in the south jetty. A submerged wreck covered 24 feet lies to the south of the channel inside the jetties.

An artificial fish haven marked by a buoy is 5.5 miles southeast of the entrance and 1.4 miles southwestward of the sea buoy.

The approach to Aransas Pass is marked by a lighted whistle buoy 5.5 miles offshore, and a lighted bell buoy and a lighted buoy 1.5 miles off the north 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.—In approaching Aransas Pass in daytime, the first objects sighted are the twin stacks and structures of the inactive Carbon Black plant, about 2.5 miles northeastward of the town of Aransas Pass, and a water tank in Port Aransas. The abandoned lighthouse, a 60-foot red brick octagonal tower on Harbor Island, and the buildings at Port Aransas will be sighted as the pass

is approached. The 78-foot tower of a rear range light, toward the south end of St. Joseph Island, shows prominently from the Gulf.

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. This station is equipped for special radio-direction-finder calibration; see the Light List for operational information.

Vessels should approach Aransas Pass through the Aransas Pass Safety Fairway or the Coastwise Safety Fairway; 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 west side of Corpus Christi Bay. For about 4 miles, at the eastern end, it extends through Turtle Cove between Harbor Island on the north and Mustang Island on the south; thence across Corpus Christi Bay to Corpus Christi. The channel is straight except for a 15° bend at about its midway point just south 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 northward from Corpus Christi Channel, and follows the northeast side of Corpus Christi Bay to a turning basin at the town of La Quinta. Federal project depth in the channel and basin is 36 feet.

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 northwestward of its junction with Corpus Christi Channel. The canal extends about 0.8 mile northeastward to a turning basin in **Kinney Bayou.** The controlling depth was 10 feet in August 1966. The entrance is marked by a light and daybeacons.

Encinal Channel branches off from Corpus Christi Channel about 0.6 mile west of the La Quinta Channel junction. It extends about 7 miles southward to a turning basin at the naval air station on **Encinal Peninsula** on the south side of Corpus Christi Bay. The controlling depth was reported to be about 10 feet in the channel and 12 feet in the basin in April 1965. 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, the only available anchorage is in the Inner Basin east of Harbor Island and north of the channel. The space here is limited and subject to shoaling; caution is necessary. Although holding ground is good, there is no protection from north and east winds. Light-draft vessels up to about 12 feet can anchor in Lydia Ann Channel north 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 anchorage area, wherein vessels not more than 65 feet in length are not required to carry or exhibit anchor lights, has been established in Corpus Christi Bay; see **202.75,** 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 easterly direction make a rough bar and raise the water inside as much as 2 feet above normal. Winds from any westerly direction have an opposite tendency. A sudden shift of the wind from south to north makes an especially rough bar for a short time. During summer months, southerly winds prevail, becoming moderate to fresh in the afternoon.

See appendix for **Corpus Christi Climatological Table and storm warning displays.**

Pilotage is compulsory for all foreign vessels and U.S. vessels under register in foreign trade. Pilotage is optional for coastwise vessels who have on board a pilot licensed by the Federal government. The Aransas-Corpus Christi Pilots maintain an office and lookout on the south side of the entrance at the inner end of the south jetty. The pilot boat is painted black with white superstructure and has the name ARANSAS PILOT in white letters on the bow, and flies the code flag P. The pilot boat is equipped with radar and radiotelephone VHF, Channels 12 and 16, and monitors 2182 and 2738 kcs; call sign: WR–8879. The pilots' office is hooked up with the FM harbor radio circuit with the harbormaster's office, pilot boat, and tugs. All pilots and tugs are equipped with citizens band portable radiotelephones used in docking, undocking, and all harbor movements. There is 24-hour pilot service to Harbor Island, La Quinta, and Corpus Christi. Pilots can be obtained on prior notice by radiotelegraph or radiotelephone through the Corpus Christi Marine operator, phone: Port Aransas—Riverside 9–5444.

Towboats are available at Harbor Island and Corpus Christi. Divers and salvage equipment may be engaged. The pilots and tugs use the citizen band radiotelephones during docking, undocking, and all harbor movements.

Quarantine.—Ships subject to inspection are boarded alongside the dock at Harbor Island, Port Ingleside, La Quinta, and Corpus Christi. The nearest U.S. Public Health Service hospital is at Galveston. Corpus Christi has several modern hospitals and a Public Health Service outpatient office.

Customs and Immigration.—The Custom Service maintains offices in the Post Office building and the Immigration Service maintains offices in the Federal building in Corpus Christi. Vessels are boarded at the dock. Officials are on 24-hour call. Corpus Christi is a port of entry and marine documents are issued.

Port of Corpus Christi (see also chart 524) is on the west 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, Texas. 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 molasses, bauxite, chrome, zinc, and other bulk ores, petroleum products, paints and pigments. The principal exports include wheat, rice, and other grains, sorghums, flour, animal feeds, flax seed, cotton, petroleum products, 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, sulphuric 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. A **speed limit** of 4 knots is in force in the harbor.

Wharves.—There are 10 public general cargo berths with transit sheds with a total of more than 600,000 square feet of storage space, 3 open cargo berths, all owned by the Navigation District. Most of the berths have double-tracked aprons, and depressed tracks at the platforms in the rear of the transit sheds. There are three privately operated berths with equipment for handling bulk materials and one private dry cargo berth. The 5½ million-bushel Corpus Christi Public Grain elevator on the north side of the Industrial Canal has shipside conveyor galleries and loading spouts. A private 4½ million-bushel grain elevator on the south bank of Tule Lake Channel is similarily equipped.

There are 10 public and 12 private berths within the port which are used exclusively for handling petroleum products, petrochemicals, and other liquid cargoes, one berth for handling acid, 2 berths for handling and storage of bulk cement, one berth for handling sugar, and one berth for handling and storage of molasses.

Four 30-ton diesel locomotive cranes, one 30-ton diesel crawler crane, and 2 steam locomotive cranes are at the wharves and barge dock. Modern cargo handling equipment such as fork lifts, conveyors are available at the terminals. General cargo is usually handled by the ships' tackle. Within the main harbor there are 12 miles of terminal railroad, 4 miles of paved roads, cotton compresses, scales and track scales.

Supplies.—Water is available at all berths. Oil bunkering facilities are available at oil docks and by oil barges. General supplies, marine hardware, and provisions are available at the numerous stores, and unusual items generally can be secured quickly from Galveston or Houston.

Repairs.—There is no shipyard with drydocks or marine ways for hauling out large ships, but an excellent machine shop is equipped to make any kind of topside repairs to any size vessel. This shop has a large portable generator, both a.c. and d.c., available for large ships. The nearest drydock for large vessels is at Galveston.

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 northwest 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 are available.

Port Aransas is a small commercial fishing and resort town on the north end of **Mustang Island** at the inner end of Aransas Pass. A channel leads to a turning basin just inside the pass. In February 1967, project depths of 12 feet were available in the entrance channel and basin.

There are boatyards and a municipal marina in the basin. Lifts can haul out craft up to 50 feet in length for general repairs or storage. Gasoline, diesel fuel, fresh water, ice, marine hardware, yacht supplies, provisions, open and covered berthage, ramps, and charter boat hire are available. A 1,200-foot fishing pier extends into the Gulf about 0.5 mile south of Aransas Pass. An automobile ferry operates between Port Aransas and Harbor Island. A Coast Guard station is at Port Aransas.

See appendix for **storm warning displays.**

Harbor Island lies at the head of Aransas Pass. There are large oil-handling plants on the east end of the island. A turning basin has been dredged for nearly 2,000 feet along the north side of the ship channel. Berthing space for three large vessels is available at the three open piers. A wharf with a transit shed is about 1,000 feet long. A toll highway from the terminals crosses Morris and Cummings Cut and Redfish Bay, and leads to the town of Aransas Pass on the mainland.

A mooring slip on the north side of Harbor Island is reported to have been dredged to 34 feet. Vessels discharge bauxite ore into barges in the slip.

From the Inner Basin off Harbor Island, a Federal project provides for a channel 12 feet deep to a basin of the same depth off the town of **Aransas Pass,** situated on the mainland about 5.5 miles northwestward of Aransas Pass, and 12 feet in a connecting channel to and in **Conn Brown Harbor.** In May–August 1966, the controlling depth in the channel was 9½ feet, thence 12 to 14 feet in the turning basin, thence project depth in the connecting channel, and 13 feet in Conn Brown Harbor. Lights and daybeacons mark the channel.

A canal crossing the west end of Aransas Pass Channel extends along the east side of the town, sheltered from Redfish Bay by a spoil bank. South of the causeway the canal offers good protection to small boats. The channel and harbor to the north of the causeway have several seafood processing plants. A large fishing fleet operates out of the town. An oil company marine base is in the harbor.

There are boatyards and marinas in the harbor. The largest marine railway can haul out craft up to 110 feet in length for general repairs or storage. Gasoline, diesel fuel, water, ice, marine and yacht supplies, open and covered berthage, and 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.

Corpus Christi Bayou, at the south end of Aransas Bay, provides small craft a short cut from Aransas Bay via **Morris and Cummings Cut** to Corpus Christi Bay. The bayou entrance is marked by a day beacon on the south 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 south 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 southward 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 35 feet.

A privately maintained and marked channel leads from the south end of Morris and Cummings Cuts to a basin at the south end of the town of Aransas Pass; the controlling dapth is about 5 feet.

Redfish Bay is shallow; it extends northward 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 north-to-south 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 westward of Mustang Island and connected with Aransas Pass by the Corpus Christi Channel. The bay is about 15 miles long in an east-and-west direction and 11 miles wide at its widest part. About the eastern 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 southeast side of Corpus Christi Bay, affords good anchorage for small boats in depths of 7 to 8 feet, soft mud bottom. A light marks the shoal water extending westward from **Shamrock Point.**

In **Port Ingleside,** on the north shore of Corpus Christi Bay about 7.5 miles westward of Aransas Pass, is a privately owned oil terminal. The oil piers are in basins north of Corpus Christi deep-draft channel; bunkering facilities are available.

La Quinta deep-draft channel is along the east side of Corpus Christi Bay, branching off Corpus Christi deep-draft channel about 8.5 miles westward of Aransas Pass, and leads northward 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 east shore of Ingleside Cove, has a marina that can accommodate boats up to 64 feet in length. Gasoline, diesel fuel, water, and open and covered berthage are available.

Jewel Fulton Canal leads into **Kinney Bayou** from La Quinta Channel. There are marinas, fish wharves, and a public boat harbor and dock. Travelifts can haul out craft up to 45 feet in length for general repairs or storage. Gasoline, diesel fuel, water, ice, marine and yacht supplies, open and covered berthage, and ramps are available. In August 1966, the controlling depth was 10 feet in the channel leading into the bayou; the channel is marked by daybeacons.

In Ingleside Cove, south 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 northeast and southwest entrance points, respectively, to Nueces Bay, are connected by U.S. Route 181 highway bridge-causeway. **Rincon Channel,** entered close eastward of Rincon Point, leads northward from Corpus Christi Bay, thence northeastward and northwestward through the highway bridge to Nueces Bay; the controlling depth in the channel is about 6 feet. The fixed span of the highway bridge over the channel has a clearance of 51 feet. In 1967, the railroad bridge-causeway just southward of the highway bridge was being removed. An overhead power cable along the railroad causeway is submerged at the channel.

A privately maintained channel, with reported depths of about 8 to 9 feet leads to a marina at the northeast end of the causeway. There is covered berthage for boats up to 40 feet in length, and gasoline, oil, and marine supplies are available. A 10-ton lift can haul out boats up to 40 feet in length for hull or engine repairs. The channel is narrow and difficult to follow and local knowledge is essential. **Nueces River** emptying into the western 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 524.—Corpus Christi Harbor is on the north side of Corpus Christi and consists of inland basins connected by an industrial canal. The basins and connecting canal are landlocked and well protected.

Corpus Christi, on the western side of Corpus Christi Bay and 18 miles from Aransas Pass, is the most important city commercially on the coast of Texas southwestward of Galveston. The principal industries are in seafood processing, agriculture, livestock, meat packing and freez-

ing, 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 rice, 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 west of Avery Turning Basin, has a vertical-lift span with a clearance of 9 feet down and 138 feet up. An overhead power cable crosses the canal midpoint between Corpus Christi Turning Basin and Avery Point Turning Basin; clearance 165 feet.

Small-boat facilities.—The entire waterfront at Corpus Christi is protected by a breakwater nearly 2 miles long. Depths over the area behind the breakwater range from 7 to 16 feet, not including the ship channel crossing the north end. The main entrance is through the ship channel to the north of the yacht basin. A draft of 7 to 8 feet can be carried southward inside the breakwater to the three large yacht piers. The best water is at the center of the protected waterway. There are four openings in the breakwater south of the ship channel. The first is shallow with a depth of 3 feet in the middle; the other three have depths of 8 to 9 feet, the most southerly being the deepest.

The yacht basin is opposite the center of the city and has excellent accommodations for yachts and small vessels. Protected berths for 300 yachts are available in depths of 7 to 11 feet. Gasoline, diesel fuel, oil, and water are available; a repair yard has facilities for hauling out boats up to 40 feet in length.

See appendix for the **Corpus Christi Climatological Table** and **storm warning displays.**

A general repair yard on the Industrial Canal has a vertical lift capable of hauling out vessels up to 85 feet in length. Wooden or steel hull and boiler repairs are made; a machine shop, a welding shop, and pipe shop are on the premises.

Chart 1117.—Laguna Madre is a shallow body of water extending southward 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, Texas; see chapter 12. **Padre Island,** a low barren, storm-swept strip of sand beach, separates Laguna Madre from the Gulf.

An artificial fish haven marked by a State maintained bell buoy is 1.5 miles offshore about 15.6 miles northward of Port Mansfield jetties. Another fish haven marked by a State maintained buoy is 4.5 miles offshore about 11.2 miles northward of the jetties.

Charts 1287, 896.—Port Mansfield, 70 miles southward of Corpus Christi Bay, is a commercial fishing and popular sport fishing and recreational center, and a base for oil exploration in Laguna Madre.

Vessels should approach Port Mansfield through the Port Mansfield Safety Fairway; see 209.135, chapter 2.

An 8.6-mile dredged channel leads westward across Laguna Madre from the Gulf at a point 78 miles southward of Aransas Pass and 31 miles northward of Brazos Santiago to Port Mansfield. The jettied entrance is marked by a lighted buoy 0.7 mile offshore, a light on the south jetty, and a buoy off the north jetty, and the channel is marked by lights, daybeacons, and buoys.

A Federal project provides for a 16-foot channel through the bar and jetty channels, thence 14 feet through the landcut and across Laguna Madre and Intracoastal Waterway to a turning basin of the same depth at Port Mansfield, and a 12-foot shrimp boat basin and 8-foot small-craft basin at the head of the turning basin. In November-December 1966, project depths were available in the bar and jetty channels, thence 13 feet to the Intracoastal Waterway, and thence project depths to and in the turning basin, shrimp boat basin, and small-craft basin.

Anchorages.—Vessels may anchor off the entrance in the Port Mansfield Anchorages on either side of the safety fairway; see 209.135, chapter 2.

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 in length 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 water, ice, gasoline, diesel fuel, and yacht and marine supplies are available. There is a marine railway at the head of the shrimp basin that can haul out vessels up to 150 feet for general repairs. A **speed limit** of 4 knots is in force 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.

See appendix for **storm warning displays.**

Charts 1288, 897.—Arroyo Colorado enters Laguna Madre through **Arroyo Colorado Cutoff,** a dredged channel, 90 miles southward from Corpus Christi. A Federal project provides for a channel 12 feet deep from the Intracoastal Waterway through Arroyo Colorado Cutoff and Arroyo Colorado to a turning basin at Port Harlingen, 22 miles from the mouth. In July 1966, the controlling depth was 11 feet to mile 7.2, thence in January 1967, project depths to and in the basin.

A barge assembly basin with attendant mooring buoys and depths of about 14 feet is on the north side of Arroyo Colorado Cutoff about 1.7 miles west of the Intracoastal Waterway. This basin is intended for the temporary moorings of barges.

Arroyo City (Camp Arroyo) is a small village on the south bank about 6.5 miles west of the Intracoastal Water-

way. There are fish camps and a small marina. Gasoline, water, ice, open and covered berthage, and ramps are available.

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 northern 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 **203.245**, chapter 2, for **drawspan regulations.** Overhead power and telephone cables between the Intracoastal Waterway and Harlingen have minimum clearance of 52 feet.

Port Harlingen, under the jurisdiction of the Arroyo Colorado Navigation District known as the Port Commission, is east 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 **harbormaster** assigns the berths. There are two reinforced concrete wharves 500 feet and 100 feet long with berthing space, three oil unloading docks, and an adjustable ramp for the offloading and loading of truck trailers to barges. A transit shed on the west wharf has 12,000 square feet of storage space, and rail siding at a loading platform in rear of shed. Water is available at the west wharf. There is a grain elevator, compressed gas and oil storage, and a fertilizer loading 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, cotton, 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 1288, 898.—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 south end of Padre Island and the north end of **Brazos Island.** It lies 236 miles south-southwestward from Galveston entrance, 106 miles southward from Aransas Pass, and 6 miles northward from the mouth of the Rio Grande.

Prominent features.—In approaching Brazos Santiago on a clear day, the water tanks 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 north side. The large motels on Padre Island northward of the entrance, and at Boca Chica on Brazos Island southward of the entrance are also 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 north side of the entrance to Laguna Madre. The radiobeacon antenna is near the light.

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 east of the jetties, a lighted 269½° entrance range, a lighted gong buoy off the submerged part of the north jetty, and a light and fog signal at the end of the south jetty. The channels are marked by lighted ranges, lights, daybeacons, and lighted and unlighted buoys.

In the 12-mile channel to Brownsville Turning Basin, **Boca Chica Cutoff Passing Basin** is 5.5 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 south end of Padre Island just inside Brazos Santiago entrance. The basin has shoaled to a depth of about 10 feet. There is a large motel-marina (boatel) in the basin where gasoline, diesel fuel, water, ice, open and covered berthage, some marine and yacht supplies, and surfaced 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 north and south the bottom is harder. After entering the pass, ships must proceed to the wharves. Temporary anchorage can be made in the turning basin at Port Brownsville while awaiting a berth.

Tides and currents.—The diurnal range of tide at Brazos Santiago is 1.4 feet and at Port Isabel 1.3 feet. The variation in the water level is largely dependent on the wind.

See appendix for the **Brownsville Climatological Table.**

Dangers.—An unmarked dangerous wreck is 4.5 miles northward of the Sea Buoy and an artificial fish haven is 1.3 miles north of the Sea Buoy.

Pilotage is compulsory for all foreign vessels and U.S. vessels under register in foreign trade. Pilotage is optional for coastwise vessels who have on board a pilot licensed by the Federal government. Most deep-draft vessels take a pilot. The pilot boats are equipped with radiotelephone and meet arriving vessels off the Sea Buoy. Vessels are taken in day or night. Arrangements can be made in advance to the Brazos Santiago Pilots by radiotele-

graph, radiotelephone, or through the ship's agents. The pilots carry portable radiotelephones.

Towage.—Two tugs of 1,200 and 900 hp. are available at Brownsville for docking and undocking vessels, coastwise towing, or for salvage work.

Customs.—Brownsville is a port of entry and marine documents are issued. A deputy Collector of Customs has an office in the Federal Building in Brownsville and suboffices at Port Isabel and Port Brownsville. Vessels are boarded at the dock.

Quarantine and Immigration.—These services maintain offices at the Gateway International Bridge. Vessels are boarded at the docks.

The nearest Public Health hospital is in Galveston. A hospital and a Public Health Service outpatient office are in Brownsville.

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 shed, 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 in force.

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, ore, chemicals, and citrus fruit. Imports are bananas, steel products, and general merchandise.

Brownsville, about 5 miles west-southwest of Port Brownsville, is a fast growing metropolis and the largest city in the rich agricultural section on the north side of the lower Rio Grande Valley that extends 100 miles westward 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.—There are 9 general cargo wharves for deep-draft vessels in Port Brownsville with 4,500 feet of berthage with 35 feet alongside. Eight of the wharves have transit sheds with about 500,000 square feet of storage space, and one is an open wharf with 100,000 square feet on the concrete apron. All but two of the wharves have double-tracked aprons and all have double-depressed tracks at loading platforms in the rear. There are 5 wharves for light-draft vessels with 21 feet alongside. Three are open wharves, two of which have double-tracked aprons, and two have double-depressed tracks in the rear. One has a transit shed with 23,000 square feet of storage space and 100,000 square feet of open storage, but has no rail siding. A fifth one has two transit sheds with 17,000 square feet of storage space, and is equipped with two gantries and conveyors for unloading bananas and pineapples to depressed tracks at loading platforms in rear of the sheds. A 400-foot small-craft wharf is at the west end of the turning basin.

There are 4 oil-handling berths. The 400-foot bulk cargo dock with 32 feet alongside has a movable loading tower, trimmer, chute, and portable barge loading conveyors. A bulk cargo warehouse on the wharf has storage for 30,000 tons, or 750,000 bushels of cotton seed meal, milo, gluten meal, feed, rice, or wheat. There are double-depressed tracks in rear of the warehouse. Mobile cranes, conveyors, scales, etc. are on the wharf.

The 1½ million-bushel grain elevator can load up to 25,000 bushels per hour. All transit sheds are equipped with automatic sprinkler systems and a 24-hour security watch is maintained in the port.

The port has oil-storage capacity of 500,000 barrels. Vegetable and fish oils are handled at one oil dock. A steam crane of 30-ton capacity and a mobile boom of 15 tons capacity are available.

There are six cotton storage warehouses and compresses in the port with a storage capacity of about 2½ million-square feet, or 346,000 bales of cotton. Five of the warehouses also store general merchandise. There are two general merchandise warehouses in Brownsville. Cold storage warehouses and freezer plants are available in the fishing harbor. A Coast Guard wharf is on the north bank of the ship channel just below the oil wharves.

Supplies.—All manner of ship supplies, marine hardware, and provisions are available at the port. Fresh water is piped to all wharves. Gasoline, kerosene, and diesel fuel at three of the oil berths. Bunker C can be delivered by barge from Corpus Christi by special arrangement. Ice is available.

Repairs.—A marine repair plant for above-water hull and engine repairs and a machine shop is located on the west bank at the head of the turning basin. There are two marine railways in the fishing harbor, but the nearest drydocks for large vessels are at Galveston.

Small-boat facilities.—**Brownsville Fishing Harbor** is 3 miles below the turning basin at Port Brownsville. 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 hauling out vessels up to 75 feet in length for hull repairs. Gasoline, diesel fuel, water, ice, ramps, open and covered berthage, 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 east of the city, with daily scheduled flights to all parts of the United States and Mexico City, where connections can also be made to Central and South Amer-

ican points. There is local taxi and bus service, and Interstate bus service to all points.

Port Isabel, about 2.5 miles westward from Brazos Santiago, is an important point for the shipping of petroleum products, cotton, and metals. It has a large fishing fleet, and the town is widely patronized as a resort for sport fishing and recreation.

Channels.—A Federal project provides for a side channel from the Intracoastal Waterway along the southern part of Port Isabel, 12 feet deep and 125 feet wide and a side channel 6 feet deep and 60 feet wide for the use of small craft. In May–July 1966, the 12-foot channel had a controlling depth of 9 feet, and the 6-foot channel was at project depth. The 12-foot channel is known as the **Industrial Channel**; it is used principally by fishing boats.

A causeway at the south end of Laguna Madre, between Padre Island and Port Isabel, has a fixed channel span with a width of 38 feet and a clearance of 18 feet. Overhead power and telephone cables crossing Laguna Madre on both sides of the bridge have a clearance of 39 feet.

Wharves.—The deepwater facilities at the turning basin in Port Isabel are controlled by the Port Isabel-San Benito Navigation District, and managed by a **port director. A harbormaster** at the wharves assigns berths and controls the movement of ships. A **speed limit** of 4 knots in the harbor and 8 knots in the ship channel is in force. There are two general cargo wharves with more than 1,000 feet of berthing space on the west side of the basin and an oil dock equipped for receiving and loading oil cargoes is on the north side. A transit shed and warehouses on the west wharf have more than 50,000 square feet of covered storage space. There is a precooler plant on the wharf. The open wharf was designed for the handling of fruit. The wharves have facilities for bunkering ships and serving them with fresh water and electricity. The entire terminal is serviced by railroad, highway, and pipeline.

Repairs.—There are two boatyards with marine railways, the largest railways can haul out craft up to 72 feet in length for general repairs.

Small-craft facilities.—There are several marinas at Port Isabel. Gasoline diesel fuel, water, ice, marine supplies, open and covered berthage, and ramps are available.

A dredged channel in Laguna Madre leads from the Intracoastal Waterway to Port Isabel Small Boat Harbor. In July 1966, Federal project depths of 7 feet were available from the waterway to the harbor entrance, thence 6 feet in the harbor channel and basin. Lights and daybeacons mark the channel.

Communications.—Rail and highway connections with San Benito and Rio Grande are available.

Del Mar (Boca Chica) Beach, on Brazos Island, is a swimming and fishing resort.

The **Rio Grande** empties into the Gulf of Mexico 6 miles southward 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 fresh water from wasting into the Gulf.

The east coast of Mexico is described in H.O. Publication 20, Sailing Directions for the East Coasts of Central America and Mexico, published by the U.S. Naval Oceanographic Office.

12. INTRACOASTAL WATERWAY, APALACHICOLA TO BROWNSVILLE

The part of the **Intracoastal Waterway** described here is the toll-free **"canal"** which affords continuous, protected passage behind the Gulf Coast for the more than 900 nautical miles between St. George Sound, Florida, and Port Brownsville, Texas. Supervision of the waterway's construction, maintenance, and operation is divided among three U.S. Army Engineer Districts (Mobile, New Orleans, and Galveston) whose district-office addresses are listed in the appendix.

Mileage.—Intracoastal Waterway **(I.W.)** mileage in this edition is zeroed at **Harvey Lock,** New Orleans, and measured **eastward (E),** or **westward (W)** along the waterway in **nautical miles.** Alternate routes are zeroed to takeoff from basic I.W. 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). **All Coast Pilot distances are in nautical miles.**

The above is a departure from the Fifth (1962) Edition, which zeroed the waterway at the John Gorrie Memorial Bridge at Apalachicola, and measured distances in nautical miles westward to Brownsville, Texas.

The distances given in the book should not be confused with those shown on bridges or markers placed along some portions of the waterway by the Corps of Engineers. These latter distances, although referenced to Harvey Lock, are given in statute miles. Tables for converting nautical miles to statute miles are in the appendix.

Channels.—The Corps of Engineers project for the Intracoastal Waterway provides for a least depth of 12 feet over a minimum bottom width of 125 feet from Carrabelle Ship Channel to Port Brownsville, Texas. Although effort is made to maintain the project depth, the channel may shoal several feet in places between maintenance dredging; see Notice to Mariners for latest controlling depths. Additional information can be obtained from the U.S. Army District Engineer offices.

Bridges.—Minimum overhead clearances of Intracoastal Waterway bridges are 48 feet at fixed bridge Mile 463.6W and 50 feet at fixed bridges at Miles 247.3E and 180.1E. Minimum width of bridge opening (basic route) is 75 feet. See **203.240** and **203.241,** chapter 2, for regulations governing operation of waterway drawspans.

Cables.—Minimum clearances of Intracoastal Waterway overhead cables is 61 feet at power cable Mile 463.6W. Several others have clearances of 71 to 76 feet.

Locks.—Minimum lock lengths are 425 feet at lock Mile 0.0 (Harvey); 640 feet at lock Mile 5.4E (Inner Harbor Navigation); and 760 feet at lock A.A. Mile 0.0 (Algiers). Minimum lock width is 56 feet at lock Mile 141.4W (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,** chapter 2, for regulations governing use, administration, and navigation of locks and floodgates.

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 dock. **Do not attempt to pass a moving cable ferry.**

Aids to navigation.—Intracoastal Waterway aids have characteristic yellow markings which distinguish them from aids to navigation marking other waters. See U.S. Coast Guard Light Lists or Chart 1 (Nautical Chart Symbols and Abbreviations) for illustrations of special markings.

Charts.—Navigation of the Intracoastal Waterway can be made easier by use of the special 800-series of nautical charts (scale 1: 40,000) and small-craft chart series which the Coast and Geodetic Survey publishes especially for that purpose.

Tides.—Under ordinary conditions the mean tidal range in the 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 northerly winds that occur principally during the winter depress the water surface as much as 3.5 feet below mean low water; southerly winds have the opposite effect. Severe hurricanes have raised the water surface 10 feet or more above low water in some localities.

Weather.—**Storm warnings** are displayed at various places along the Intracoastal Waterway and connecting channels; see appendix for complete listing.

Chart 865.—The improved part of the Intracoastal Waterway proper begins at 29°47.5′ N., 84°40.4′ W., in Carrabelle Ship Channel at **Mile 327.0E.** Waterway depths are available to **Carrabelle,** 3.7 miles to the north, and to the open waters of the Gulf, 3.3 miles to the south; see chapter 6.

From Carrabelle channel, the well marked I.W. route is southwestward for 18.0 miles through **St. George Sound** to 29°39.9′ N., 84°58.1′ W., in **Apalachicola Bay,** thence north by west for 3.6 miles to Apalachicola

A highway bridge-causeway extends from **Cat Point** on the mainland to St. George Island. The fixed span over the Intracoastal Waterway has a clearance of 50 feet. The fixed span over the auxiliary channel 0.8 mile south of Cat Point has a clearance of 26 feet. An overhead power cable close eastward of the causeway has a clear-

ance of 40 feet over most of the 3.5 miles between the point and the island but is submerged at the Intracoastal Waterway.

Chart 866.—Apalachicola, at **I.W. Mile 305.6E,** is on the west side of the entrance to **Apalachicola River.** The town has facilities for repair of small craft. Available supplies include fuel, water, and marine supplies; see chapter 6. **Storm warning displays** are listed in the appendix.

John Gorrie Memorial Bridge is a 4.2-mile east-west combination of highway bridges and causeways over the entrances to East Bay and Apalachicola River. The swing span over the river at **Mile 305.6E** has a clearance of 28 feet; the power cable 100 yards north of the bridge has a clearance of 84 feet.

The railroad bridge over Apalachicola River at **Mile 301.5E** has a swing span with a clearance of 11 feet. Extreme care is advised in the vicinity of the bridge. A marina in a small bayou on the south bank about 0.5 mile east of the bridge has gasoline, water, ice, yacht supplies, open and covered berthage, and ramps. A half mile west of the bridge is a small pier at which gasoline and water are available.

The I.W. leaves Apalachicola River at **Mile 300.4E** and proceeds through Jackson River to **Lake Wimico,** which is entered at **Mile 296.3E.**

Chart 867.—The I.W. leaves Lake Wimico at Mile **292.0E** through **Searcy Creek** and a long land cut. There is a submerged fresh-water syphon at Mile 287.0E. An abandoned pontoon bridge at Mile 288.0E has a horizontal clearance of 80 feet.

The highway bridge over the waterway at **White City, Mile 286.7E,** 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 **I.W. Mile 285.3E, Gulf County Canal** with a centerline depth of 9 feet in June 1966, extends 6 miles southwestward of **Port St. Joe** where fuel and supplies can be obtained; see chapter 6. A power cable crossing the waterway 3.5 miles from entrance has a clearance of 85 feet.

At **Overstreet, Mile 274.1E,** a pontoon drawbridge crosses the waterway.

Chart 868.—North of Overstreet, the I.W. follows a cut in **Wetappo Creek** for a short distance then enters **East Bay** of St. Andrew Bay at **Mile 271.2E.** The channel through the bay is well marked with lights and buoys. U.S. 98 highway bridge (Dupont Bridge) crossing East Bay at **Mile 256.8E** has a fixed span with a clearance of 50 feet over the Intracoastal Waterway channel. The swing span, pivot piers, and the four spans of the old highway bridge about 200 yards eastward have been removed.

Chart 869.—Panama City, at **I.W. Mile 254.0E,** is on the north side of St. Andrew Bay. Berthing and repair facilities, supplies, and fuel are available at the resort town; see chapter 6. The municipal yacht basin is on the northwest side of the entrance to Massalina Bayou at Mile 252.2E.

The I.W. continues through a well marked channel in St. Andrew Bay and its northwest arm, **West Bay. Hathaway Bridge,** at **Mile 247.3E,** has a fixed span clearance of 50 feet; part of the old highway bridge on the south side still remains. There is a marina in a slip on the north side of the west end of the bridge; gasoline, water, and open and covered berthage are available.

North Bay extends in a northeasterly direction from I.W. Mile **245.1E.** The controlling depths are 12 feet to the bridge at **Lynn Haven,** 5 miles above the waterway, and thence 4½ feet to a dam, two miles above the bridge; oyster bars in the middle of the bay with 2 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. Several bayous along North Bay affords 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 miles east of Alligator Bayou have a clearance of 45 feet. The transmission towers are reported to be unlighted and present a hazard to small craft at night.

Fanning Bayou, about 0.7 mile northwestward of the bridge, leads to the town of **Southport** at the head of the bayou. A channel reported dredged to 13 feet leads to an oil terminal wharf on the east bank of the bayou about 0.5 mile above the entrance. In 1965, a depth of 3 feet was reported available to a shrimp dock at Southport.

A marina in dredged basin on the west side of **Mill Point** at the north end of the bridge has gasoline, water, some covered berthage, and a ramp. A fish camp is in the basin. In February 1965, a depth of 10 feet was reported in the stake-marked channel to the basin.

A State park is east of the south end of the bridge. Ramps are available in the park. Some berthage is available in a small bayou on the west side of the south end of the bridge. Fuel and marine supplies are available in Lynnhaven.

From West Bay, the waterway enters **West Bay Creek** at **Mile 237.2E.** A power cable across the waterway at Mile 237.3E has a clearance of 70 feet. State Route 79 highway bridge over the waterway at **Westbay, Mile 236.6E,** has a lift span with clearances of 10 feet down and 80 feet up. A gasoline station is on the highway near the bridge, but there are no berthing facilities at the small settlement.

Chart 870.—From West Bay Creek, the I.W. follows a long land cut and enters **Choctawhatchee Bay** at Mile 220.6E. A power cable crossing the waterway at Mile 234.2E has a clearance of 100 feet; a cable ferry crosses at Mile 221.7E. An overhead power cable at the ferry crossing has a clearance of 70 feet.

The channel through the shallow eastern 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 south side. The causeway crossing the bay at Mile 217.7E 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 198.2E.** The bay and its tributaries are described in chapter 6.

Chart 871.—The I.W. leaves Choctawhatchee Bay at **Mile 194.2E** and proceeds westward for 33 miles through **The Narrows** and **Santa Rosa Sound** to Pensacola Bay. The east part of the route is through a well marked dredged channel while the western 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 191.8E to Mile 177.9E; see 204.134 and 204.136, chapter 2, for limits and regulations.

U.S. 98 highway bridge over The Narrows at **Mile 194.1E** has a fixed span with a clearance of 50 feet. The old swing bridge has been removed. There are two marinas at the south end of the bridge. Gasoline, diesel fuel, water, ice, open and covered berthage with electricity, supplies and ramps are available. Craft up to 42 feet can be hauled out for hull and engine repairs or storage.

Fort Walton Beach, on the north side of The Narrows at **Mile 193.1E** has limited repair facilities; fuel and marine supplies can be obtained.

A power cable crossing The Narrows at Mile 189.9E has a clearance of 76 feet. State Route 399 highway **Navarre Causeway** over Santa Rosa Sound at **Mile 180.1E** has a fixed channel span clearance of 50 feet over the waterway.

State Route 399 highway bridge over the western end of Santa Rosa Sound, at **Mile 164.7E,** has a bascule span with a clearance of 20 feet; the nearby overhead power cable has a clearance of 70 feet. Gasoline, diesel fuel, water, ice, ramps, open and covered berthage, and some marine supplies are available at two marinas on Little Sabine Bay at Pensacola Beach at the south end of the bridge. There was reported to be 6 feet in 1965, in the privately-marked channel leading from the waterway to the marinas. Fuel, water, and berthage are also available at marinas on the east side of both ends of the bridge.

Chart 872–SC.—At I.W. **Mile 159.7E,** a 4.1-mile route leads about north-northeastward through deep water in **Pensacola Bay** to **Pensacola.** The city has complete supply and repair facilities; see chapter 6.

From Pensacola Bay, the waterway passes through a land cut at **Mile 155.9E** into **Big Lagoon.** On the north shore west of **Trout Point,** Mile 153.8E, there are two boatyards and two marinas. Gasoline, diesel fuel, water, ice, ramps, and open and covered berthage with electricity are available. A marine railway can haul out craft up to 45 feet and lifts can haul out craft up to 30 feet for general repairs or storage.

State Route 182 highway bridge over the western end of the lagoon at **Mile 149.6E** has a bascule span with a clearance of 10 feet; approach the bridge at slow speed as the draw is slow to open.

Gulf Beach is a summer resort south of the bridge. **Holiday Harbor** is a yacht basin on the south bank of the waterway about 0.6 mile west of the bridge. Gasoline, diesel fuel, water, ice, marine and yacht supplies, ramps, and open and covered berthage with electricity are available at a marina in the basin. A 25-ton travelift can haul out craft up to 40 feet in length for general repairs or storage. Five Flags Yacht Club is at the basin. Berthage, water, and ice are available at a pier on Old River about 3.5 miles east of **Florida Point.**

From **Mile 145.0E,** 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 145.5E and 147.7E. Perdido Bay and its tributaries are described in chapter 6.

A marina is at a small-boat basin on the south side of the waterway in Arnica Bay at **Mile 143.9E.** Gasoline, diesel fuel, water, ice, and marine and yacht supplies are available. A marina in **Roberts Bayou,** on the north side of Arnica Bay, has gasoline and water.

Orange Beach, on the south side of Wolf Bay at **Mile 141.0E,** has a small repair yard for local fishermen, but passing craft can have work done in an emergency. Berthing, fuel, and supplies are available at the small settlement.

A fishing lodge at **Miflin** at the head of Wolf Bay has gasoline, water, ice, boat ramp, and open and covered berthage with electricity.

From the western end of Wolf Bay at **Mile 138.6E,** the waterway extends through a long land cut to and through **Oyster Bay** and enters **Bon Secour Bay** at **Mile 131.2E.**

State Route 59 highway bridge crossing the cut at Mile **135.1E** has a swing span with a clearance of 10 feet. The power cables in the vinicity of Mile 134.6E have clearances of 93 feet. Gasoline, diesel fuel, water, ice, marine and yacht supplies, berthage, and ramps are available at the bridge. Repairs can be made and dry storage is available at a small boatyard in a small basin on the east side of the bridge at the north end.

Marine supplies can be obtained at **Gulf Shores,** 0.7 mile south of the bridge. The Dixie Graves Highway extends westward from Gulf Shores to Fort Morgan on Mobile Point.

See appendix for **storm warning displays.**

The 20-mile route of the I.W. 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 116.3E; Mobile** is 25.2 miles northward. Mobile Bay and its tributaries are described in chapter 7.

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 111.3E,** has a lift span with clearance of 19 feet down and 79 feet up. A power cable on the west side of the bridge has a clearance of 91 feet.

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 southward of the bridge lift span; see chapter 7. A fish camp at the north end of the bridge at Cedar Point has fuel, water, and limited berthage. A highway bridge in the causeway just south 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 874–SC, 876–SC, 1267.—The I.W. leaves the well marked Pass aux Herons Channel at **Mile 108.0E** and enters the open water of Mississippi Sound which has general depths greater than 12 feet until up to Marianne Channel, **Mile 50.8E** at the western end of the sound.

If bound for **Bayou La Batre,** depart the waterway at the light marking the west end of Pass aux Herons Channel, **Mile 103.9E,** and proceed on a north-northwesterly 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.

The entrance to Mississippi Sound from the Gulf through **Petit Bois Pass** is 2 miles south of **Mile 101.0E.** A lighted buoy is at Mile 99.5E. The Alabama-Mississippi boundary crosses the waterway at **Mile 97.4E.**

At **Mile 95.2E,** a lighted buoy, 2.5 miles north of **Petit Bois Island,** marks the waterway route.

At **Mile 91.3E,** the I.W. crosses the deep ship channel in Mississippi Sound between Horn Island Pass and **Pascagoula.** The channel to Pascagoula extends northward for 1.9 miles, thence northwestward for 5.8 miles to the turning basin. Berthing and repair facilities, supplies, and fuel are available; see chapter 7.

A light at **Mile 86.1E** and lighted buoys at Miles 85.9E and 83.9E mark turning points in the waterway route. At mile 78.2E, a lighted buoy, 3.4 miles southward of low and rounded **Belle Fontaine Point,** marks the waterway route.

At **Mile 76.6E,** a 15-foot dredged channel leads northward and northwestward for 9.4 miles to **Biloxi.** A junction buoy on the intracoastal route marks the entrance of this channel.

Chart 876–SC.—At **Mile 70.9E,** a lighted buoy, 2.6 miles north of Ship Island, marks the I.W. route through Mississippi Sound. From the buoy a north by westerly course in depths of 15 to 10 feet for 4.7 miles leads to a 10-foot marked channel which continues northward and eastward for 3.2 miles to Biloxi. A northwesterly course from the buoy for 6.4 miles leads to a large yacht basin at **Beauvoir.** Berthing and repair facilities, supplies, and fuel are available; see chapter 7.

At **Mile 63.8E** the waterway crosses the deep **Gulfport Channel** between Ship Island Pass and Gulfport. The channel to Gulfport extends northwestward for 6.0 miles to the ship basin. Small-boat basins are on both sides of the ship basin. Berthing and repair facilities, supplies, and fuel are available; see chapter 7.

Chart 877.—At **Mile 57.1E,** the I.W. route rounds a lighted buoy in Mississippi Sound and turns sharply to the southwestward. If bound for **Pass Christian Harbor,** depart the lighted buoy on a west-northwest 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.

From **Mile 57.1E,** the southwestward reach proceeds through well marked natural depths and through dredged **Marianne Channel** to Mile 47.2E; thence the route is westward through dredged **Grand Island Channel** to natural depths exceeding 12 feet at Mile 40.2E in the eastern approach to Grand Island Pass.

Chart 878.—The Mississippi-Louisiana boundary follows the I.W. route westward through **Grand Island Pass** to Mile 35.2E, then turns sharply northward from the waterway and follows the channel to **East Pearl River.**

From **Mile 35.2E,** the waterway continues westward through dredged cuts and crosses the **Lake Borgne** end of the Rigolets at **Mile 31.0E.** The **Rigolets** (see chapter 7) is a comparatively deep passage that connects Lake Borgne with **Lake Pontchartrain,** several miles to the westward.

From the Rigolets, the I.W. route is southwestward through nearly 20 miles of **Rigolets-New Orleans Cut.** Pilots should be on the alert for cross currents at waterway crossing of passes and bayous. **Chef Menteur Pass** (see chapter 7), which is crossed at Mile 20.0E is specially noted for such currents; the pass is another deep link between Lake Borgne and Lake Pontchartrain.

At **I.W. Mile 13.3E,** privately-owned **Michoud Canal,** with depths greater than 12 feet, extends northward 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 north side of the waterway at Mile 12.2E, is said to have depths greater than 20 feet. This is the approximate turning point from east-west reach to southeast reach of the deep **Mississippi River-Gulf Outlet;** see chapter 8. The waterway continues westward through the deep outlet to Mile 11.7E where it is crossed by a pontoon drawbridge; the power cable on the west side of the bridge has a clearance of 135 feet.

In 1964, a fixed highway bridge was under construction just east of the pontoon bridge; design clearance is 135 feet.

The Port of New Orleans Bulk Materials Handling Plant is on the north bank of the waterway at Mile 8.8E.

The power cable over the I.W. route at Mile 7.5E has a clearance of 170 feet. The waterway enters the deep **Inner Harbor Navigation Canal** of New Orleans at **Mile 6.8E** and proceeds southward through the canal to Mississippi River; see chapter 8.

The combination Southern Pacific railroad and Florida Avenue highway bridge over Inner Harbor Navigation Canal at Mile 6.6E has a bascule span with a clearance of 1 foot; the power cable on the north side of the bridge has a clearance of 132 feet.

The marine service station on the east side of the canal

at Mile 5.9E has a 440-foot dock with depths of 10 feet alongside. Gasoline, diesel fuel, water, ice, and marine supplies are available. The station's marine railway hauls out vessels up to 110 feet in length and the machine shop handles repairs to gasoline and diesel engines.

The highway bridge over the canal at Mile 6.0E has a lift span with clearances of 41 feet down and 156 feet up.

Inner Harbor Navigation Lock, at Mile 5.7E, is 640 feet long, 75 feet wide, more than 31½ feet deep over sills, and handles lifts up to 17 feet.

The highway bridge over the canal at Mile 5.7E, at the south end of the lock, has a bascule span.

Chart 879.—The Intracoastal Waterway leaves Inner Harbor Navigation Canal and enters **Mississippi River at I.W. Mile 4.8E.** The basic route follows the **New Orleans** waterfront upriver to **Canal Street, Mile 3.3E** 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.

From Canal Street, the I.W. route continues up Mississippi River and passes under the high fixed bridges at Mile 2.5E. At **Harvey,** on the south side of Mississippi River 3 miles above Canal Street, the route leaves the river and proceeds southward through **Harvey Canal No. 1.**

Harvey Lock, at Mile 0.0, is 425 feet long, 75 feet wide, 12 feet deep 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; the power cable on the north side of the bridge has a clearance of 90 feet. The highway bridge at Mile 0.2W 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 haul out vessels up to 300 feet in length, and the machine shops can repair gasoline and diesel engines.

The power cable over Harvey Canal No. 1 at Mile 1.6W has a clearance of 90 feet. The basic route continues southward and enters Bayou Barataria at Mile 5.8W.

The **Algiers Alternate Route (A.A.)** is zeroed at **Algiers Lock (A.A. Mile 0.0)** where the basic route enters the Mississippi. The alternate route swings downriver, departs the river about 6 miles below Canal Street, and continues southwestward through a land cut with same project dimensions as the basic route.

Algiers Lock, at A.A. Mile 0.0, is 760 feet long, 75 feet wide, 13 feet deep over the sills, and handles lifts up to 18 feet. The highway bridge over the route at A.A. Mile 0.9 has a lift span with clearance of 4 feet down and 100 feet up; the power cable on the southwest side of the bridge has a clearance of 112 feet.

The Missouri Pacific railroad bridge at A.A. Mile 3.3 has a lift span with clearance of 2 feet down and 100 feet up; the power cables on the southwest side and 300 yards northeast of the bridge have clearances of 120 feet.

The power cable over the waterway at A.A. Mile 7.4 has a clearance of 110 feet. The alternate route enters Bayou Barataria and rejoins the basic route at **A.A. Mile 8.0 which coincides with I.W. Mile 5.8W.**

From I.W. Mile 5.8W the waterway continues southward and westward for several miles through **Bayou Barataria.** At Mile 9.2W is the town of **Crown Point** which has facilities for hauling out vessels up to 75 feet in length. The highway bridge over the waterway at Mile 11.0W has a swing span with a clearance of 9 feet; use the south opening.

The waterway departs Bayou Barataria at Mile 12.8W and crosses **Bayou Villars** at Mile 13.2W. From the crossing, Bayou Villars extends 1.0 mile westward to **Lake Salvador,** which has depths of 5 to 7 feet, and 0.4 mile eastward to a junction with Bayou Barataria at the town of Lafitte. An overhead power cable crossing Bayou Villars close westward of the Intracoastal Waterway has a clearance of 185 feet. A 20-mile chain of bayous and canals winds southeastward from Lafitte to **Barataria Bay:** see chapter 9 for bridges, cables, and controlling depths. **Lafitte** has a shipyard that can haul out vessels up to 80 feet in length; gasoline, diesel fuel, water, ice, and marine supplies are available.

At Mile 17.4W, the I.W. route crosses **Bayou Perot** which is another passage from the lakes on the southeast to Lake Salvador on the west. An overhead power cable crossing the mouth of the bayou has a clearance of 60 feet. An overhead power cable at Mile 19.9W has a clearance of 185 feet. The waterway enters **Harvey Canal No. 2 at I.W. Mile 25.4W** which is 1.2 miles from the canal's Lake Salvador terminus, and proceeds southwestward in the canal to Larose.

The power cables over the waterway at Miles 29.8W and 30.1W have minimum clearances of 90 feet. A pontoon drawbridge crosses the waterway at Mile 30.4W.

At **Mile 30.5W,** the I.W. route crosses **Bayou Lafourche** which is described in chapter 9. On the northeast side of the crossing is **Larose.** Boatyards in the vicinity have facilities for hauling out vessels up to 70 feet in length; gasoline, diesel fuel, water, ice, and marine supplies are available. A pontoon drawbridge crosses Bayou Lafourche at Larose.

The I.W. route westward from Larose is through the **Larose-Bourg Cutoff.** State Route 1 highway bridge over the cutoff at Mile 30.7W has a lift span with clearance of 35 feet down and 73 feet up; the power cable 0.1 mile south of the bridge has a clearance of 90 feet.

At Mile 42.4W, the cutoff crosses **Company Canal** which connects **Bourg,** on Bayou Terrebonne, with Lockport on Bayou Lafourche; see chapter 9. A cable ferry crosses the I.W. route at Mile 43.2W; the power cable on the east side of the ferry crossing has a clearance of 90 feet.

The power cables over the waterway at Miles 46.8W, 47.5W, and 48.3W have a minimum clearance of 90 feet. The route swings sharply southward and crosses an east-west reach of **Bayou Terrebonne at Mile 49.8W;** the bayou is described in chapter 9. The I.W. highway bridge on the north side of the crossing has a lift span with clearances of 8 feet down and 73 feet up; the power cable north

of the bridge has a clearance of 88 feet. The highway bridge on the south side of the crossing has a bascule span with a clearance of 4 feet; the power cable south of the bridge has a clearance of 106 feet.

In the southwest angle of the Terrebonne-Intracoastal Waterway crossing is the town of **Houma (Mile 50.0W)** 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 and highway connections, a sugar mill, seafood canneries, and cold-storage facilities. Gasoline, diesel fuel, water, ice, and marine supplies are available. The Houma shipyard can haul out craft up to 225 feet in length and boatyards can haul out vessels up to 60 feet in length, and there are facilities for engine repairs. **Marine documents** are issued by the Coast Guard.

The Southern Pacific railroad bridge over the I.W. route at **Mile 51.1W** has a swing span with a clearance of 3 feet. Immediately south of the bridge, **Black Bayou** branches westward from the waterway and follows a winding 24-mile course through several towns and under numerous bridges and cables to another junction with the waterway at **Mile 72.7W** (see chart 880). Dams have been constructed across the bayou at 0.5 and 4.3 miles west of the easterly junction of the bayou with the Intracoastal Waterway; this section of the bayou has been declared non-navigable waters. The bayou has a depth of about 4 feet from the westerly dam to Gibson; thence about 8 feet to the western 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. 90 highway bridge crossing the bayou at Gibson has a lift span with clearances of 2 feet down and 56 feet up; see **203.245**, chapter 2, for **drawspan regulations.** The numerous overhead power cables crossing the bayou have a minimum clearance of 40 feet. Black Bayou has very little through traffic, and any such traffic could be difficult at times because of the many vessels that are moored in the bayou.

U.S. Route 90 runs along the east bank of the bayou and crosses over to the west bank at **Gibson,** then continues on to Morgan City. A large shipyard on a basin off the bayou about 3 miles south of Gibson builds barges, crew boats, and offshore oil well structures.

The highway bridge over the I.W. route at Mile 51.9W has a swing span with a clearance of 5 feet; the power cable on the southwest side of the bridge has a clearance of 108 feet.

Chart 880.—The waterway continues westward through land cuts to **Mile 64.2W** where it crosses the southeastern part of **Lake Hackberry**; there are hyacinth booms on both sides of the lake crossing.

The I.W. route enters narrow **Lake Cocodrie at Mile 66.9W** and departs the lake at **Mile 70.0W**; the channel through the lake is well marked. Next link is **Bayou Cocodrie**; winding Bayou Black, previously described in connection with chart 879, comes down from the north to join Bayou Cocodrie at I.W. Mile 72.3W.

Bayou Cocodrie joins the northern loop of **Bayou Chene,** which in turn joins **Bayou Boeuf at I.W. 75.4W**; this is also **L.R. Mile 0.0 of the Landside Route,** a lesser channel that winds northward through Bayou Boeuf and other waterways for 43 miles to a junction with the latter-described Morgan City-Port Allen Alternate Route.

The controlling depth through the Landside Route was 5½ feet in July 1966. U.S. 90 highway bridge over Bayou Boeuf at L.R. Mile 1.1 has a fixed span with a clearance of 73 feet. The Southern Pacific railroad bridge over the bayou at L.R. Mile 1.6 has a swing span with a clearance of 6 feet; the power cable 0.3 mile north of the bridge has a clearance of 120 feet. There are shipyards that build barges and offshores oil well structures, and oil company marine terminals on Bayou Boeuf.

Chart 881.—The Landside Route proceeds northward through landcuts and through **Bayou Milhomme** to L.R. Mile 10.4 where the waterway is crossed by a pontoon bridge. Continuing northward, the route is through **Bayou Long** and **Belle River** to L.R. Mile 20.5 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 35.8. 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 42.7 (M.P. Mile 32.4).**

Chart 880.—Returning to the main Intracoastal Waterway, the route westward and northwestward from I.W. Mile 75.7W is through the western reach of Bayou Boeuf. The power cable over Bayou Boeuf at Mile 78.9W has a clearance of 130 feet.

Bayou Boeuf Lock, at I.W. Mile 81.0W, is 1,150 feet long, 75 feet wide, 13 feet deep over sills, and handles lifts up to 11 feet.

A cable ferry crosses Bayou Boeuf at I.W. Mile at 81.8W; the power cable on the west side of the ferry crossing has a clearance of 90 feet. Deep **Bayou Shaffer** branches southward from I.W. Mile 82.0W; see chapter 9.

Chart 881.—At **I.W. Mile 83.0W** 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 northward from the junction for about 2 miles. On the northeast side of the junction is the port of **Morgan City (I.W. Mile 82.7W)**; see chapter 9 for port facilities, services, supplies, and repairs. See **207.240,** chapter 2, for regulations governing navigation on the Atchafalaya River at Morgan City.

I.W. Mile 83.0W also is M.P. Mile 0.0 of the Morgan City-Port Allen Alternate Route and A.R. Mile 101.5 of the Atchafalaya River Route, both of which wind northward to outlets on the Mississippi River near and above Baton Rouge. Both of the alternate routes have the same project dimensions as the basic I.W. route.

The Southern Pacific railroad bridge over Berwick Bay at M.P. Mile 0.3 has a swing span with a clearance of

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4 feet. U.S. 90 Long Allen highway bridge that crosses from Morgan City to **Berwick** at M.P. Mile 0.6 has a fixed span clearance of 50 feet.

At **M.P. Mile 1.5, Bayou Teche** branches westward from Berwick Bay; see chapter 9 for depths, locks, bridges, cables, and facilities.

At M.P. Mile 2.0 (A.R. Mile 99.5), the two alternate routes separate. The Morgan City-Port Allen Alternate Route turns sharply to the eastward, then follows winding courses northward through land cuts and bayous. Two power cables cross the waterway between M.P. Mile 2.0 and Mile 8.0; least clearance is 40 feet.

Bayou Sorrel Lock, at M.P. Mile 31.9, is 760 feet long, 56 feet wide, 14 feet deep over sills, and handles lifts up to 21 feet.

The Landside Route, described previously, comes in from the southeast and merges with the Morgan City-Port Allen Route at **M.P. Mile 32.4 (L.R. Mile 42.7)** in Lower Grand River. At M.P. 33.3 a pontoon bridge crosses the bayou. A cable ferry crosses the bayou at M.P. Mile 33.9.

The M.P. route continues northward through land cuts and bayous. Jack Miller Store is on the east side of the waterway at M.P. Mile 37.7, and **Indian Village** is on the same side at M.P. 40.0. An overhead power cable with a clearance of 99 feet crosses the route at M.P. Mile 39.0.

Bayou Plaquemine branches eastward from **M.P. Mile 40.2** and leads for 6.6 miles to **Plaquemine,** which is on the west bank of Mississippi River 98 miles above Canal Street, New Orleans. **Plaquemine Lock,** formerly the northern terminus of the Morgan City-Port Allen Alternate Route, is permanently closed, and two former drawbridges 0.2 mile west of the lock are fixed spans with a clearance of 14 feet; the power cables over the bayou have 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 40.2, the Morgan City-Port Allen Alternate Route continues northward through parts of Bayou Grosse Tete and through the land cuts of the **Port Allen Canal.** State Route 77 highway bridge over the waterway at **M.P. Mile 40.8** has a swing span with a clearance of 2 feet.

The Texas and Pacific railroad bridge over Port Allen Canal at **Mile M.P. 48.7** has a lift span with clearances of 7 feet down and 73 feet up.

Port Allen Canal turns northeastward at M.P. Mile 49.5. An overhead power cable at M.P. Mile 50.0 has a clearance of 92 feet. The canal turns again at M.P. Mile 54.3 and heads southeastward to Port Allen Lock. The power cable over the canal at M.P. Mile 54.8 has a clearance of 90 feet. The Texas and Pacific railroad bridge over the canal at M.P. Mile 55.6 has a lift span with clearances of 14 feet down and 73 feet up; State Route 1 highway bridge on the southeast side of the railroad bridge has a fixed span, with a clearance of 65 feet.

Port Allen Lock at M.P. Mile 55.7, is 1,180 feet long, 84 feet wide, 14 feet deep over 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 west side of the river 115 miles above Canal Street, New Orleans. In July 1966, the midchannel controlling depth in the Morgan City-Port Allen Route was 10 feet; controlling depths are published in Notice to Mariners.

Chart 881, 1050.—Getting back to Berwick Bay, the **Atchafalaya River Route** turns sharply to the northwestward at **A.R. Mile 99.5 (M.P. Mile 2.0)** and follows improved channels through **Stouts Pass** and **Sixmile Lake,** then winds northward to **A.R. Mile 0.0,** which is at **Barbre Landing** 0.5 mile east of the confluence of **Atchafalaya River, Red River,** and Old River.

From A.R. Mile 0.0, the route leads for 5.2 miles eastward 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. Navigation maps of Atchafalaya River, with listings of bridges and overhead cables are published by the Mississippi River Commission, Vicksburg, Mississippi.

Old River, about 64 miles above Baton Route and 181 miles above Canal Street, New Orleans, is a 6-mile long stream which formerly connected the Mississippi River with the Red and Atchafalaya Rivers. A dam about a mile from its eastern entrance prevents the Mississippi from flowing uncontrolled into the Atchafalaya Basin. An outflow channel with a control structure on the west 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 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 west 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 project was completed and the lock opened to navigation in March 1963. The lock is 1,185 feet long, 75 feet wide, and 11 feet over the sill at mean low water Gulf. A highway bridge over the lock has a lift span with a clearance of 74 feet down and 116 feet up at mean low water Gulf.

Atchafalaya River flows southward into the Gulf of Mexico from its confluence with Red and Old Rivers at **A.R. Mile 0.5.** The 101.5-mile section, the confluence to Morgan City, has a Federal project depth of 12 feet. The channel is maintained. In 1963, 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 sulphur, 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 4.2,** has a swing span with a clearance of 6 feet. In 1967, a fixed highway bridge just above the railroad bridge was under construction; design vertical clearance is 50 feet.

Two aerial gas pipelines crossing at **A.R. Mile 24.5** have a clearance of 52 feet.

The Texas and Pacific railroad bridge at **Melville** on the west bank at **A.R. Mile 25.5** has a vertical lift span with clearances of 4 feet down and 54 feet up. A ferry crossing is just north of the bridge.

U.S. 190 highway bridge at **Krotz Spring** on the west bank at **A.R. Mile 35.1** has a fixed span with a clearance of 41 feet. An overhead telephone cable just north of the bridge has a clearance of 51 feet.

The Missouri Pacific railroad bridge at **A.R. Mile 35.5** has a swing span with a clearance of 6 feet. An overhead power cable crosses on the bridge.

Overhead power cables at **A.R. Mile 50.0** and **A.R. Mile 89.5** have clearances of 70 and 75 feet, respectively. At Morgan City, U.S. 90 highway bridge at **A.R. Mile 101.0** has a fixed span with a clearance of 50 feet. The Southern Pacific railroad bridge 0.3 mile south of it has a swing span with a clearance of 7 feet.

Chart 880.—Returning to Morgan City and the basic I.W. route, the waterway continues southwestward in Lower Atchafalaya River. The power cable over the river at I.W. Mile 83.8W has a clearance of 130 feet.

The Intracoastal Waterway departs Lower Atchafalaya River at Mile 85.3W and proceeds westward in **Little Wax Bayou.** The river entrance to the bayou is marked by a light. The preferred channel is north of the small island at the mouth of the Little Wax Bayou. The route leaves Little Wax Bayou at I.W. Mile 88.6W and continues westward through a land cut that crosses several other bayous; there are hyacinth booms on the bayou sides of most crossings.

At I.W. Mile 93.5W, the waterway crosses **Wax Lake Outlet** which is a deep drainage ditch. Alternate channels north and south of the direct crossing facilitate vessels passing during periods of strong cross currents; westbound traffic uses the north detour and eastbound traffic uses the south detour. During relatively slack periods the main (or middle) channel is used by craft going in either direction. There are tie-up dolphins on the north side of the I.W. route a mile on either side of the crossing.

Chart 882.—The town of **North Bend** is at Mile 98.3W on the north side of the waterway. State Route 317 highway bridge over the waterway at North Bend has a lift span with clearance of 5 feet down and 80 feet up; the power cable on the east side of the bridge has a clearance of 94 feet. Another power cable over the waterway at Mile 98.4W has a clearance of 90 feet.

The I.W. continues in a cut to **Bayou Bartholomew,** where a cutoff at Mile 104.9W leads northward through Franklin Canal and through Hanson Canal to Bayou Teche; see chapter 9.

At Miles 105.5W and 106.5W, hyacinth booms block the entrances to **Mud Lake.**

At Mile 106.8W, the waterway is crossed by a cut which leads southwestward through The Jaws to West Cote Blanche Bay (see chapter 9) and northeastward for 5.5 miles through Charenton Canal to Bayou Teche, 0.5 mile below **Baldwin.**

Charenton Canal (see also chart 1051) had a controlling depth of 12 feet in April 1966 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 112.6W, the waterway is crossed by a ferry.

A highway bridge over the waterway at **Cypremort, Mile 116.2W,** has a swing span with a clearance of 7 feet. The power cable east of the bridge has a clearance of 90 feet.

Weeks, on the east side of the waterway at Mile 119.3W, is the site of the largest salt mine in Louisiana. Just north of the village, at Mile 120.3W, **Vermilion Bay** is entered through Weeks Bayou; the route northward to Port of New Iberia is at Mile 121.8W through a cut to **Wilkins Canal**; see chapter 9.

At Mile 126.7W, the waterway is crossed by **Bayou Petite Anse** leading northward through connecting canals to Avery Island and Delcambre; Avery Canal connects with the bayou south of the waterway to provide a passage to Vermilion Bay; see chapter 9.

Between Miles 138.0W and 139.3W, the waterway passes through a cut in Vermilion River. At Mile 138.0W, Vermilion River Cutoff leads southeastward to Vermilion Bay. Tows using the I.W. 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 north bank well before entering the river until past the junction.

Repair facilities, supplies, and fuel are available at Perry and Abbeville, 19 to 21 miles north of the waterway on Vermilion River; see chapter 9.

Chart 883.—**Intracoastal City,** on the north side of the waterway at **Mile 139.0W,** 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. There is telephone service; a State highway passes through the settlement.

At Mile 139.9W, **Schooner Bayou Cutoff** leads southwestward from the waterway through connecting canals to White Lake or the Gulf; see chapter 9.

Vermilion Lock, at Mile 141.4W, is 1,182 feet long, 56 feet wide, 11 feet deep over sills, and handles lifts up to 5 feet. The lock prevents salt water from entering rice fields to the westward. Small boats may anchor or tie up alongside the banks in a small dredged slip at each end of the lock.

A pontoon drawbridge crosses the waterway at **Forked Island,** Mile 147.5W. Just northwest of the bridge, at Mile 147.7W is an oil company slip and wharves. A cable ferry crosses at Mile 149.5W.

A cable ferry crosses the waterway at Mile 154.9W. A power cable over the waterway at Mile 160.2W, west of **Florence Canal,** has a clearance of 90 feet. Oil company docks and tanks are at Miles 170.6W and 174.4W. Fuel and boat supplies are available at the service wharf on the north bank about 1.5 miles east of Mermentau River.

The waterway crosses **Mermentau River** between Miles 175.1W and 176.0W and continues westward in a land cut. The Mermentau River is navigable for more than 32 miles northward of the crossing. Southward of the waterway, the river leads through Grand Lake to the Gulf; see chapter 9.

Bayou Lacassine (see also chart 1051) crosses the waterway at Mile 178.2W. North of the crossing, the bayou had a controlling depth of 5½ feet in November 1966 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 southward 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. **Drawspan regulations** are given in **203.245**, chapter 2. South of the I.W. crossing, Bayou Lacassine flows through **Mud Lake** into Grand Lake.

At Miles 183.7W and 184.9W, a canal on the south side of the waterway leads to **Little Lake Misere**, thence eastward through **The Narrows** to **Lake Misere** and **Bayou Misere** to Mud Lake. The I.W. route arcs to the northward in this section. **Bell City Drainage Canal** crosses the waterway at Mile 184.5W.

Chart 884.—A pontoon drawbridge crosses the I.W. at **Gibbstown**, Mile 191.0W. A power cable on the east side of the bridge has a clearance of 120 feet.

An oil company loading docks and tanks are on the north side of the waterway at Mile 194.1W; a cut here leads to **Sweet Lake.**

A pontoon bridge crosses the waterway at **Grand Lake Ridge**, Mile 200.7W; the power cable on the south side of the crossing has a clearance of 90 feet. A loading dock is near the crossing.

At Mile 206.0W, a straight canal leads through a lock to Calcasieu River. A cable ferry crosses the canal at Mile 206.7W.

Calcasieu Lock, Mile 206.9W, is 1,180 feet long, 75 feet wide, 13 feet deep over the sills, and handles lifts up to 4 feet. The lock prevents salt water from entering rice fields to the eastward.

The I.W. enters **Calcasieu River** at Mile 207.5W and continues northward around a bend in the river across deep Calcasieu Channel to Choupique Cutoff. Vessels and tows are advised to use caution at the junctions.

Lake Charles (chart 592), 9.8 miles up Calcasieu Channel from the I.W. junction at Mile 209.6W, 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, supplies, and fuel are available; see chapter 9.

From Mile 209.6W, the I.W. passes through Choupique Cutoff and the long land cut **Lake Charles Deepwater Channel** for 21 miles to the Sabine River at Orange. In March 1966, the controlling depth was 15 feet.

Bayou Choupique is part of the waterway between Miles 209.8W and 210.2W. The 12-foot deep eastern exit leads to Calcasieu Channel while the western exit passes through marshland for many miles. The controlling depth in the western branch is 9 feet to the highway bridge 2.5 miles above the junction; the bridge has a swing span with a channel width of 45 feet in the south draw and a clearance of 1 foot; **drawspan regulations** are given in **203.245**, chapter 2. A power cable west of the bridge has a clearance of 62 feet.

At Mile 211.1W, **Old Canal** leads eastward to the Calcasieu River. In August 1965, the controlling depth was 9 feet.

A pontoon drawbridge crosses the waterway at Mile 211.2W; a power cable 200 feet northeast of the bridge has a clearance of 139 feet.

A cable ferry crosses the waterway at **Gum Cove Ridge**, Mile 220.8W.

Vinton Canal, crossing the waterway at Mile 224.5W had a controlling depth of 4 feet in November 1966 to the highway bridge over 6.8 miles northward of the junction. The canal connects with **Black Bayou** southward of the waterway.

At **Mile 230.0W**, the waterway enters **Sabine River** and continues around the south bend of the river to the deep ship channel.

Orange, 0.9 mile up the Sabine River Ship Channel from the I.W. junction at **Mile 231.1W**, has repair facilities, supplies, and fuel; see chapter 10.

From Mile 231.1W, the I.W. continues for 20 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 231.8W, and **Cow Bayou**, at Mile 234.1W, both on the north side of the waterway, are described in chapter 10.

At Mile 240.5W, a 15.9-mile channel leads up the **Neches River** to the port facilities at **Beaumont**; see chapter 10.

Charts 885, 152–SC.—Port Arthur, between I.W. Miles 243.2W and 250.9W (junction with Port Arthur Canal), has complete repair facilities, supplies, and fuel at places along the Sabine-Neches Canal and in Taylor Bayou; see chapter 10.

A highway bridge across the waterway at **Mile 247.7W** has a bascule span with a clearance of 10 feet. At Mile 248.7W in 1967, a fixed bridge was under construction; design vertical clearance is 136 feet.

The I.W. leaves the Sabine-Neches Canal at Mile 250.8W and continues for 53 miles through a land cut to Galveston Bay.

State Route 87 highway bridge across the waterway at **Mile 250.8W** has a bascule span with a clearance of 10 feet. The power cable west of the bridge has a clearance of 125 feet.

A small-boat basin on the south side of the waterway at Mile 251.2W has berthing facilities for craft drawing up to 5 feet. Available supplies include gasoline, diesel fuel, and water.

A spillway at Mile 254.4W contains **Shell Lake** and other lakes south of the waterway. Floodgates on the south side of the waterway at Mile 265.8W contain **Star Lake.**

At Mile 273.1W, dirt ramps of a cattle crossing are on either side of the waterway.

Railroad and highway bridges over the waterway at **Mile 277.5W** have swing spans with clearances of 10 feet. The power cable west of the highway bridge has a clearance of 110 feet. The railroad bridge tender is on duty from 6 a.m. to 6 p.m. Mondays through Fridays and can be contacted by radio; at other times the drawspan is in the open position.

An oil-loading terminal is in a slip on the north side of the waterway just eastward of the railroad bridge. **High Island,** on the highway and railroad 1.5 miles south of the waterway, is an oil-producing center with numerous oil wells, but there are no facilities for passing craft. A landing for shallow-draft boats is at Mile 279.3W. At Mile 280.2W, an overhead power cable has a clearance of 93 feet.

The waterway passes through a marked cut in the southeastern part of shallow **East Bay** between Miles 283.5W and 285.4W. Berthing facilities for shallow-draft boats are in slips at each side of the bay; gasoline, water, ice, and some marine supplies are available at **Gilchrist** at Mile 285.1W.

An oil-loading terminal is at Mile 289.7W on the southeast side of the I.W. route. The waterway continues southwestward to Port Bolivar and Galveston Bay. There are marinas in basins along the waterway where fuel, water, ice, berthage, and marine supplies can be obtained.

Bolivar Yacht Basin, at Mile 298.3W on the southeast side of the waterway, can accommodate yachts drawing up to 10 feet; the basin has facilities for hauling out vessels up to 55 feet in length. Gasoline, diesel fuel, water, ice, berthage, marine supplies, and a surfaced ramp are available.

A channel leading from Galveston Bay through **Sievers Cove** to the Intracoastal Waterway, about Mile 298.2W, had a controlling depth of about 2 feet in 1965.

Charts 886, 152–SC.—Port Bolivar is at **I.W. Mile 303.2W** on the southeast side of the waterway and is near the southwestern end of **Bolivar Peninsula.** Gasoline, diesel fuel, and water are available at some of the town landings.

The Intracoastal Waterway leaves the Bolivar cut and enters **Galveston Bay at I.W. Mile 303.7W.** The direct route bypasses Galveston and proceeds southwestward through the lower part of the bay. **Houston Ship Channel** is crossed at **I.W. Mile 304.5W;** the port of **Houston** is 43 miles to the northwestward; see chapter 10. The channel to **Texas City** is crossed at **I.W. Mile 305.1W;** the port is five miles to the west-northwestward; see chapter 10.

There is a large yacht basin and marina on the end of Texas City Dike about 0.6 mile north of the junction with Texas City Channel. Fuel, water, ice, berthage with electricity, ramps, storage, and marine supplies are available.

The basic route continues southwestward through dredged cuts to the bridges which separate Galveston Bay from West Bay.

I.W. Mile 303.7W is also G.L. Mile 0.0 of the Galveston Loop which swings southward into **Bolivar Roads,** then southwestward in **Galveston Channel.** The port of **Galveston** is centered at **G.L. Mile 4.9** on the south side of Galveston Channel; see chapter 10 for port facilities, services, supplies, and repairs. The **Pelican Island** rail-highway bridge over Galveston Channel at G.L. Mile 6.0 has a bascule span with a clearance of 12 feet. The Galveston Loop leaves the big port's deep water at the bridge and proceeds westward in dredged cuts to rejoin the basic route at G.L. Mile 9.0 which also is I.W. Mile **309.9W.**

The rail-highway bridge over the waterway at I.W. Mile 310.6W has a bascule span with a clearance of 7 feet; the power cable on the southwest side of the bridge has a clearance of 99 feet. The two fixed bridges at Mile 310.7W have a clearance of 73 feet.

Westward of the bridges an improved channel leads southeastward from **I.W. Mile 311.0W** 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.

The Intracoastal Waterway continues westward through dredged cuts between the islands in the northeastern part of **West Bay.** At I.W. Mile 315.6W the waterway enters a 10-mile cut which is never more than 0.2 mile behind the northwest short of West Bay.

Charts 887, 152–SC.—At Mile 325.9W, the waterway leaves the land cut and crosses the northwestern end of West Bay through a buoyed channel with range lights at each end. A marked channel to **Chocolate Bay** leads northward from the waterway at Mile 326.9W. Gasoline, water, berthage, supplies, and repair facilities are available at marinas and boatyards on Chocolate Bayou; see chapter 10.

San Luis Pass and tributaries to the western part of West Bay are described in chapter 10.

From Mile 328.7W, the waterway enters a land cut which passes through and across shallow bays, bayous, and rivers for 29 miles to Mile 357.7W at the northwestern end of Cedar Lakes.

Oyster Creek, emptying into the Intracoastal Waterway at **Mile 341.1W,** about 2.5 miles northeastward of Brazosport, is a tortuous stream of no importance used as a storm refuge by small craft. 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 marina and yacht yard at the bridge has gasoline, diesel fuel, water, ice, marine supplies, open and covered berthage with electricity, and a surfaced ramp. A 10-ton mobile lift can haul out craft up to 30 feet in length for general repairs or storage.

The highway bridge across the waterway at **Mile 342.4W** has a fixed span with a clearance of 73 feet. The power cable on the west side of the bridge has a clearance of 97 feet.

Small-boat basins at Miles 341.9W, 342.0W, 342.6W, and 342.9W had controlling depths of 3 to 10 feet in 1965. Available supplies include gasoline, diesel fuel, water, ice, open and covered berthage with electricity, and some marine supplies. Marine railways and lifts in the basins

can haul out boats up to 65 feet in length for general repairs.

The power cables crossing the waterway at Miles 343.4W and 343.5W have clearances of 74 feet.

At Mile 343.5W, the private canal on the north side of the waterway is closed to the public by a gate across the entrance.

Freeport, 2 miles up Old Brazos River from the I.W. junction at **Mile 343.6W,** has berthing and repair facilities, fuel, and supplies; see chapter 11.

A power cable crossing the waterway at Mile 343.9W has a clearance of 108 feet. A pontoon drawbridge crosses at Mile 345.7W.

The I.W. crosses the **Brazos River** at **Mile 348.5W.** The 75-foot wide floodgates on both sides of the river control waterway traffic when crossing conditions are hazardous due to strong current velocities. See **207.180** and **207.187,** chapter 2, for regulations governing use, administration, and navigation of the floodgates; local information is issued by the Galveston District Engineer, Corps of Engineers.

Information signs concerning current and operation of the floodgates are at Miles 347.7W and 349.3W. The lockmaster may be contacted by telephone or radiotelephone. Mooring piles are on both banks of the I.W. 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 I.W. crosses **San Bernard River** at **Mile 352.3W.** 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. Gasoline, water, ice, berthage, ramps, lifts, and marine supplies are available at marinas just west of the entrance to the river and on the south bank about 0.5 mile upriver. San Bernard River is described in chapter 11.

Chart 888.—The I.W. continues in a land cut from the north side of Cedar Lakes to Mile 365.2W where it follows a cut along the north shores of shallow East Matagorda Bay and Matagorda Bay for 31 miles, thence across the open waters of Matagorda Bay to Port O'Connor. Prolonged east winds will create a difference in water level between East Matagorda Bay and Matagorda Bay, thus causing strong westerly currents in the waterway.

The power cable over the waterway at Mile 363.5W has a clearance of 73 feet. A pontoon drawbridge crosses at Mile 363.6W. Another power cable on the west side of the bridge has a clearance of 94 feet.

Caney Creek crosses the waterway through a 0.5-mile canal leading to **East Matagorda Bay** at Mile 365.2W. 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 I.W. and 2 miles below **Sargent,** has a 28-foot fixed span with a clearance of 10 feet.

There is a private boat basin with 5½ feet alongside the bulkhead at abandoned **Old Gulf,** on the north side of the waterway at Mile 379.0W.

On oil-loading terminal is on the north side of the waterway at Mile 381.4W.

The power cable over the waterway at Mile 383.2W has a clearance of 71 feet. A pontoon drawbridge crosses at Mile 383.3W.

Matagorda, a small fishing and oystering fleet base, is on the north side of the I.W. at **Mile 383.5W.** Gasoline, diesel fuel, water, ice, berthage, and ramps are available in the small-boat slip just east of the bridge at Mile 383.3W. Provisions and hardware can be obtained in the town. There is also a slip west of the bridge. The controlling depth is about 3 feet in each slip. Matagorda repair yards can haul out vessels up to 40 feet in length. See appendix for **storm warning displays.**

Colorado River Locks, at Miles 383.6W and 384.2W, are 1,200 feet long, 75 feet wide, 15 feet deep over sills, and handle lifts up to 10 feet. The locks control I.W. traffic when crossing conditions are hazardous due to strong current velocities; see **207.180,** chapter 2, for operating regulations. Local information is issued by the Galveston District Engineers, Corps of Engineers.

Information signs concerning the operation of the floodgates are at Miles 382.9W and 384.9W. The lockmaster may be contacted by telephone or radiotelephone. Mooring piles are on both banks of the I.W. on the canal sides of the floodgates for the mooring of vessels when the floodgates are closed or when tows are limited.

Colorado River crosses the I.W. at **Mile 383.9W** 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 April 1965, a sand bar had built up across the entrance from the Gulf. It was reported that only a narrow channel remained close to the western shore and only the smallest fishing boats could use the passage. There are fish camps along the east bank where fuel, water, ice, ramps, and berthage are available.

A Federal project provides for a 9-foot channel from the Intracoastal Waterway for 13.5 miles to a 9-foot turning basin in a slip at the Matagorda Navigation District No. 2 Bay City Barge Terminal. In June 1966–February 1967, the controlling depth was 6 feet from the waterway to the basin, thence 9 feet in the basin. The head of navigation in the river is just above the slip. The channel is marked by daybeacons as far as the slip.

The overhead power cable, crossing the Colorado River just above the I.W. junction, has a clearance of 92 feet. A highway bascule bridge about 8 miles above the waterway has a clearance of 28 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 400 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. A grain elevator and liquid cargo storage tanks are at the terminal. A Port Director is in charge of operations.

Bay City, the county seat of Matagorda County, is about 7 miles north of the terminal. It is a rice, cattle, cotton, petroleum, natural gas, sulphur, and petrochemical center. The Missouri Pacific, Southern Pacific, and Santa Fe

Railroads, and an interstate busline serve the city. Two main state highways pass through the city. The feature of the city is a fabridam in the river which is inflated during growing season to impound water for irrigation purposes.

Chart 889.—At Mile 396.1W, the waterway enters the open waters of **Matagorda Bay** through a well marked channel and continues across the bay for 16 miles to Port O'Connor. Openings are provided through the spoil banks on the north side of the I.W. 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 404.9W and 409.1W, respectively; see chapter 11.

Emergency moorings have been established on the southerly bank of the land cut south 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 **409.1W,** the Intracoastal Waterway crosses the Matagorda Ship Channel. Small craft should not anchor in the area between the waterway and the entrance to the land cut through Matagorda Peninsula due to the turbulence reported in the waters in the area.

Chart 890.—The I.W. channel to **Port O'Connor, Mile 411.8W,** is between jetties with lights on the outer ends at the southwestern end of Matagorda Bay. Berthing facilties, fuel, and supplies are available; see chapter 11.

From Port O'Connor, the I.W. passes through a cut along the north shore of Espiritu Santo Bay for 16 miles to San Antonio Bay.

At Mile 415.8W, a marked channel across Espiritu Santo Bay leads to a military base on Matagorda Island; see chapter 11.

Gasoline and a launching ramp are available at a small-boat basin on the north side of the waterway at Mile 421.9W.

Chart 891.—At Mile 427.6W, the I.W. enters the open waters of shallow **San Antonio Bay** through a well marked channel. A marked channel leads northward from this point to **Seadrift** and other places in the bay; see chapter 11.

At Mile 435.5W, the waterway leaves San Antonio Bay and passes through land cuts and buoyed channels in shallow bays for 9 miles to Aransas Bay. The **Aransas Migratory National Waterfowl Refuge** is on the north side of the waterway at the eastern end of the land cut.

Chart 892.—At **Mile 444.6W,** the I.W. 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 northwestern side of the waterway provide passage in depths of 3 to 12 feet to Rockport and other places in Aransas Bay; see chapter 11.

At Mile 454.7W, the I.W. route swings westward and follows a cut along the northwestern shore of Redfish Bay to Corpus Christi Bay. The former route continues southwestward and southward through Lydia Ann Channel to Aransas Pass.

Rockport, 1.5 miles northwestward of **Mile 455.0W,** has berthing and repair facilities, fuel, and suppies; see chapter 11.

Boat operators are advised to stay in the I.W. channel throughout the cut in Redfish Bay to avoid rock formations which may project from the channel slopes.

At **Mile 463.2W,** the waterway crosses Aransas Channel which leads westward to the town of **Aransas Pass** and eastward to the Gulf through Aransas Pass. Repair facilities, fuel, and supplies are available at the town; see chapter 11.

The fixed highway bridge across the waterway at **Mile 463.3W** has a clearance of 48 feet. Avoid passing vessels in the vicinity of the bridge where the channel width is only 80 feet. An overhead power cable just north of the bridge has a clearance of 61 feet.

Chart 893.—At Mile 464.4W, the I.W. is crossed by a dredged channel; north of the waterway, the channel leads to a small-boat basin at the town of Aransas Pass. The channel southward leads to Corpus Christi Bay.

At **Mile 469.0W,** the I.W. joins Corpus Christi Channel and follows it for a short distance before turning southward in Corpus Christi Bay at Mile 470.8W to Laguna Madre.

La Quinta (chart 523), 4.7 miles northwestward of **I.W. Mile 470.3W,** is reached through deep La Quinta Channel.

Corpus Christi (chart 523), 9.5 miles westward of **I.W. Mile 470.8W,** has complete berthing and repair facilities, fuel, and supplies. Corpus Christi and other places in Corpus Christi Bay are described in chapter 11.

From the Corpus Christi junction, the I.W. continues southward in an arced channel marked by lights and buoys to Mile 472.4W where it crosses the open water of Corpus Christi Bay in a southeasterly direction in depths of 12 feet to Laguna Madre.

At Mile 478.3W, the waterway enters a well marked channel that extends for 104 miles through shallow **Laguna Madre** to Port Isabel.

At **Mile 479.1W,** an overhead power cable crossing from the mainland to Mustang Island is submerged at the channels into Laguna Madre.

John F. Kennedy Causeway, extending across Laguna Madre, has a pontoon drawbridge across the I.W. at **Mile 482.3W.** Another pontoon opening in the causeway is 1.8 miles to the westward; drawbridge regulations are given in **203.245,** chapter 2. Just north of the causeway, a private channel crosses the waterway; westward to Encinal Peninsula and eastward to Padre Island. **Storm warning displays** are listed in the appendix.

At Mile 489.5W, a privately marked channel extends northwestward to the mainland through an area obstructed by oil wells and pipelines.

Charts 894, 895.—Baffin Bay, extending westward from **I.W. Mile 505.6W,** is a commercial and sport fishing

area, and the site of oil exploration and drilling. A privately marked natural channel with depths of 8 to 10 feet extends for about 15 miles up Baffin Bay. Strangers should stay in the marked channel because of the numerous rocks at the entrance and througout the bay. A boatyard in a small-boat basin at the end of the marked channel can haul out vessels up to 50 feet in length. Available supplies include gasoline, diesel fuel, and water.

Yarborough Pass extends eastward from the waterway at Mile 510.1W across the Padre Island to the Gulf. The 6-foot channel is closed at the eastern end.

Between Miles 514.5W and 533.9W, the waterway passes through a long cut in the sand and mud of Laguna Madre. In this stretch, short oil company side channels extend on either side of the waterway.

At Mile 516.3W, a 4-foot private channel extends eastward for a mile to a basin.

Charts 896, 897.—Port Mansfield, 1 mile west of the I.W. at **Mile 549.3W,** has berthing and repair facilities, fuel, and supplies; see chapter 11.

At Mile 561.4W, **Arroyo Colorado Cutoff** leads westward from the I.W. and joins **Arroyo Colorado** to form a route to **Rio Hondo** and **Port Harlingen**; see chapter 11.

Chart 898.—At the south end of Laguna Madre at Mile 580.0W, the I.W. enters a reverse curve cut between Port Isabel and **Long Island,** and joins deep Brownsville Ship Channel at Mile 582.9W.

The pontoon drawbridge across the waterway at Mile 580.7W connects Port Isabel with Padre Island by a causeway over the southern end of Laguna Madre. A fixed 38-foot span opening at the eastern end of the causeway has a clearance of 18 feet. A small marine way at the east end of the causeway can haul out boats up to 30 feet in length; repair facilities are limited.

Port Isabel, Mile 581.0W, has berthing and repair facilities, fuel, and supplies; see chapter 11.

From Mile 582.9W, the I.W. follows the Brownsville Ship Channel for 12 miles to Port Brownsville.

Port Brownsville, at Mile 594.5W, the western terminus of the Intracoastal Waterway, and the city of **Brownsville,** 5 miles west-southwestward of the port, are described in chapter 11.

13. PUERTO RICO

Nine hundred miles east-southeast 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 north of Puerto Rico is the Atlantic Ocean, and on the south 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.

The island Commonwealth includes the smaller islands of Mona, Culebra, and Vieques. The big island is about 96 miles long, west to east, and about 35 miles wide. The interior of Puerto Rico is mountainous and very rugged. The highest mountains are nearer the south and east 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.

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 south and east sides of the island are short and fall rapidly to the sea, while those on the north and west 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 Pilot Rules** apply shoreward of the outermost buoy or other aid to navigation of any system of aids; **International Pilots 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 easterly trade winds. Anchorages are numerous except along the north coast. Strong northerly 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 meterological conditions. Along the northern and western coasts of Puerto Rico the tide is chiefly semidiurnal, while along the Caribbean coast it is more or less diurnal.

Currents.—Along the Atlantic and Caribbean coasts of Puerto Rico, the currents are greatly influenced by the trade winds. In general, there is a westward drift caused by prevailing easterly trade winds; the velocity averages about 0.2 knot and is said to be strongest near the island. A decided westerly set has been noted near the 100-fathom curve along the Caribbean coast from Isla Caja de Muertos to Cabo Rojo. 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 northward of Isla Caja de Muertos and Cayo Berberia.

Predictions of the tidal current in Canal Guanajibo and at three locations off the east 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 Mona Passage are 2 to 3 hours later than in Canal Guanajibo. The times of southward and northward currents in the passages eastward of Puerto Rico, as far as Isla Culebrita, are believed to be about the same as the times of westward and eastward currents, respectively, in Pasaje de Vieques.

In Mona Passage, on the northwest end of the bank about 13 miles westward 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 western 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 Peña, it is estimated that the current velocity is less than 1 knot. From Isla de Culebra the southward current sets toward Punta Este, Isla de Vieques, around which tidal currents are strong.

In Canal de Luis Peña, the southeastward current is deflected northward of Bahía Tarja and thence sets toward the south end of Cayo de Luis Peña; the current is weak off the entrance to Bahía de Sardinas. The northwest-

ward current sets directly through the channel. The current velocity is about 2 knots.

WEATHER.—The appendix lists storm warning displays and radio stations which transmit weather information. Also included are climatological tables for San Juan and Santa Isabel. The following description of general weather conditions in Puerto Rico was prepared by the Office of Climatology, U.S. Weather Bureau.

Climate.—Puerto Rico is a tropical, hilly island which lies directly in the path of the easterly 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 orographic 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 easterly trades, which generally blow fresh during the day. The center of the Bermuda High shifts a little north in summer and south in winter changing the direction of the winds over that island from north-northeast in winter to east in summer.

Factors which interrupt the trade wind flow are frontal and easterly wave passages. As the cold front approaches, the wind shifts to a more southerly direction, and then as the front passes there is a gradual shift through the southwest and northwest quadrants back to northeast. The easterly wave passage normally does not bring a westerly wind but is usually characterized by an east-northeast wind ahead of the wave and a change to east-southeast following 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 northwestern parts 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.

At San Juan the lowlands east of the city permit the trade winds to be felt throughout the harbor area by day. At night the trade winds generally diminish and a light southerly breeze comes off the land. Except for hurricanes, heavy northerly winds are the most troublesome, piling up heavy seas and breakers in the harbor mouth.

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 Weather Bureau'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 orographic 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 location on the island. In the southern portion of Puerto Rico the dry season normally lasts from about December to April, while in the northern portion it runs from about February to April. In both the north and south the wet season commences in May.

Precipitation at San Juan, averaging 60 inches annually, ranges between a low monthly average of 2.42 inches in March and a high monthly average of 6.51 inches in May.

Temperature.—Temperatures are normally steady over the tropical island of Puerto Rico. At San Juan for instance, the average annual temperature is 78° F. The coolest months, January and February, average 74.9° F., and the warmest months, August and September, average 80.5° F., a difference of only 5.6° F. The extremes of temperature at San Juan are 96° F. and 62° F.

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.

Routes.—Vessels bound from Straits of Florida (24°25′ N., 83°00′ W.) to San Juan can proceed by rumb 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 east 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.—All foreign vessels and United States vessels engaged in foreign trade are required to take a licensed pilot 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 engaged. 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 will take vessels in or out day or night.

Towage.—Large tugs are available at San Juan; some of the other ports have small towboats.

Quarantine.—National quarantine laws are enforced in Puerto Rico by officers of the U.S. Public Health Service. Vessels subject to quarantine inspection include all vessels from foreign ports, vessels with sickness on board, and vessels from domestic ports where certain quarantinable diseases prevail. An outpatient clinic and detention

facilities are available at San Juan; an outpatient office is at Ponce. Municipal or private medical facilities are available at all the ports.

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. Bureau of Customs. 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.

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 at San Juan, Aguirre (Bahía de Jobos), Ponce, Ensenada (Bahía de Guánica), and Mayagüez have wharves where large vessels can go alongside to load and unload cargo. Bahía de Guayanilla has finger piers with mooring dolphins for the handling of petroleum products. At the other ports, small vessels can go alongside the wharves, but large vessels must anchor offshore and be loaded and unloaded by barges.

Supplies.—All kinds of supplies are available at San Juan, Ponce, and Mayagüez. Gasoline, water, 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 has a 691-foot graving dock, machine shops, and foundry that can handle any ship repair. Complete salvage equipment is available. Ordinary repairs to machinery can be made at Ponce and Mayagüez.

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 Mayagüez. 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 Mayagüez 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 thorugh 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
Bahía—Bay
Bajo—Shoal
Banco—Bank
Barra—Bar
Blanco—White
Boca—Mouth, entrance
Boquerón—Wide mouth
Cabeza—Shoal head
Cabezo—Summit of hill
Cabo—Cape
Caleta—Cove
Canal—Channel
Caño—Creek, channel
Castillo—Castle
Cayo—Key
Cerro—Hill
Ciénaga—Marsh
Cordillera—Mountain chain
Costa—Coast
Desembarcadero—Landing
Embarcadero—Wharf, quay
Ensenada—Bay, cove
Escollo—Shelf, reef
Este—East
Estero—Creek, inlet
Estrecho—Strait
Exterior—Exterior
Farallón—Rocky islet
Golfo—Gulf
Gran, Grande—Great
Interior—Interior
Isla—Island
Isleta—Islet
Istmo—Isthmus
Lago—Lake
Laguna—Lagoon
Laja—Flat rock
Largo—Long
Mar—Sea
Medio—Middle
Meridional—Southern
Monte, Montaña—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
Pueblo—Town
Puerto—Port, harbor
Punta—Point
Rada—Roadstead
Rincón—Inside corner
Río—River
Roca—Rock
Rojo—Red
Septentrional—Northern
Sierra—Mountain range
Sonda—Sound
Sud—South
Tierra—Land
Verde—Green
Viejo—Old

Chart 920.—Mona Passage, 61 miles wide between the western end of Puerto Rico and the eastern end of Hispaniola, is one of the principal entrances to the Caribbean Sea. Three small islands are located in the passage: Isla Mona and Isla Monito about midway in the southern part, and Isla Desecheo about 12 miles westward of the extremity of Puerto Rico in the northern part.

On the western side of Mona Passage, a bank extends from Cabo Engaño, the eastern extremity of Hispaniola, for 23 miles, with a least depth of 27 fathoms. 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 eastern side of the passage, an extensive bank makes off from the west coast of Puerto Rico extending up to 15 miles offshore. The west coast of Puerto Rico is described later in this chapter.

Tidal currents set generally southward and northward through Mona Passage. 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 north-northwest is generally experienced during all seasons. In summer, when the trade wind has slackened and blows more from the east and east-southeast, a strong countercurrent sets eastward off the south coast of Hispaniola. This countercurrent occasionally induces a northerly set in the passage.

A 3.5-knot current, setting approximately west-southwest, has been reported in the passage northward of Isla Mona. Observations made on the northwest edge of the bank about 13 miles westward of Punta Guanajibo, Puerto Rico, gave a velocity of about 1 knot for both southward and northward strengths.

The tidal currents also set with considerable velocity, especially near the shore south of Cabo Engaño, where they have been reported to set with a velocity of 3.5 knots during the month of May, with ebb currents setting northeastward for 3 hours and flood currents setting southwestward 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 southeast 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 901.—Isla Mona (18°05′ N., 67°54′ W.), 6 miles long east and west and 4 miles wide, lies in the middle of the southern part of Mona Passage. Temporary anchorage and landing can be made in places on the south and west sides of the island during good weather, but on many days anchorage and landing are impracticable. The attendants for the light station on Cabo Este are the only inhabitants of the island, which is a commonwealth forest preserve.

The island is composed of limestone and from eastward appears perfectly flat on top, breaking off abruptly at the water in a vertical whitish cliff about 175 feet high. On the northwestern and northeastern coasts there are extensive caves which 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 western, southern, and southeastern 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 southeast side, where it is about 1.7 miles off, and on the southwest 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 Sardinero,** on the west coast, is the best anchorage during southeast winds, and **Anclaje Isabella,** just south of Punta Oeste, is good during northeast winds. Boat landings can be made at Anclaje Sardinero and Playa Pajaro.

Currents.—In Anclaje Sardinero the tidal currents set northward and southward with a velocity of about 0.5 knot. A northerly current with a velocity of 0.5 knot has been experienced off Playa Pajaro.

Isla 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 eastern extremity of the island. A radiobeacon is at the light; see appendix for **storm warning displays.**

Vertical cliffs with deep water close to shore extend from Cabo Este northward and westward to **Cabo Barrionuevo,** the northwest 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 northward and southwestward.

Playa Pajaro, about 1.5 miles southward of Isla Mona Light, has a boat harbor with 3 to 8 feet of water inside the reefs. The southern and main entrance, with depths of 7 to 20 feet, is marked by a range maintained by the light attendant for use of the Coast Guard supply vessel. The landing place has 7 to 8 feet alongside, but with southerly winds a swell sets into the landing.

The southernmost point of the island is surmounted by a large balanced rock. **Punta Oeste,** the westernmost point, is a low, narrow ridge, covered with brush, which projects nearly a mile westward of the cliffs; a reef extends 0.3 mile westward of the point.

Isla Monito, 3 miles north-northwestward of Isla 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 northeastward of Isla Mona and 12 miles westward 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 Mona Passage and the west coast of Puerto Rico. Isla Desecheo is a forest reserve and a native-bird reserve; it is uninhabited and there are no anchorages along its shores. A depth of 5 fathoms is reported about 9 miles southwestward of Isla Desecheo, in 18°15.8′ N., 67°34.5′ W.

Punta Higuero, the most westerly point of the mainland of Puerto Rico, is projecting and prominent with the land back of it rising abruptly to rolling hills which ascend gradually to **Pico Atalaya,** 6 miles inland to the southeastward. 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 northeastward.

Bahía de Aguadilla, 7 miles northeastward of Punta Higuero, is exposed northward and westward, but with ordinary easterly trade winds anchorage is smooth. There are frequent rough spells during the winter when the wind is from northward.

Aguadilla is on the east shore of the bay. Radio towers south of the town, and the city hall clock tower and twin gray towers of the cathedral at the plaza are prominent. The small white shaft of Columbus Monument is about a mile south of city hall. **Storm warning displays** are made near the Fire Department; see appendix.

Large vessels load raw sugar and molasses at the conveyor pier with mooring buoys and dolphins 1.1 miles north of Aguadilla; depths of 40 feet or more are at the outer end of the pier.

An Air Force crash boat basin, 1.8 miles north of Aguadilla, has an emergency landing pier with 6 feet alongside.

Pilots for Bahía de Aguadilla are available at Mayaguez. The port is served for **customs** and **immigration** by officials stationed at Ramey Air Force Base, and for **quarantine** matters by a contract U.S. Public Health Service doctor in Aguadilla.

Charts 901, 903.—The **north coast** of Puerto Rico from Mona Passage to San Juan extends in an almost easterly 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 west 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 westward of San Juan.

In addition to the marine and aero lights near Punta Borinquen, the marine lights at Arecibo and San Juan, several stacks, radio towers, and towns are prominent from offshore along the north coast. All dangers will be avoided by staying a mile or more offshore.

Chart 901.—Punta Borinquen, at the northwest 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 western 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; see appendix for **storm warning displays.** A 200-foot rock bluff begins 0.8 mile southwestward of the light and extends northeast and eastward along the north coast of Puerto Rico. A brown scar in the cliff just beneath the light is conspicuous.

A boat landing may be made at times in the sandy cove on the west side of **Punta Sardina,** 7.3 miles east of Punta Borinquen Light.

Chart 903.—Punta Peñon, 16 miles east of Punta Borinquen Light, is a slight projection with lower land between it and the foothills. A rocky islet lies westward of the point and a chain of bare rocks and a small islet extend 0.8 mile eastward of it.

Puerto Arecibo, 26 miles east of Punta Borinquen Light and 33 miles west of San Juan, is an open bight somewhat protected by the headland of **Punta Morrillos** on the east side with a 1,200-foot breakwater extending from it to **Roca Cocinera.** Only fishing vessels and small pleasure craft use the port. **Arecibo** is along the southwestern 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 western 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.

An 18-foot channel marked with buoys leads to a 550-foot bulkhead pier on the south side of the breakwater at Puerto Arecibo. Care should be taken to avoid the offshore rocks when approaching the port from westward and eastward. Gasoline can be obtained at the pier in an emergency. Fishing vessels and small craft anchor south of the pier.

Danger zones for artillery and small-arms ranges extend up to 10 miles offshore in the vicinity of **Punta Puerto Nuevo,** 42 miles east of Punta Borinquen Light; limits and regulations are given in **204.228,** chapter 2.

A boat landing can be made at times inside the rock islets that extend a mile west of Punta Puerto Nuevo. An aero radiobeacon (18°28.2′ N., 66°24.8′ W.), marked by a flashing red light, is prominent southwestward of Punta Puerto Nuevo.

Several large structures are prominent on **Punta Salinas,** a narrow projecting point 3 miles west of San Juan.

Chart 908.—Bahía de San Juan, the most important commercial harbor in Puerto Rico, is about 60 miles eastward of Punta Borinquen and 30 miles westward of Cabo San Juan. It is the only harbor on the north coast which affords protection in all weather. It is protected on the north by the relatively high land of Isla San Juan, and on the south, east, and west by the adjacent low mangrove swamps of the Puerto Rico mainland.

The bay is about 3 miles long in a southeasterly direction and varies in width from 0.6 to 1.6 miles, but the entire southwestern side is shoal. The southwest shore is divided into two large bights by **Punta Cataño,** the point which extends about 0.6 mile northeastward into the harbor.

Metropolitan **San Juan,** the capital and principal port of Puerto Rico, includes Isla San Juan on the north side of Bahía de San Juan and the communities surrounding the bay. The principal commercial facilities are on the south side of Isla San Juan (Old San Juan) and on the north side of **Isla Grande** which projects westward from the eastern 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, and alcoholic products. Over half the commerce of Puerto Rico passes through San Juan. Most commercial and government activities are located here.

Prominent features.—Isla de Cabras, on the west side of the entrance to Bahía de San Juan, is low with cliffs 32 to 36 feet high at its northern end. **Las Cabritas** are three small islands and rocks 0.1 mile northeast 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 southern extremity of Isla de Cabras.

Isla San Juan, on the eastern side of the entrance to the harbor, is generally bold and rocky, with a ridge 100 feet high extending along its northern side. At each end of the island are large stone forts connected by a continuous high wall. **San Cristobal** is on the summit of the ridge in the easterly part and **Castillo del Morro** is on the extreme western 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 east-southeast of the light.

The white marble dome of the capitol building, a mile eastward of the light, and a white church 0.4 mile farther eastward are prominent landmarks.

Several tanks and towers are prominent on Isla Grande; an aero light is shown about 300 yards southeastward of its northwestern end. Many radio towers, stacks and tanks surround Bahía de San Juan.

Channels.—Bar Channel, the entrance channel to Bahía de San Juan, leads to the deep-draft anchorage southwestward of Isla Grande, via Anegada Channel; Federal project depths in Bar and Anegada Channels, and the deep-draft anchorage are 45, 36, and 36 feet, respectively. San Antonio Channel, project depth 35 feet, leads from Anegada Channel between Isla San Juan and Isla Grande, to the wharves on the south side of Isla San Juan; depth of 20 to 35 feet can be carried to the wharves. The Army Terminal Channel leads southward from Anegada Channel to the Army Terminal and turning basin, Puerto Nuevo Terminal bulkhead wharves, and to the oil piers at the south end of the harbor; project depths in the Army Terminal Channel and turning basin are 36 feet. Graving Dock Channel and turning basin, southward of Isla Grande, leads from Anegada Channel; project depths in Graving Dock Channel and turning basin are 30 feet. Puerto Nuevo Channel, project depth 32 feet, in the southeastern part of the harbor, connects Army Terminal Channel with Graving Dock Channel. See notice to Mariners and lastest editions of charts for controlling depths.

The entrance channel and the channels inside the harbor are marked with lighted and unlighted aids, and lighted ranges.

Vessels should proceed with caution when dredging is in progress in the channels; navigation regulations are given in **207.810,** chapter 2.

A channel partially marked by buoys, leads to a landing pier at the northeast end of the causeway between Isla de Cabras and Punta Palo Seco; depths of about 4 feet can be carried. The channel is used by vessels carrying dangerous or explosive cargoes.

Caño de Martin Peña, at the southeastern end of Bahía de San Juan, is a narrow slough that connects with lakes and lagoons which extend eastward for 7 miles. A 6-foot channel extends for 1.5 miles above the entrance to fertilizer plants supplied by barges. The fixed bridge at the entrance has a width of 100 feet and a clearance of 19 feet. The fixed bridges above the fertilizer plants have a least width of 44 feet and a clearance of 7 feet.

Anchorages.—Limits and regulations of the anchorage areas in Bahía de San Juan are given in **202.240,** chapter 2. In 1965, a controlling depth of 26 feet was in Anchorage F, on the southwest side of Anegada Channel, with shoaling to 25 feet in the southerly 100 yards of the anchorage.

Dangers.—Bajo Colnas, on the west side of the entrance to Bahía 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 east 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 southern part of the bay; see **207.812,** chapter 2, for limits and regulations.

Tides.—The mean range of tide is only about 1 foot; the wind causes considerable variation in the depths.

Currents.—The currents along the north shore of Puerto Rico are greatly influenced by the direction and strength of the winds. The prevailing easterly trade winds generally cause a westerly drift. In Bahía de San Juan a slight westerly flow prevails at all times. When northerly seas set into the harbor entrance, an undertow and surge may be felt as far as San Antonio Channel.

Weather.—The prevailing winds are the easterly trades, which generally blow fresh during the day. The lowlands eastward of San Juan permits the cool trades to be felt throughout the harbor. At night the trade winds generally dies down and a light southerly breeze comes off the land. Heavy northerly winds pile up heavy seas and breakers in the harbor entrance.

See appendix for **storm warning displays.**

Routes.—From a position about 0.5 mile northward of **Punta del Morro,** the northwestern point of Isla San Juan,

enter Bahía de San Juan on the lighted range bearing 188°, then follow the buoys into the harbor. From westward, Punta Salinas 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 northeast trades are blowing strongly, as they may force a vessel almost broadside to the swells. Vessels outbound should avoid getting too close to Bajo Colnas; this is particularly so with long vessels in a strong northerly breeze.

Pilotage.—Vessels usually are boarded by a pilot in a motorboat at the entrance buoys. The Commonwealth Captain of the Port maintains a daytime signal station on San Cristobal; communication is by International Code signals.

Traffic signals.—The alphabet flag N, when displayed from either yardarm of the signal mast on San Cristobal, will govern entry and departure of vessels at Bahía de San Juan:

(a) When displayed from the northwestern yardarm, all incoming vessels must remain at a safe distance outside the entrance.

(b) When displayed from the southeastern yardarm, all outgoing vessels must remain at a safe distance inside the harbor entrance or at the anchorages or berths.

Towage.—Tugs up to 1,400 horsepower are available for docking, undocking, and long distance towing and salvage.

Quarantine.—Vessels subject to visitation are boarded at the dock. The Public Health Service outpatient clinic is on Fernandez Juncos Avenue, 0.3 mile west of the San Juan Yacht Club. Hospital cases are taken to the Presbyterian Hospital.

Customs.—San Juan is a port of entry and marine documents are issued. The U.S. Customhouse is located on the waterfront west of Pier 1, and is open daily, except Sundays and holidays; inspectors are on duty from 8 a.m. to 5 p.m. The office is open on Saturdays from 8 a.m. to 12 noon only for entrance and clearance of vessels. Special arrangements can be made for work outside regular hours. Goods going to the customs warehouse cannot be landed directly, but are hauled from the general cargo piers.

Immigration.—Vessels subject to inspection are boarded by immigration officers at the docks. The port hours are 6 a.m. to 6 p.m.; at other times, inspection is made only on advance request.

Harbor regulations.—The Commonwealth Captain of the Port enforces the local rules and regulations for Bahía de San Juan. His office is located on Isla Grande.

Wharves.—The principal public and private piers and bulkheads of the port are on the south side of Isla San Juan, the north and south sides of Isla Grande, and at the south end of the harbor. Depths of 5 to 34 feet are alongside. Cruise ships are berthed at piers where space is available according to size and draft.

Caution.—Lesser depths may exist alongside and in the vicinity of the piers and wharves on the south side of Isla San Juan due to shoaling in this area. Mariners are advised to exercise caution, and to seek latest information on depths from pilots and local authorities prior to docking.

Pier 1, 530 feet long, 28 feet along west side, covered storage, general cargo. Operator: Ports Authority.

Bulkhead between Piers 1 and 2, 150 feet long, 14 feet alongside, general cargo of small interisland vessels. Operator: Ports Authority.

Pier 2 has been demolished and structures removed. In 1966, depths of 7 feet existed where pier 2 was located.

Pier 3, 600 feet long, 31 feet alongside, covered storage, general cargo; berths cruise ships up to 725 feet on both sides. Operator: Ports Authority.

Bulkhead between Piers 3 and 5, 695 feet long, 15 feet alongside, general and bulk cargo of small interisland vessels. Operator: Ports Authority.

Pier 5, 480 feet long, 20–25 feet alongside. Operator: Ports Authority. (Note.—Pier damaged by fire in 1961—sometimes used to tie-up vessels.)

Pier 6, 955 feet long, 27 feet alongside, covered storage, general and bulk cargo. Operator: Ports Authority.

Pier 7, 550 feet long, 21–25 feet alongside, covered storage, general cargo. Operator: Felix Benitez Rexach.

Pier 8, 590 feet long, 28 feet along west side, covered storage, bulk cargo, conveyor, 2½-ton mobile crane. Operator: Ports Authority.

Pier 8, 590 feet long, 400 feet across outer end, 11 to 17 feet along east side and outer end, covered storage, general and container cargo, pipeline for fuel oil. Operator: Ports Authority.

Pier 9, 600 feet long, 350 feet across outer end, 11 to 22 feet alongside, covered storage, general and container cargo. Operator: Ports Authority.

Pier 10, 450 feet long, 30 feet alongside, bulk cargo, petroleum products, 15-ton mobile crane, 25-ton floating crane, 1,400 horsepower tugs, 1,500-ton dry lighters, 1,100-ton liquid lighters, pipeline for molasses. Operator: Porto Rico Lighterage Co.

Pier 11, 580 feet long, 28 feet alongside, open and covered storage, general, bulk, and container cargo. Operator: Waterman Line.

Bulkhead between Piers 11 and 12, 269 feet long, 27 feet alongside. Operator: Ports Authority.

Pier 12, 260 feet long, 30 feet alongside, covered storage, general and bulk cargo. Operator: Ports Authority.

Pier 13, 500 feet long, 27 feet alongside, open and covered storage, general and bulk cargo. Operator: Ports Authority.

Pier 14, 480 feet long, 27 feet alongside, open and covered storage, general, bulk, container, and trailer cargo. Operator: Ports Authority.

Fernandez Juncos Bulkhead (18°27.8′ N., 66°05.6′ W.), 900 feet long, 29 feet alongside. Operator: U.S. Navy.

Isla Grande Terminal, a 3,000-foot bulkhead wharf, is on the north side of Isla Grande. Depths alongside berths E, D, and C, west to east, shoal from about 29 feet to 15 feet; open and covered storage are available, and general, bulk, container, and trailer cargo are handled at

these berths. The westerly 640 feet of this terminal is used for sea-train operations; covered storage and a 125-ton crane are available; depths alongside are about 27–29 feet. Operator: Ports Authority.

San Antonio Tank Farm (18°27.7′ N., 66°06.0′ W.), 350 feet long, 25–30 feet alongside, fuel oil. Operator: U.S. Navy.

Wagner Shipyard (18°27.3′ N., 66°06.3′ W.), marine railway can haul out vessels of 1,500 tons, 200 feet in length, and 17 feet in draft; 25-ton lift, machine shop, electrical shop. Operator: Wagner Shipyard & Marina, Inc.

Tender Pier (18°26.9′ N., 66°06.3′ W.), 1,000 feet long, 22–30 feet alongside. Operator: U.S. Navy.

Pier 15 (18°27.0′ N., 66°05.4′ W.), 1,000 feet long, 30 feet alongside, 45-ton mobile crane, 25-ton floating crane, 2,000-ton floating drydock; graving dock—691 feet over all, 632 feet docking length with 83 feet at bottom and 96 feet at top, 25 feet over sill; machine shop, electrical shop. Operator: Puerto Rico Drydock and Marine Terminals, Inc.

Pier 16 (18°27.0′ N., 66°05.3′ W.), 600 feet long, 28 feet alongside, open and covered storage, general, bulk, and container cargo. Operator: Alcoa Steamship Co.

Puerto Nuevo, a 3500-foot bulkhead wharf, is on the south side of the harbor eastward of the Army terminal; facilities from west to east are: Berth A, bulk sugar, has a conveyor and open storage. Berth B, general and bulk cargo; covered storage. Berths C and D handle trailer cargo; open storage available. Berths E and F, general cargo; four ship loading cranes are on the wharf. Each crane has a boom 85 feet above water, and during erection extends 120 feet into Puerto Nuevo Channel. The ends of the booms are marked with 2 red lights and 2 flashing white lights. Operator: Ports Authority. Depths range from 24 to 32 feet alongside the terminal.

Cataño Navy Fuel Pier (18°25.8′ N., 66°06.5′ W.), 490 feet long, 28 feet alongside, fuel oil. Operator: Oil companies.

Army Terminal Pier (18°25.9′ N., 66°06.6′ W.), 600 feet long, 200 feet across outer end, 28 feet alongside, covered storage, military cargo, 75-ton fixed crane, 20-ton mobile crane. Operator: U.S. Army.

Caribbean Refining Co. Oil Pier (18°25.9′ N., 66°06.7′ W.), 400 feet long, 34 feet alongside, petroleum products. Operator: Borinquen Refinery.

Pier and tieup dolphins (18°26.1′ N., 66°06.6′ W.), 600 feet long, 30 feet alongside, conveyor. Operator: Puerto Rico Mills.

Pier and tieup dolphins (18°26.2′ N., 66°06.6′ W.), 600 feet long, 30 feet alongside, conveyor. Operator: Rice Growers Assn. of California (P.R.), Inc.

The office and operating base of the Coast Guard are on **La Puntilla**, the southwest point of Isla San Juan.

Supplies.—All kinds of supplies are available at San Juan. Water can be obtained from pipelines at all piers and at anchorage from barges. Fuel oil is available at Pier 8 and Cataña Navy Fuel Pier, and at anchorage from barges.

Repairs.—Major repairs can be made and complete salvage equipment is available; types of equipment are given under "Wharves".

Small-boat facilities.—Small boats usually anchor northwestward of La Puntilla inside the harbor entrance and eastward of San Antonio Channel.

The San Juan Yacht Club, at the southeastern end of Isla de San Juan, has a small marine railway and boat lift; gasoline and diesel fuel are available.

Docking facilities, gasoline, diesel fuel, water, and marine hardware are available at the marina which is part of the shipyard on the west side of Isla Grande.

A marine railway at Punta Cataño can haul out boats up to 125 feet in length and 10 feet in draft for repairs.

Charts 903, 904.—The **north coast** of Puerto Rico from San Juan to Cabo San Juan trends in an east by south 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 eastern 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 two miles or more offshore.

Chart 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 depths of 2 to 3 feet is westward of the reef off Punta Cangrejos. The inlet leads under a fixed bridge with a clearance of 15 feet to a private yacht club where gasoline is available and minor repairs can be made in an emergency. The entrance to the inlet is marked by a lighted buoy and private range lights. See appendix for **storm warning displays.**

Chart 904.—**Punta Vacia Talega,** 12 miles east 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 east 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 sand bar across the entrance.

A rocky patch with a least depth of 2½ fathoms is 1.5 miles northward of **Punta Picúa,** 21 miles east of San Juan. The patch breaks in a moderate swell and is marked by a lighted buoy.

Sierra de Luquillo, the mountains in the northeast part of Puerto Rico, are the prominent feature in clear weather for this part of the coast. **El Yunque,** the westernmost of the three closely connected peaks 5 miles inland and 10 miles from the eastern end of the island, is the highest and most prominent.

Chart 921.—**Cabo San Juan,** the northeastern point of Puerto Rico, is a bluff hill 200 feet high. **Cabezas de San Juan,** two 100-foot clifflike heads, are at the north 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 cylin-

drical tower on the front of a white rectangular dwelling on the highest part of the cape. See appendix for **storm warning displays.**

Charts 921, 917, 904.—Beginning 1.5 miles north of Cabo San Juan, a chain of islands, islet, rocks, and reefs extends southeastward for 20 miles to Isla de Culebra. The chain is nearly steep-to on the north and south 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 northward of Cabo San Juan, lie at the northwestern end of the chain. A light is shown from a white cylindrical tower on one of the rocks. A shoal with depths of 15 to 26 feet extends 0.9 mile northwestward of the light and a rock is awash 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.

Los Farallones, a group of rugged bare rocks 30 feet high, are 0.8 mile eastward of Las Cucarachas. Deep water is close to the north and west 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 southward of Los Farallones and continues about 0.4 mile westward from the northwest end of Cayo Icacos. The western 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 and has a clear depth of 40 feet. A 23-foot spot is 500 yards southeastward of the light on Las Cucarachas and another 23-foot spot is 200 yards westward of Los Farallones. A **218°** course for Cabo San Juan Light will lead through the passage over a least depth of 40 feet. It is the best passage for sailing vessels entering the northwest end of Sonda de Vieques with the usual easterly trade winds.

Cayo Icacos, 1.3 miles eastward 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 southwest point of the island. A prominent tower is in about the center of the island.

Cayo Ratones, 250 yards eastward of Cayo Icacos, is 60 feet high; the eastern summit is a large bare ledge. A number of bare rocks are off its north side, and a reef awash is between the island and Cayo Icacos.

Cayo Lobos, 0.5 mile east-southeastward of Cayo Ratónes, is 25 feet high with several bare rocks and islets up to 75 feet high off the north side. A chain of bare rocks and islets up to 30 feet high continues southeastward for 2.2 miles to Cayo Diablo. A 300-yard wide channel with depths of 11 to 30 feet is between Cayo Ratónes and the bare rocks northwestward of Cayo Lobos. A tourist resort and private landing field occupy Cayo Lobos. A concrete pier is on the west side of the island with a lighted gasoline sign located on the pier. A 7-foot deep channel leads to the pier from about 0.25 mile west with shoal coral areas to the north and south of the channel.

Cayo Diablo, 5 miles southeastward of Cabo San Juan, is low with a 40-foot grassy hummock at its eastern end. White beaches are on the north and south sides.

Between Cayo Diablo and Cayo Lobito, 8 miles east-southeastward, 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 east-southeastward 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 east-southeastward of Cayo Diablo and 1.3 miles westward 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 eastward of it. A 28-foot shoal is 0.6 mile westward of the buoy.

Chart 914.—Cayo Lobito, 13 miles eastward of Cabo San Juan, is the westernmost of the chain of islands extending for over 3 miles northwestward of Isla de Culebra. **Cayo Tuna** and a bare ledge are close to the northwest end of the island. **Roca Columna** is a detached 75-foot bare pinnacle rock on the south end of the island.

Cayo Lobo, a mile southeastward of Cayo Lobito, is a triangular-shaped island covered with scrub grass, the highest part being at the west 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 southeastward 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 west coast of Isla de Culebra, consist of three islets. **Cayo Yerba,** the northernmost, 66 feet high, has a smooth grassy slope on the east side, and rocky bluffs on the west side. **Cayo Ratón,** the southwesternmost and smallest, 46 feet high, is grassy on top and rocky on the sides; a low rock is close to its southeast side. **Cayo del Auga,** the southeasternmost, is low in the middle and 39 feet high as its eastern 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 westward. The passage between Cayo Ratón and Cayo del Agua should be avoided.

Cayo de Luis Peña, off the western side of Isla de Culebra and the largest island of the chain, rises to a peak in about the center with the south and north ends joined to the island by low necks. **Punta Cruz,** the southwest point of the island, has a prominent whitewashed cliff. The 0.3-mile wide passage between Cayo del Agua and Cayo de Luis Peña has depths of 30 feet or more.

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Isla de Culebra, 16 miles eastward of Puerto Rico, is about 6 miles in length east and west. The island is fairly high, with broken and ragged terrain. **Monte Resaca,** a mountain about in the center, rises to 650 feet, and **Cerro Balcón,** about 1.5 miles east-southeast of it, is 551 feet high. The island is barren and brown in appearance. The northern 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.** Navigation by vessel other than those authorized by the Secretary of the Navy is prohibited within the 3-mile limit.

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 fresh-water streams, and rain water stored in cisterns forms the principal water supply. No fresh water is available for vessels. The principal harbor is Ensenada Honda, one of the most secure in the Leeward Islands.

Punta Noroeste, the northwest point of Isla de Culebra, is at the end of a prominent projecting ridge. A reef extends 200 yards northwestward from the high bare rock close to the point.

A shoal area with several rocks extends 2.2 miles northwestward from Punta Noroeste. **Cayo Botijuela,** 2 feet high, and **Roca Lavador,** awash, are the northwesternmost rocks of the group.

Alcarraza, 1.6 miles northwestward 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 northwestward of Punta Noroeste, consist of a 20-foot rock 50 yards in diameter with a low rock close to its southwest side and another small rock 100 yards northwestward. **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 Ancón, 0.9 mile northwestward of Punta Noroeste, is a rock with 7 feet over it that breaks when there is considerable sea; a buoy is 150 yards east of the rock.

Piedra Stevens, 0.6 mile north-northwestward of Punta Noroeste, is a 30-foot rock 100 yards in diameter with a 27-foot shoal extending 100 yards southward of it. A lighted buoy is 100 yards northwestward of the rock.

La Pasa de Los Gemelos, between Los Gemelos and El Ancón on the west and Piedra Stevens on the east, is a 0.5-mile wide passage with depths of 45 feet or more; it is the safest passage northwestward 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 **north 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 0.5 mile east by north of Punta Noroeste and a 17-foot spot the same distance eastward of the point have been reported; otherwise depths of 30 feet or more are 0.4 mile off the north 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.

Bahía Flamenco, 1.8 miles southwestward of Punta Noroeste, is constricted by reefs. Buoys mark the entrance into the bay.

Cayo Matojo, 3.2 miles about east by south of Punta Noroeste, is a 20-foot high island off **Punta Resaca,** a projecting point separating Bahía de Marejada and Bahía de Oleaje.

Roca Speck, 100 yards off **Punta Manchita,** 4.8 miles southeastward of Punta Noroeste, is low and bare. **Punta Anade** is a projecting point 0.8 mile southeastward of the rock.

Cabeza de Perro, the eastern point of Isla de Culebra, is a pointed rocky bluff. A break in the reef 0.3 mile north of the point leads to a boat landing. **Pelá,** 0.5 mile southwestward of the point, is a 30-foot high cay that presents a prominent bluff facing southeastward.

Cayo Norte, 0.5 mile off the northeastern 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 western part of the island. **Cayo Sombrerito,** a 59-foot rocky islet, extends about 300 yards northward of the eastern end of the island.

Several rocky islets and islands extend up to 0.5 mile northeastward from Cayo Norte. **Cayo Ballena** and **Cayo Tiburón,** the northwesternmost group, are 10 to 20 feet high with foul ground between. **Cayos Geniqúi,** the southeasternmost group, are two connected islands; the 79-foot western island is flat and grass covered on top. the 82-foot eastern island is pointed on top.

Isla Culebrita, 0.6 mile off the east 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 west side of the island. The eastern 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 northwestward of Isla Culebrita.

The islands, islets, and reefs on the eastern and southern sides of Isla de Culebra form a protected passage and several well-protected anchorages.

Canal de Cayo Norte, between Cayo Norte and the mainland, 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 northwestward 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

Tiburón, or between Cayo Tiburón and Cayos Geniquí. The passages are at least 0.3 mile wide with depths of 30 feet or more.

Tierra á Medio, between Isla de Culebra and Isla Culebrita, is a shoal area with depths of 13 to 29 feet that obstructs the southern end of Canal de Cayo Norte. A buoy marks the southwestern side of the shoal area.

Canal de Culebrita and **Canal del Sur** are a continuation of the protected passage on the east and southeast sides 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 southwestward from Isla Culebrita, protects the inside passage from southward. The southwestern 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 southwestern part of Canal del Sur. Buoys mark the northwestern side of Cabezas Puercas and the northeastern side of Cabezas Crespas.

Anchorages.—The best anchorage is in Canal de Culebrita in 60 feet of water with the extreme western end of Cayo Botella in line with the eastern side of Cayo Sombrerito, and the southeastern extremity of Isla Culebrita bearing 067°. Vessels can anchor closer under the lee of Isla Culebrita according to draft.

Puerto del Manglar, at the southeastern end of Isla de Culebra, is a small but well-sheltered bay. The entrance is constricted to 100 yards wide by reefs, but once inside vessels can anchor in depths of 21 to 50 feet near the middle of the bay; sand and mud bottom. The sides and head of the bay are shallow.

Bahía de Almodóvar, on the southern 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 northwestward of Pelá.

Currents.—The current velocity is 1.5 knots between Cayo Norte and Cayos Geniquí and sets southward and northward, and 2 knots in Canal del Sur and sets southwestward and northeastward.

Routes.—To enter Canal de Cayo Norte from northward, steer **132°** between Cayo Norte and Isla de Culebra until 300 yards off Punta Anade, then draw in toward the Culebra side to avoid the middle ground, heading **146°** between the buoy marking Tierra á 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 northward, steer toward Cayo Norte and, having passed 150 yards west of Cayo Tiburón, bring the western extremity of Cayo Botella in line with Cabeza de Perro and steer **186°** until Cerro Balcón on Isla de Culebra bears **240°**, then make a sharp turn and head for Cerro Balcón on **241°**, passing midway between the 23-foot spot on the north side and the 12-foot spot on the south side of the channel; continue southwesterly, swinging to get on course **146°**, passing 300 yards off Punta Anade.

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 west-northwest 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 southeastern extremity of Isla de Culebra. The southern head, on which there is a depth of 23 feet, lies with Punta del Soldado in range with the southern extremity of Cayo de Luis Peña bearing 293°. A lighted buoy is on the southern side of Bajos Grampus. A buoy marks the northern edge of the innermost or western head of these shoals. A 23-foot spot lies 0.3 mile northeast of this buoy. Virgin Passage is discussed in chapter 14.

Canal de Grampus is a channel between this western knoll and Arrecife Culebrita; it is a clear navigable channel about 0.6 mile wide, and is marked by buoys. The tidal current sets diagonally across Canal de Grampus southwestward and northeastward.

To pass southward of Bajos Grampus, keep on or southward of the line of Sail Rock and Signal Hill on St. Thomas Island until Cayos Geniquí show eastward of Cabo del Pasaje, the northeast point of Isla Culebrita. Bajos Grampus will then be cleared and the course can be shaped as desired.

Chart 913.—Ensenada Honda, on the south side of Isla de Culebra between bluff **Punta Vaca** on the east and Punta del Soldado on the west, is the most secure anchorage in the area. The harbor is about 1.5 miles in length 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 eastward 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 northward of Bajo Amarillo, is 0.3 mile in length with a least depth of 4 feet. A buoy marks the eastern extremity of the shoal.

Bajo Camarón, 0.2 mile southward of Punta Vaca, has a least depth of 9 feet over the 0.2-mile long shoal. A buoy is at the southern end.

Bajo Snapper, 0.3 mile westward 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 southward, bring the left tangent of Punta Vaca to bear **008°** before the southern end of Cayo de Luis Peña closes behind Punta del Soldado and steer

for Punta Vaca close up to Bajo Camarón; 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 westward and anchor according to draft.

From southeastward, 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 westward, when 0.5 mile south 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 northeast 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 west end of Ensenada Honda. Vessels calling at Culebra use Bahía de Sardinas.

Charts 914, 913, 915.—The 5.5-mile long **southwest 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 Peña.

Punta del Soldado, the southern point of Isla de Culebra, is wooded and terminates in a rocky bluff. A light is on the west side of the point.

Bahía de Sardinas, 1.5 miles northwest of Punta del Soldado, is the harbor for the towns of Culebra and Clark Village. The boat 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 Bahía 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 groceries and gasoline in drums. Telephone and telegraph communications are available. A motorboat carries passengers between Culebra and Fajardo; the mail is delivered by airplane.

Punta Melones, the northwestern point of Bahía 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 northwest 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 Peña and the chain of islands and reefs to the northwestward have been described previously in this chapter.

Canal de Luis Peña, between the north end of Cayo de Luis Peña 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 Peña and Isla de Culebra in depths of 30 to 79 feet. The rocky patch with depths of 42 to 53 feet, 0.6 mile westward 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 **Bahía Tamarindo,** a mile northwestward of Punta Melones. A fair anchorage in depths of 40 to 55 feet is about 0.3 mile off the northwest side of Cayo de Luis Peña.

Currents.—In Canal de Luis Peña the southeastward current is deflected northward of **Bahía Tarja,** just north of Punta Melones, and thence sets toward the south end of Cayo de Luis Peña; it is weak at the entrance to Bahía de Sardinas. The northwestward current sets directly through the passage. The current velocity is about 2 knots.

Charts 904, 917.—Sonda de Vieques extends from the east coast of Puerto Rico to Virgin Passage between the chain of islands and reefs including Isla de Culebra on the north and Isla de Vieques on the south. The sound is about 20 to 22 miles long and from 8 to 15 miles wide. The eastern part is clear with depths of 7 to 17 fathoms, except for Bajos Grampus southeastward of Isla de Culebra. The western part has numerous shoals and reefs extending as much as 8 miles off the east coast of Puerto Rico.

A **danger area** for aerial gunnery and bombing extends 9 miles south and southwesterly of Isla de Culebra; limits and regulations are given in **204.230,** chapter 2.

Explosives anchorage areas are in Sonda de Vieques north of Isla de Vieques; limits and regulations are given in **202.245,** chapter 2.

Boundary lines of inland waters.—The lines established for Sonda de Vieques are described in **82.245,** chapter 2.

Isla Palominos, 3.5 miles southeastward 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 northeastern side.

Good anchorage is afforded about 0.5 mile off the west side of the island in about 40 feet on the following bearings: Cabo San Juan Light **313°**; Las Cucaraches Light **331°**; and the left tangent of Punta Aguila **037°**.

Bajo Blake, 2 miles eastward of Isla Palominos, is 0.4 mile in diameter and has a least depth of 20 feet. The south side is marked by a buoy.

Bajo Hodgkins, 7 miles southeastward of Isla Palominos, is a narrow 0.8-mile long ridge with a least depth of 28 feet; a buoy is off the eastern side of the shoal.

The area between Bajo Hodgkins and the east 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 northwestern end of Sonda de Vieques between Cabo San Juan and Isla Palominos.

Routes.—Vessels bound from San Juan to Isla de Culebra and eastward frequently enter Sonda de Vieques through Pasaje de San Juan and proceed southward of the chain of islands and reefs to gain comparatively smooth water.

A buoyed north-south route along the east coast of Puerto Rico is used by vessels with a draft of 22 feet or less. Large deep-draft vessels bound for the south coast of Puerto Rico usually enter Sonda de Vieques through Pasaje de San Juan and continue around the east coast of Isla de Vieques. Vessels from northeasterly points use Virgin Passage and pass south of Isla de Vieques to go to ports on the south coast of Puerto Rico.

Charts 904, 940.—Isla de Vieques, 6 miles off the nearest point of the east coast of Puerto Rico, forms the south side of Sonda de Vieques. It is 18 miles long east and west 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 western end and **Cerro Matias Jalobre,** 3 miles from the east end. The island is wooded in places, especially its eastern half and Monte Pirata, but some of the hills are cultivated with sugarcane to their summits.

Principal products are sugarcane, 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 Bahía de Mulas on the north coast; sugarcane is loaded on barges at Puerto Real on the south coast. When the trade wind is northward of east a heavy surf runs and landing is difficult on the open north coast.

Naval restricted areas extend 1,500 yards offshore around the western part of the island; limits and regulations are given in **207.815,** chapter 2.

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 north of the western end of Isla de Vieques and between that island and Puerto Rico. The current velocity is 1.2 knots in the passage and floods southwestward and ebbs eastward.

Punta Arenas, at the northwestern 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 west end of Isla de Vieques, southward of Punta Arenas, there is a smooth anchorage with easterly winds but exposed to the south and west.

Escollo de Arenas is a continuation northwestward of a shoal which fringes the north side of Isla de Vieques to a distance of about 1 mile and extends eastward nearly to Punta Mulas. The western edge of the shoaler part of the bank extends 3.3 miles north-northwestward 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 northward 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 southwesterly set is noted frequently north of Escolla de Arenas. The bank itself is generally indicated by the tide rips.

Punta Boca Quebrada, 1 mile southward of Punta Arenas, is a low wooded point which terminates in a dry ledge outside of a white sand beach.

A 1.2 mile causeway extends from shore at **Desembarcadero Mosquito,** 3.9 miles east of Punta Arenas. A pier is on the west side of the causeway, about 350 yards from the end. In 1965, a depth of 37 feet was available on either side of the pier.

Arrecife Mosquito, a reef awash, is 1.7 miles to the northeastward 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 west-northwestward from the reef. During ordinary weather a fairly smooth anchorage is 0.3 mile south of Arrecife Mosquito, in 40 feet, sandy bottom. Several spots with 12 to 17 feet are in the approaches to the anchorage, and vessels drawing more than 12 feet should use it only with local knowledge.

Arrecife Corona, a reef awash, is about 0.3 mile long and about 0.2 mile eastward of Arrecife Mosquito. Several shoals are around the reef, including a 9-foot spot 0.2 mile southward. **Bajo Merail,** a shoal with least depth of 6 feet, lies 0.6 mile southward of Arrecife Corona.

Caballo Blanco, a low grassy islet, is 1.8 miles northwestward of Punta Mulas. Several shoals surround the islet, the outer of which are 0.6 mile northerly and 0.2 mile southerly. **Bajo Comandante,** a shoal about 600 yards in extent and covered by 10 to 17 feet, lies about midway between Caballo Blanco and the shore. There are 24-, 26-, and 27-foot spots in the channel between Caballo Blanco and Bajo Comandante.

Bahía de Mulas, 8 miles east of Punta Arenas and 10 miles west of Punta Este, is an open bight on the north coast of Isla de Vieques. **Isabel Segunda** (P.O. Vieques), the principal town on the island, is on the southeast 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 northeast side of the bay. An old Spanish brick fort and building is prominent on a hill 0.5 mile southeastward of the light. A depth of 12 feet can be taken to the 300-foot pier on the east side of the bay. Depths of 4 to 12 feet are along the pier.

Small vessels and schooners anchor north and south 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 northerly 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 (east coast of Puerto Rico).

The approach to Bahía 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 northwest by staying in the white section 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 groceries and gasoline in drums. Telephone and telegraph communications are available. A motorboat carries passengers between Isabel Segunda and Fajardo; the mail is delivered by airplane.

Cabellos Colorados, 3.1 miles eastward of Punta Mulas, is rocky and steep-to. **Puerto Negro** is a boat landing 4.8 miles east 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 westward of the entrance, is marked by **Roca Roja,** a large bare rock close-in. **Punto Goleta** is the eastern entrance point.

Roca Cucaracha, 3.4 miles west-northwestward of Punta Este Light, consists of 2 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.

Caño Hondo extends 0.6 mile eastward of Roca Cucaracha to the reefs forming Bahía Salinas. It is open northward and has depths of 18 to 42 feet. It has no sheltered anchorage except for small craft, which can anchor at its southeast end. A narrow channel with a depth of 8 feet south of an islet about 15 feet high and 250 yards from shore leads from Caño Hondo to Bahía Salinas.

Bahía Salinas, 1.6 miles westward of Punta Este, has an anchorage with depths of 12 to 24 feet. It is the best landing along the north coast eastward of Bahía 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 north by a reef 0.6 mile long, the highest part of which is awash. The entrance from eastward is between the reef and those reefs which fringe the shore. About 1.5 miles northwestward of Punta Este is a high bluff point with bare white cliffs to eastward.

Punta Este, the eastern 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 south coast of Isla de Vieques is irregular and indented by sandy bays. **Bahía Salina del Sur,** 2 miles westward of Punta Este, is 0.5 mile in diameter and affords a boat landing with the wind northward of east. **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 southeast end, lies 0.3 mile off the western entrance point. Anchorage is in the western half of the bay in 18 to 24 feet, sheltered from winds northward of east. The clearer entrance is between Roca Alcatraz and the island off the western point of the bay. For 1 mile westward of the island, shoals with 18 feet and less extend nearly 0.5 mile from shore.

Ensenada Honda, about 6 miles westward of Punta Este, is 1.2 miles wide, and has several bare rocks and reefs awash. The bay is rough with southeasterly winds, but with the wind northward of east 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 east-northeastward from **Punta Conejo,** the western entrance point. A light is on the east side of the point. **Cayo Jalovita** and **Cayo Jalova** are small islands on the eastern side of the harbor.

Bahía de la Chiva is a shallow bight on the west 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 westward of Punta Conejo. **Bahía Tapon** is a bight northward of the reef, with depths of 2 to 3 feet.

An offshore fueling line extends about 700 yards seaward from the tank west of Bahia de la Chiva, and is marked by buoys.

Puerto Ferro, 9 miles westward 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. A light, 68 feet above the water, is shown from a 44-foot white octagonal tower on the summit of a rocky bluff 0.3 mile southward of the entrance.

Puerto Mosquito, about 10 miles westward of Puerto Ferro Light, is a boat harbor. Least depths in the narrow entrance are 2 to 3 feet.

Ensenada Sun Bay, 2.3 miles westward of Puerto Ferro Light, is about 0.6 mile wide. It offers anchorage in 18 to 24 feet exposed to winds from southeast to southwest. A shoal extends 200 yards westward from the eastern point of the bay and a shoal with 16 feet over it lies westward from the middle of the entrance. The depths in the southern half of the bay are 18 to 27 feet.

Puerto Real, on the south coast of Isla de Vieques 3 miles westward of Puerto Ferro Light, provides good anchorage in ordinary weather. The port is somewhat protected by **Punta de Tierra** on the east and **Cayo Real** on the south; depths are 18 to 24 feet. Barges are loaded with sugarcane at the pier on the northeast side of the port and towed to Humacao; a depth of 10 feet is alongside the pier. The radio tower lights 0.4 mile inshore are prominent.

The principal outlying danger is a shoal covered by 13 to 17 feet, with 30 to 50 feet around it, lying 0.7 mile from shore and 0.9 to 1.3 miles west-southwestward from the south end of Cayo Real; its eastern and western ends are each marked by a buoy. A spot with 23 feet is about 0.4 mile southwestward from the southern end of Cayo Real. A shoal with 15 feet of water is 0.2 mile from shore and 0.6 mile west from the north point of Cayo Real.

Vessels can anchor in 35 feet about 550 yards westward of Cayo Real. The approach to the anchorage is between the buoy marking the east end of the principal offshore danger and a 23-foot spot nearly 0.4 mile southwestward of Cayo Real.

Punta Vaca, 3 miles westward of Puerto Real, is the southernmost point of the island. Outlying rocks are a

short distance off it. Thence the coast trends westward and turns northward past **Punta Boca Quebrada** to Punta Arenas.

A **267°31′–87°31′ measured nautical mile** is off Punta Vaca; the front and rear markers are shown from poles.

Charts 904, 917.—The **east coast** of Puerto Rico extends 10 miles southward from Cabo San Juan to Punta Puerca and then 22 miles southwestward 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 east coast, but entrance caution is necessary to avoid the shoals near the route. The principal ports on the east coast are Fajardo and Humacao.

Chart 921.—Playa Canalejo, 0.2-mile south-southeastward of Cabo San Juan Light, is a shallow indentation leading to a Coast Guard pier where landings can be made in good weather.

Punta Gorda, 1.4 miles southward of Cabo San Juan, is a conspicuous high head. A 360-foot hill, 0.4 mile west-northwest from the point, is the northern end and highest part of a high ridge which extends southwestward nearly to Playa de Fajardo.

Punta Bateria, 2.2 miles southward of Cabo San Juan, is a black rocky 70-foot cliff from which a grassy ridge makes inland.

Bahía de Fajardo, 2.5 miles southward of Cabo San Juan Light, affords good shelter for medium draft vessels. It is somewhat protected on the east and south by two islands and surrounding reefs. Motorboats carry passengers between Playa de Fajardo, Isla de Culebra, Isla de Vieques, and the Virgin Islands. Small interisland vessels trade in general cargo, building materials, and livestock. Large vessels load molasses from barges offshore.

Prominent features.—Cabo San Juan Light is the principal landmark in making the approach to Bahía de Fajardo. A hotel with two cupolas, each marked by a red light, just south of Punta Gorda, and two stacks of a sugar central, and a radio tower near Fajardo are prominent.

See appendix for **storm warning displays.**

Channel.—The principal entrance to Bahía de Fajardo is from northward through the channel marked by buoys wastward of Bajo Laja, although small vessels can enter from eastward and southward with local knowledge. The north entrance has a controlling depth of 23 to 30 feet to Buoy 5, thence 11 feet to the public pier. The controlling depth from eastward is 17 feet to Buoy 5, and from southward, 9 to 11 feet to the public pier.

Anchorages.—Large vessels anchor northeast 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 in the vicinity of the public pier.

The hurricane anchorages for large vessels are Ensenada Honda (Isla de Culebra) and Ensenada Honda, 10 miles southward of Fajardo. Small vessels can anchor south of Isla Marina.

Dangers.—The approaches to Bahía 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 east side of the north entrance and is marked with buoys.

Isla Marina, with surrounding reefs up to 0.5 mile, is on the east side of the bay.

See appendix for **storm warning display.**

Arrecife Corona Carrillo and a long reef to the westward obstruct the south 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 southern entrance to the bay.

Currents.—The current velocity is 0.3 knot in a south-southeastward direction on the flood and 1 knot in a north-northwestward direction on the ebb in the channel in Bahía de Fajardo.

Pilotage.—A local pilot is available.

Towage.—Small towboats used for towing molasses barges are available.

Quarantine, customs, and immigration.—A representative of the quarantine service enforces the national quarantine laws. Fajardo is a 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.

Harbor regulations.—Local regulations are enforced by a Commonwealth Captain of the Port.

Wharves.—The landing facilities are at **Playa de Fajardo** on the southwestern side of Bahía de Fajardo. The westerly 300-foot public pier has 12 feet at the outer end and 8 feet alongside. An 80-foot bulkhead pier with 12 feet alongside for passenger motorboats is just west of the public pier.

The easterly 400-foot pier with 5 feet at the outer end is used by the sugar central to load molasses by pipeline into barges for transfer to large vessels in the anchorage area. The former limestone pier to the eastward is in ruins.

See appendix for **storm warning displays.**

Supplies and repairs.—Water is available and gasoline can be trucked in. Groceries can be obtained 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-boat facilities.—A marina on Isla Marina, on the east side of Bahía de Fajardo, has facilities for small boats. Depths of 8 to 14 feet can be taken to the dock. Available supplies include gasoline and diesel fuel; water, ice, covered storage and electricity 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.

Chart 917.—Isla de Ramos, 4 miles south 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 east-southeastward of the island.

Cayo Largo, 1.5 miles eastward of Isla de Ramos, consists of a narrow 1.8-mile long ridge steep-to on all sides. The southern half is awash at low water and the sea always breaks on it; the northern half has depths of 5 to 15 feet. Buoys mark the western side. The velocity of the current is 0.5 knot in the channel west of Cayo Largo; it floods southward and ebbs northwestward.

Isla Piñeros, 8 miles southward of Cabo San Juan Light, is a wooded island with a prominent tower on the 249-foot hill near the middle. **Isla Cabeza de Perro,** just eastward of Isla Pineros, has a large detached rock off the rocky bluff northeast 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 east point of the island. **Pasaje Medio Mundo,** west of Isla Piñeros, 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 southward of Cabo San Juan, is a prominent bold wooded head with a high rock bluff at the shoreline.

Chart 922.—Ensenada Honda, 11 miles south 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,** 3.5 miles north of Ensenada Honda, to 2 miles westward of the entrance; limits and regulations are given in **§ 207.815,** chapter 2.

Bahia de Puerca, a mile northeastward of Ensenada Honda, has dredged depths of 38 feet or more leading to a pier with 40 feet alongside at the head of the bay. 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 east side of the entrance to Ensenada Honda, has a rocky bluff on the east side. **Isla Cabras Light (18°12.9′ N., 65°36.0′ W.),** 70 feet above the water, is shown from a white skeleton tower with a white daymark with fluorescent red-orange stripe near the east 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 western point at the entrance to Ensenada Honda, has rocky cliffs on the south side and a bare reef 250 yards off the southeastern side. Many houses are on the high part of the point and trees fringe the shoreline.

Channels.—A dredged channel, marked by lighted and unlighted buoys and a 315° lighted range, leads to a large turning basin in Ensenada Honda; project depths in the channel and turning basin are 40 feet. Vessels anchor inside the harbor according to draft; the holding ground is soft mud which may cause some dragging during a hurricane. In 1966, a controlling depth of 40 feet was available in the channel and turning basin.

Wharves.—Pier 1, U.S. Navy fuel pier, the more westerly pier on the northeastern side of Ensenada Honda, is 450 feet long with 32 feet along the westerly side and 36 feet along the easterly side; water is available. A small boat landing with about 15 feet alongside is inshore of the easterly side of the fuel pier.

Pier 2, U.S. Navy cargo pier, southeastward of Pier 1, is 400 feet long with 32 feet alongside; water is available. An LST landing ramp is about 400 yards southeastward of the cargo pier.

The 1,200-foot long aircraft carrier pier is 0.25 southward of Pier 2. Depths of about 39 feet are alongside.

Quarantine, customs, and immigration services are handled by representatives from Fajardo.

Chart 923.—Puerto de Humacao, 19 miles southward of Cabo San Juan, affords some shelter for medium draft vessels. The port is exposed southeastward and southward, and a heavy sea sometimes makes in with southeasterly winds. The port is used by a sugar central to receive sugarcane by barge from Isla de Vieques and to ship molasses by large vessels loaded from barges offshore.

Prominent features.—Punta Lima, 3 miles northeastward of Puerto de Humacao, is a projecting wooded hill with low land back of it. A reef 0.5 mile eastward of the point usually shows breakers on it.

Cayo Santiago, 0.7 mile southeastward of the waterfront at **Playa de Humacao,** is the most prominent feature when approaching the port. The island is low at the north end, rising to 162 feet at the southern end. The U.S. Public Health Service maintains a monkey colony for experimental purposes on the island; no visitors are permitted.

El Morrillo, 1.8 miles southwestward 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 southwestward 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 eastward and southward of Cayo Batata.

Channels.—The principal entrance to Puerto de Humacao is from southward through the buoyed channel westward of **Bajo Parse** and **Bajo Evelyn;** small vessels can enter from northward. The south channel has depths of 24 to 30 feet to Buoy 6 marking Bajo Evelyn, thence 10 feet to the wharf. The north channel has depths of 6 to 10 feet to the wharf.

Anchorages.—Large vessels usually anchor inside the entrance bell buoy, 2.3 miles south of Cayo Santiago, as close inshore as possible and shift offshore as they are loaded.

Ensenada Honda, 10 miles northeastward, is the nearest hurricane anchorage.

Small vessels anchor in depths of 3 to 10 feet in the northeast part of **Puerto de Naguabo,** 2 miles northeastward of Puerto de Humacao. Good anchorage is afforded except with southeasterly or southerly winds.

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 east of Cayo Santiago is marked by a buoy and the shoals at the south entrance are marked by buoys. 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 covered 8 feet is 300 yards southeastward of the outer end of the long pier.

Pilotage.—A local pilot is available.

Towage.—Small towboats of the sugar central are available.

Quarantine, Customs, and Immigration services are handled by representatives from Fajardo.

Harbor regulations.—Local regulations are enforced by a Commonwealth Captain of the Port.

Wharves.—The sugar central 625-foot wharf at Playa de Humacao has depths of 10 to 12 feet at the outer end. It has pipelines for water, fuel oil, and molasses. The 200-foot pier, 250 yards northeastward of the sugar central wharf, is used by small boats with supplies for Cayo Santiago.

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 hardware is San Juan, 44 miles by highway from Playa de Humacao.

Chart 918.—Puerto Yabucoa, 23.5 miles southwestward of Cabo San Juan Light and 6 miles northeastward of Punta Tuna Light, is an open bay with numerous reefs and sunken rocks with depths of less than 5 feet. The bay is exposed and should be used as an anchorage only with local knowledge.

Playa de Guayanes is at the north end of Puerto Yabucoa which extends for 2.2 miles from rocky **Punta Guayanes** on the north to **Punta Quebrada Honda** on the south. An unused pipeline trestle pier formerly used for loading molasses is at Playa de Guayanes.

Chart 924.—Punta Yeguas, 1.2 miles south 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 eastern end of Cuchilla de Panduras.

Punta Toro, the point 1.4 miles west-southwestward of Punta Yeguas, is a spur 500 feet high from **Cuchilla de Panduras,** which is 1 mile northward of the point and has elevations of 1,400 feet.

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; see appendix for **storm warning displays.** The point projects as a high cliff; a 400-foot hill 0.5 mile northward is prominent.

Arrecife Sargent, 0.5 mile southeastward of Punta Tuna, is 1.8 miles long and 0.3 mile wide at its widest point. Because it breaks the force of the southeast swell, the reef affords some protection from the southeast 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 eastward 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 901, 902.—The **south coast** of Puerto Rico from Punta Tuna to Cabo Rojo extends in an almost westerly 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 eastern and western 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 insured 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.

Chart 925.—Puerto Arroyo, 11 miles westward of Punta Tuna Light, is an open bay exposed to southerly winds. The harbor is used only by small fishing vessels that anchor near **Arroyo** in the northeastern part of the bay.

Punta Figuras, a projecting point on the east side of Puerto Arroyo, is marked by a **light. Cerro Range,** 3.2 miles north of the light, is a distinct sharp conical hill. The stacks of several sugar centrals are also prominent.

The principal entrance channel is from southwestward; a lighted buoy is on the east 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 eastward 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 5 to 20 feet to the private pier at Arroyo. The east passage has depths of 20 to 30 feet to the anchorage.

The best anchorage is in 23 to 30 feet a mile west-southwestward of Punta Figuras Light. The prevailing southeast 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. Bahía de Jobos, 10 miles westward, 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

eastern 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 westward of Punta Figuras, has a least depth of 5½ feet. **Arrecife Algarrobo,** 2.3 miles westward 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 southward of **Punta Barrancas,** a point on the west side of Puerto Arroyo 3.8 miles westward of Punta Figuras.

Local harbor regulations for Puerto Arroyo are enforced by a Commonwealth Captain of the Port.

Chart 909.—Bahía de Jobos, 20 miles westward of Punta Tuna Light, is a good hurricane anchorage. The harbor is formed by **Punta Pozuelo,** a projecting point on the east side, and many islands on the south and southwesterly sides. The shore and islands are low, and are covered with thick brush and mangroves. **Central Aguirre,** on the northwestern side of the bay, is one of the largest sugar centrals of Puerto Rico. The eastern part of the bay is shoal and is used only by local fishing boats.

A privately-dredged and marked channel leads eastward from Punta Rodeo along the north side of Punta Pozuelo to the private barge receiving wharf of an oil company. The channel was reported dredged to 15 feet in 1967.

Prominent features.—A light on the east end of **Cayos de Ratones** marks the entrance to Bahía de Jobos. The stacks at Central Aguirre, the stack back of **Puerto Jobos,** and the tank at **Salinas** show up well from offshore.

Boundary lines of inland waters.—The lines established for Bahía de Jobos are described in **82.230,** chapter 2.

Channels.—The principal entrance is from westward between **Cayo Morrillo** and Cayos de Ratones, thence through the buoyed channel to the pier at Central Aguirre; private range lights also mark the dredged cuts. The midchannel controlling depth was 27 feet in September 1962–July 1965.

Boca del Infierno, a small-boat entrance into Bahía 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 northeastward of **Cayos de Pájaros.** The anchorage inside the bay is southward 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 southerly winds.

Dangers.—Numerous wooded islands with reefs awash and steep-to surround the south and southwesterly part of Bahía de Jobos up to 1.5 miles from the mainland. There are passages between some of the island groups, but only the principal entrance east of Cayos de Ratones should be used by large vessels and small boats without local knowledge.

Pilotage.—Vessels are boarded by a pilot in a motorboat off Cayos de Ratones.

Quarantine, customs, and immigration.—A Public Health Service doctor at Central Aguirre enforces national quarantine laws. Customs and immigration are cleared by representatives from Ponce.

Wharves.—A 1,000-foot pier at Central Aguirre extends south of the main buildings; depths of 29 feet are along each side with 32 feet at the outer end. Pipelines for water and molasses, a conveyor belt for bulk sugar, and a gantry crane for bulk loading are on the pier.

Supplies and repairs.—Supplies have to be obtained from inland towns; San Juan is 67 miles by highway. Some emergency repairs can be made by the machine shop at Central Aguirre.

Small-boat facilities.—A private yacht club is 0.3 mile northeastward of the pier at Central Aguirre. A depth of 4 feet can be taken to the pier where water and gasoline are available.

Bahía de Rincon, 26 miles westward of Punta Tuna Light, is a 5-mile wide bay used only by local fishing boats that anchor near **Playa Salinas** in the northeastern part. There is a good anchorage in depths of 25 to 28 feet in the eastern part of the bay during ordinary weather. The bay shoals to 18 feet and less within a mile of the shore in some places.

Arrecife Media Luna and **Arrecife Alfenique** obstruct the entrance to Bahía de Rincon from southward. The reefs are partly bare or awash, steep-to, and the sea breaks on them. The western 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 southern sides. Foul ground with depths of 3 to 8 feet extends northward to **Punta Petrona,** the western point of the bay.

Depths of 23 to 28 feet can be taken to anchorage in Bahía de Rincon on either side of Arrecife Media Luna; avoid the 11-foot shoal 0.4 mile westward of Cayos de Ratones. Small vessels with local knowledge also use the narrow channel north of Cayos de Ratones.

Chart 926.—The 15-mile indentation in the coast between Bahía de Rincon and Bahía Ponce is obstructed by islands and shoals up to 5 miles offshore. The only landmarks are the stacks of several sugar mills. 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 westward of Punta Tuna Light, is a small settlement near the beach where water and gasoline can be obtained. A depth of 4 feet can be taken to the landing. Groceries and some other supplies are available at **Santa Isabel,** 0.7 mile inland.

Cayo Berberia, 33 miles westward of Punta Tuna Light, is 3 miles offshore and is surrounded by a reef and shoals. The fringing reef, on which the sea breaks on the southern and eastern sides, extends up to 0.4 mile from the island. A shoal with depths of 2 to 12 feet extends for 0.2 mile north of the island and over a mile westward of it.

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 southwest end is low except for a 170-foot steep hill at the extreme southwest end. Landings can be made on the western side of the island during ordinary weather. **Isla Morrillito** is a small 31-foot flat-topped island 200 yards off the southwest 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 0.4 mile off the eastern shore. A bar with a least depth of 15 feet extends northeastward from Isla Caja de Muertos gradually curving eastward and joins the shoal area westward of Cayo Berberia. The sea rarely breaks on the bar; it is dangerous to approach.

A passage northward 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.

Cayos Frios (chart 927), 4.3 miles north-northwestward of Isla Caja de Muertos and 0.5 mile offshore, are surrounded by a 0.4-mile long reef that is steep-to on the southern edge.

Chart 927.—Bahía de Ponce, 43 miles westward of Punta Tuna Light and 32 miles eastward of Cabo Rojo Light, is the most important commercial harbor on the south coast and one of the three leading ports of Puerto Rico. The harbor is protected from the prevailing easterly trade winds by Punta Penoncillo and Cayo Gata with their surrounding reefs, but it is exposed to the southward causing a swell at times in the anchorage. The port facilities are in the eastern part of the 3.5-mile wide bay which is surrounded by shoals and reefs; the north 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.—Isla Caja de Muertos, with the light on its summit, is the most prominent feature in the approach. The stacks of the cement factory west of Ponce, the hotel on the hill back of Ponce, and the radio towers and stacks surrounding the bay can be seen from well offshore.

Cayo Cardona, in about the middle of the entrance to Bahía de Ponce, is marked by a light shown from a white tower near the middle of the island.

Cayo Gata and several islets extend 0.3 mile westward of **Punta Carenero,** 0.3 mile southeastward of the municipal pier on **Punta Penoncillo.** A dike extends from the southeast end of Cayo Gata eastward to Punta Carenero.

Boundary lines of inland waters.—The lines established for Bahía de Ponce are described in **82.225,** chapter 2.

Channels.—The principal entrance channel is eastward of Cayo Cardona where the controlling depth is 30 feet to the municipal pier and bulkhead. The channel is marked by a lighted range and buoys; do not confuse the rear range light with the flashing red radio tower lights back of it. A 0.2-mile wide channel between Cayo Cardona and Las Hojitas is sometimes used by small vessels with local knowledge.

Anchorages.—The usual anchorage is northeastward of Cayo Cardona in depths of 30 to 50 feet, although vessels can anchor in 30 to 40 feet northwestward of Las Hojitas. A small-craft anchorage is northeastward of Las Hojitas in depths of 18 to 28 feet; limits and regulations are given in **202.255,** chapter 2. A well-protected anchorage for small boats in depths of 16 to 30 feet is northeastward of the yacht club on Cayo Gata. A comfortable anchorage with little swell during ordinary weather in depths of 18 to 30 feet can be found in **Caleta de Cabullón,** the bight eastward of Cayo Gata.

Bahía de Ponce is not safe as a hurricane anchorage because it is exposed to the southward. The nearest hurricane anchorages are at Bahía de Jobos, 28 miles eastward, Bahía de Guayanilla, 8 miles westward, and Bahía de Guanica, 16 miles westward.

Dangers.—Bajo Tasmanian, an extensive bank on the eastern 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 westward of the bell buoy to clear the western limit of the bank.

The bank on the western side of the entrance extends almost to Cayo 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 southwestward of the island.

Bajo Cayo Cardona extends 600 yards east-southeastward from Cayo Cardona with depths of 12 to 17 feet. A bare reef on which the sea breaks extends 300 yards northeastward 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 westward and southwestward from Cayo Gata. The sea always breaks on the outer side of this reef.

It is reported that with an easterly wind of 25 knots or more, the mud from the reef off Cayo Gata discolors the water across the channel to Cayo Cardona and beyond, making the channel off the piers at Punta Penoncillo appear shoal.

Other unmarked shoals and reefs are dangerous in approaching Bahía de Ponce through any of the inshore passages. A reef with three islets extends 0.4 mile from shore to Punta Cabullón, 2.5 miles east of Cayo Cardona. The reef is steep-to and the sea breaks on the southern side. **Roca Ahogado,** a bare rock in the middle of Caleta de Cabullón, has shoal water of 4 to 18 feet extending up to 0.2 mile from it.

Las Hojitas (Arrecife Cayito), northwestward of Cayo Cardona, is 0.8 mile long in a northeasterly direction with a small patch awash near the southwest end. The reef has depths of 4 to 11 feet and is steep-to eastward and northeastward of this patch.

Cayo Viejo (Escollo Hojas), 0.8 mile westward of Cayo Cardona, is about 0.3 mile in diameter and awash at it shoalest point.

Cayo Ratones, on the western side of the entrance to Bahía de Ponce and a mile offshore, is a low island with a reef that bares at low water extending a mile east-southeastward of it. **Cayo Arenas,** 0.5 mile northeastward of Cayo Ratones, is surrounded by a reef and shoals that exend 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 displays are made from the customhouse at Playa de Ponce and the yacht club; see appendix.

Routes.—From eastward: When 3 miles south of Isla Caja de Muertos Light steer **303°** for 8 miles until Cayo Cardona Lights bears 005°, distant 2.5 miles, then head in on the lighted range bearing **015°**. From westward: When 5 miles south of Guánica Light steer **079°** for 15.4 miles to the position off the entrance of Bahía de Ponce.

Pilotage.—Vessels usually are boarded by a pilot in a motorboat at the entrance buoys.

Towage.—Vessels enter and clear the harbor under their own power. No towboats or launches are available for towing, however towboats can be arranged for at Bahía de Guayanilla.

Quarantine.—Vessels subject to visitation are boarded at the dock. The Public Health Service has an outpatient office at Ponce; see appendix.

Customs and Immigration.—Ponce is a port of entry and marine documents are issued. The customhouse is located at Playa de Ponce. The deputy collector of customs and his inspectors act as immigration inspectors.

Harbor regulations.—A Commonwealth Captain of the Port with an office at Playa de Ponce enforces the local rules and regulations for Bahía de Ponce.

Wharves.—The municipal dock on Punta Penoncillo is administered by a board with a dock superintendent in charge. The facilities includes: A finger pier 450 feet long and 125 feet wide with covered sheds and depths of 26 to 30 feet along both sides; pipelines for water, molasses, and bulk cement are on the pier. A 1,900-foot bulkhead wharf, locally known as Alcoa Pier, on the northern side of Punta Penoncillo, has depths of 26 to 30 feet alongside and in the maneuvering basin extending 250 yards northward of it; the northerly limit of the basin is marked by buoys and the red sector of the anchorage light on shore. Pipelines for water and diesel oil are on the bulkhead; transit sheds are along the wharf. A 25-ton mobile crane is available.

Supplies.—Most supplies are available at Ponce. If necessary, supplies can be brought in from San Juan by truck in a few hours. Water and bunkers (bunker C-light diesel) are available by pipeline at the municipal pier; diesel oil and water are available at the municipal bulkhead; gasoline can be trucked in.

Repairs.—The Porto Rico Iron Works can do repairs to ships above the waterline. There is no drydock or large marine railway at the port. Minor electrical and small engine repairs can be made in Ponce.

Small boat facilities.—A yacht club pier 300 yards eastward of the municipal dock has water and gasoline; the controlling depth to the landing is 10 feet.

The Ponce Yacht and Fishing Club, with docking facilities for about 40 craft, and depths of about 8 feet, is on the north side of Cayo Gata. The club has a small marine railway that can accommodate two small craft at a time; water is available.

Charts 902, 928.—Bahia de Tallaboa, 27 miles eastward of Cabo Rojo Light, is an open bay somewhat protected by islands and surrounding reefs. Private facilities of Union Carbide Caribe Inc., in the bay, include a 60-foot long offshore tanker loading platform with dolphins, about 0.2 mile southwestward of Cajo Rio, and a 60-foot long barge dock at the mouth of a 200-foot wide effluent canal, about 0.6 mile northward of the tanker loading platform. In 1965, it was reported that the controlling depth in the canal and the approach thereto was about 10 feet. The tanker loading platform is used by large vessels to load bulk ethylene glycol and other products; the corners of the upper deck of the platform are marked by lights.

Depths of 32 feet or more can be taken to the loading platform through a channel marked by buoys and a **358°** lighted range which leads into Bahia de Tallaboa between **Cayo Caribe** on the east and **Cayo Maria Langa** and **Cayo Palomas** on the west. There are no additional aids for the barge dock, however, the harbor entrance buoys in the bay for the offshore tanker loading platform provide a safe entrance and departure route for the barges. Shoals and reefs with depths of 10 feet and less extend from the islands nearly to the buoyed channel.

Chart 928.—Bahía de Guayanilla, 25 miles eastward of Cabo Rojo Light, is the largest hurricane harbor and one of the best in Puerto Rico. The reefs and islands to the southeastward break the sea but not the wind; some dragging can be expected. The harbor, between low and wooded **Punta Guayanilla** on the east and bluff faced **Punta Verraco** on the west, is protected at its entrance by extensive reefs which extend a mile or more offshore. Large vessels call here to deliver crude oil and load petroleum products.

Prominent features.—The two processing towers with red lights on top of the Commonwealth Oil Refining Company, 2 miles northeastward of Punta Guayanilla, are the most prominent features in the approach. The tanks on Punta Pepillo and the two black stacks south of **Guayanilla** are conspicuous.

Cerro Toro, on the southwestern side of Punta Verraco, has a 100-foot hill with a bluff head at its western end and a gentle slope northeastward to the low part of Punta Verraco. There is a bright yellow spot in the bluffs on the southeast side. A low break separates the hill from **Punta Ventana,** 0.4 mile to the southwestward. The hill and point usually show well.

Boundary lines of inland waters.—The lines established for Bahía de Guayanilla are described in **82.220**, chapter 2.

Channels.—The entrance channel marked by buoys is between the shoals extending 0.4 mile from Cayo María Langa on the east and the shoals extending 1.4 miles from Punta Verraco on the west. The controlling depth is 36½ feet to the Commonwealth Oil Refining Company dock, thence 30 feet to the dock off Punta Pepillo. A depth of 7 feet can be taken to the pier at **Playa de Guayanilla** in the north end of the bay.

Anchorages.—The usual anchorage is 0.5 to a mile northeastward 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 near the piers in the north 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 northward of Cayo Mata, thence eastward between two jutting points of land; the channel is privately marked and maintained; local knowledge is required.

Dangers.—Cayo María Langa is surrounded by reefs on which the sea breaks. The 30-foot curve is 0.3 mile southward and about 0.6 mile east-southeastward from the island, descending abruptly to great depths.

See appendix for **storm warning display.**

Arrecife Fanduco, the southwest end of the shoal that extends 0.6 mile southward of Punta Guayanilla and 0.4 mile westard of Cayo María 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 south-southwestward from **Punta Gotay,** the western end of Punta Guayanilla.

Arrecife Guayanilla and **Arrecife Unitas,** on the west side of the entrance to Bahía de Guayanilla, form the south and southeastern 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 south side, and the slope is abrupt to great depths.

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 32 feet.

Routes.—Vessels approaching in the daytime from east or west can follow the coast at a distance of 2.5 miles until the entrance to Bahía 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.—Vessels usually are boarded by a pilot in a motorboat a mile outside the entrance buoy for Bahía de Guayanilla and Bahia de Tallaboa.

Towage.—Small tugs are available for Bahía de Guayanilla and Bahía de Tallaboa.

Quarantine, Customs, and **Immigration** services are handled by representatives from Ponce who board vessels at dock or anchorage for both Bahía de Guayanilla and Bahía de Tallaboa.

Harbor regulations.—Local regulations are enforced by a Commonwealth Captain of the Port whose office is at Playa de Guayanilla.

Wharves.—The Commonwealth Oil Refining Company oil piers at the end of a causeway, 0.4 mile southwestward of Punta Pepillo, provide about 3,000 feet of berthing space. Depths alongside the northerly pier are about 32 feet, and about 37 feet alongside the southerly pier. The ends of the piers are marked by privately maintained 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.

Texaco's distributing plant 525-foot dock off Punta Pepillo has a depth of 31 feet at the end; depths of 12 to 18 feet are alongside the dock. A private light marks the outboard end of the dock. Mooring buoys are available to assist in clearing the dock and mooring dolphins.

The westerly of two piers at Playa de Guayanilla in the north end of the bay is 300 feet long and has 7 feet at the outer end; the easterly pier is in ruins.

A private 150-foot long marginal barge wharf is at the north end of the large cove, known as Cano de Los Placeres, about 0.8 mile northeastward of Punta Gotay. A privately dredged channel leads from the entrance to the cove to the wharf; the channel has been reported dredged to 10 feet.

Supplies.—Water, bunker C, diesel fuel, and other petroleum products are available in quantity at the Commonwealth Oil Refining Company dock. Groceries and marine hardware can be obtained from Ponce, 12 miles by highway from Bahía de Guayanilla.

Repairs.—No repair facilities are available. Above the waterline and minor electrical and small engine repairs can be made in Ponce.

Chart 929.—Bahía de Guánica, 16 miles eastward 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 east and west sides. Large vessels call here to load fertilizer, sugar, and molasses.

Prominent features.—Guánica 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 east side of the entrance to Bahía de Guánica. An abandoned lighthouse tower just southeasterly of the light is prominent in the daytime.

Boundary lines of inland waters.—The line established for Bahía de Guánica is described in **82.215,** chapter 2.

Channels.—The buoyed entrance channel is between Bajo La Laja on the east and **Punta Brea** on the west, thence through a dredged channel marked by a lighted range, and thence a continuation of a buoyed dredged channel in a northwesterly direction to the sugar mill at the west end of the bay. The controlling depth was 32 feet in 1964. A depth of 28 feet can be taken to the fertilizer plant 0.5 mile north of Guanica Light.

A power cable crosses the channel at the entrance; clearance is 150 feet.

Anchorages.—The usual anchorage is 0.6 mile eastward of the sugar mill dock in depths of 20 to 30 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 Guánica.

See appendix for **storm warning display.**

Dangers.—Cayos de Caña Gorda, 2 miles eastward of the entrance to Bahía de Guánica, extend 0.8 mile southwestward from **Punta Criollo.** 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 eastward of the entrance, is an extensive coral reef partly bare at low water. The west end of the reef is nearly a mile southeastward from Guánica Light. Foul ground is between it, the north shore, and Cayos de Caña Gorda.

Bajo La Laja, 0.9 mile southward of Guánica 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 westward of the shoal almost to the buoyed channel.

On the western side of the entrance, a shoal with an 11-foot spot extends 0.2 mile southeastward of Punta Brea. A series of ridges with depths of 28 to 30 feet are 0.6 mile southward of the point and extend eastward to an extensive shoal on the eastern side of the approach. This shoal is 1 to 2 miles offshore and has depths of 20 to 24 feet on its northern part and 28 to 30 feet on its southern part.

A detached shoal, 0.6 mile northeastward of Punta Brea, has depths of 20 to 29 feet near the west side of the entrance channel. Other spots with depths of 26 to 28 feet are near the limits of the channel leading into the bay.

Ensenada las Pardas, an open bay north 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 south of Guánica Light, head towards the entrance lighted buoy, passing 50 yards west of it to avoid the shoal with a least depth of 20 feet on the west side of the channel and the 28-foot spots on the east side of the channel. When about 50 yards off Buoy 3, steady on the entrance range bearing **354½°** into the harbor.

Pilotage.—Vessels usually are boarded by a pilot in a motorboat 0.5 mile outside the entrance buoy. A tug from Bahía de Guayanilla is available if necessary.

Quarantine, Customs, and Immigration.—A representative of the Public Health Service enforces the national quarantine laws; vessels subject to visitation are boarded at the dock. Customs and immigration services are handled by inspectors from Ponce.

Harbor regulations.—Local regulations are enforced by a Commonwealth Captain of the Port whose office is near Playa de Guánica.

Wharves.—A 440-foot fertilizer bulkhead wharf and conveyor, 0.5 mile northward of Guánica Light, has 28 feet alongside. The conveyor pier, 0.2 mile northward, has 28 feet alongside the mooring dolphins.

The sugar mill docks on **Punta Pera** at the west end of the bay have 30 feet alongside. Vessels go alongside the two small sugar docks on the south side of the point for loading; there are pipeline connections for water, fuel oil, and molasses, and a conveyor for bulk sugar. The Dominican Dock, extending off the east end of the point, is equipped for handling sugarcane.

Supplies.—Water is available at the sugar mill dock. Some marine supplies can be obtained at **Ensenada** and **Guánica.**

Repairs.—Some emergency repairs can be made by the machine shop of the sugar central at Ensenada.

Chart 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 northwest of Punta Jorobado, and **Cerro Mariquita,** 6 miles northeastward of Cabo Rojo.

Punta Jorobado, 2 miles westward of Punta Brea, is a small projecting point with a hummock 92 feet high. **Arrecife Baul** is a reef lying 0.7 mile southeast of the point. **Cayo Terremoto,** a mile westward of Punta Jorobado, is a sandy islet 300 yards wide surrounded by reefs. **Bahía Montalva,** the bay about 2.8 miles northwest 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. **Cayo Corral,** an islet 3.6 miles west of Punta Jorobado, is small and sandy, with shoals of 16 to 21 feet deep extending southeastward and southwestward.

At **Parguera,** 8.5 miles eastward 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. Water and electricity are at the berthing piers; gasoline, some groceries and a small marine railway are available.

Arrecife Margarita, 9 miles west of Punta Jorobado, is 1.5 miles south of **Punta Tocon,** and its western end is about 2 miles southeast of Cabo Rojo. Rocks awash and depths up to 28 feet are on this reef which extends nearly 4.5 miles in an east-west direction.

Cabo Rojo, the southwest point of Puerto Rico, is a low neck 1.5 miles long, at the southern end of which are two hills with yellow bluff faces; the easterly hill is 118 feet high, and the westerly 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 southeast point of the cape. A radiobeacon is at the station.

The **west coast** of Puerto Rico extends 26 miles northward from Cabo Rojo to Punta Higuero and then 11 miles northeastward 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 southern part the land is low near the shore with prominent high hills in the interior. Between Cabo Rojo and Bahía de Mayagüez reefs with depths of 30 feet or less extend up to 13 miles offshore; lighted buoys mark the extension of the shoal area. North of Bahía de Mayagüez 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 Bahía de Mayagüez.

Punta Aguila, 1.7 miles northwest 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 westward from the point. Water and gasoline are available at a fishing village a mile north 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 western edge, which is fairly steep-to; a buoy marks the western limit. A shoal with 22 to 28 feet extends westward from the southern part of Bajo Casabe, its western end lying about 2.7 miles west northwestward from Punta Aguila.

Chart 932.—Bahía de Boqueron, 6 miles northward 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 Guánica. 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, north and south of **Bajo Enmedio,** the latter a shoal with depths of 5 to 17 feet which lies across the middle of the bay. A buoy marks its southern edge.

Punta Melones, the southerly point, is a bluff at the water's edge, backed by a 230-foot hill. Punta Guaniquilla, the northerly 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 north-and-south direction near the middle of the bay between Bajos Roman and Ramito. The depths east of the ridge decrease gradually from 26 to 12 feet.

Canal Norte is the channel leading into the bay between Punta Guaniquilla and the north end of Bajo Enmedio. It has 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 south 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 Bahía de Boqueron, except on the shoals where the bottom is hard.

Bajo Palo is a shoal that extends nearly 0.7 mile northward from the south shore of the bay, between 0.4 and 0.8 mile northeastward of Punta Melones. A depth of 5 feet is 0.3 mile from shore, and north of this the water deepens gradually from 8 to 13 feet at its north end. The west 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 south side of the bay, and 1.7 miles northeastward from Punta Melones. It is marked by a buoy. **Roca Velasquez,** a rock which should be avoided by all vessels, lies nearly 0.2 mile westward 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 north shore and 1 mile southeasterly from Punta Guaniquilla.

Boqueron, a small fishing settlement on the north side at the head of the bay, is principally a bathing resort for Mayagüez. Water and some groceries are available; gasoline can be trucked in.

Chart 901.—Canal de Guanajibo, a buoyed passage inside the reefs between Punta Aguilla and Bahía de Mayagüez, has a least depth of 18 feet at its northern end on the ridge extending northeastward from Escollo Negro. The least depth at the southern end of the channel is 23 to 24 feet on a bank making westward from Bajo Casabe. The current velocity is about 1 knot and sets northward and southward in the channel.

Bajos Resuello, the shoals off the entrance to Bahía de Boqueron, consist of three shoals separated by channels having depths of 24 to 36 feet; the southern extremity of the shoals is westward 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 northwest shoal, 1.3 miles long, is 4.5 miles westward from Punta Guaniquilla; it has a least depth of 12 feet at its north end. The southeast shoal is 1 mile long and has depths on the coral heads of 16 to 18 feet.

Punta Carenero, the north 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 south point of Puerto Real, is low and covered with coconut trees which extend southward to **Punta Boca Prieta.** A good anchorage in 36 feet is 0.5 mile westward of Punta La Mela.

Cerro Buena Vista, an 850-foot hill 4 miles eastward of Puerto Real, is a prominent and useful landmark for many miles, especially from westward. From that direction it shows a knob at the summit, with a steep convex slope on its north side.

Puerto Real, 8 miles northward of Cabo Rojo, is a circular basin 0.7 mile in diameter used by local fishing vessels. Depths in the basin are 10 to 15 feet, except for a 6-foot spot in the entrance and shoal water toward the eastern end. **Puerto Real,** a small fishing community, is on the north shore of the basin. Water and some groceries are available; gasoline can be trucked in from **Cabo Rojo,** 2.5 miles inland. A small marine railway can haul out boats for minor repairs.

Escollo Media Luna, a rocky patch with a least depth of 25 feet, is 12 miles northwestward 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 south end of which is 3.2 miles northwest of Punta Guaniquilla. The shoal extends 1 mile northward and 2.5 miles east-northeastward 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 west-southwestward from Punta Ostiones, and depths of 13 to 17 feet are along the center portion of the ridge.

Escollo Negro is the northern shoal on the west side of Canal de Guanajibo. It is about 2.2 miles long in a northeasterly 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 westward from Escollo Negro, with a width of 2.7 miles, its northwest end lying 9.2 miles westward from Punta Guanajibo. On the western and southern parts of the reef are depths of 30 to 42 feet, decreasing to 18 and 24 feet on its northeast part. A 30-foot spot off the northwestern end of the reef is marked by a lighted buoy.

Punta Ostiones, 9.5 miles northward of Cabo Rojo and 1.3 miles northward of the entrance to Puerto Real, is projecting and prominent, especially as seen from southward. **Cayo Fanduca,** 0.8 mile southwestward from Punta Ostiones and about 0.5 mile from shore, consists of a few bare rocks which seldom show water. A narrow channel between it and the shore has a depth of about 7 feet, but it should not be attempted by strangers.

Chart 931.—Bahía de Mayagüez, about halfway along the 34-mile stretch of the west 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 north 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 northern part of the bay, but the southern part is shoal.

Mayagüez, the largest city on the west coast of Puerto Rico, is a mile southward 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 northward of Cabo Rojo Light, is a 165-foot flat-topped ridge on the south side of Bahía de Mayagüez. A reform school on the point shows well from southward.

Cerro Anterior, a 433-foot saddle-shaped hill 1.5 miles inshore at Mayagüez, is conspicuous, and **Pico Montuoso,** a dome-shaped peak 9 miles eastward of the bay is readily identified from westward.

The city hall clock tower and a church are conspicuous above the other buildings at Mayagüez. A fixed white light with a red sector is on top of a transit shed at the shipping terminal, but at night the white sector is difficult to identify from offshore because of background lights. Several radio towers are located near the southern shore of the bay and a stack and tanks are back of the shipping terminal.

Boundary lines of inland waters.—The lines established for Bahía de Mayagüez are described in **82.210,** chapter 2.

Channels.—The principal entrance channel is between the lighted buoys marking Manchas Grandes and Manchas Interiores; in 1964, the controlling depth was 28 feet to the shipping terminal. The entrance is marked by a lighted range and the approach to the terminal is marked by buoys and the white-red sector of the light on the transit shed.

A secondary channel with depths of 18 feet or more leads into the bay from northward inside of Manchas Exteriores and Manchas Interiores and west of Arrecife Algarrobo.

Anchorages.—The usual anchorage is southwestward of the shipping terminal in depths of 30 to 50 feet; the holding ground is good. The nearest hurricane anchorage is on the south coast at Bahía de Guánica, a distance of 60 miles.

Small fishing boats anchor in depths of 3 to 12 feet along the shore southward of the shipping terminal. Pleasure craft anchor in depths of 7 to 12 feet along the shore 1.2 miles southward of the terminal. Some small boats use Puerto Real, 10 miles southward of Bahía de Mayagüez, as a hurricane anchorage.

Dangers.—Escollo Rodriguez, a bank with depths of 3 to 18 feet extending northward for 2.5 miles from Punta Guanajibo, has a reef at the western end which is awash and always breaks. **Roca Blanco,** 0.7 mile northeastward of the reef, has 9 feet over it with deep water close-to.

Manches Grandes, on the south side of the principal entrance, has depths of 12 to 20 feet and extends southward to Escollo Rodriguez.

Manchas Interiores and **Manchas Exteriores** with depths of 12 to 18 feet extend in a northwestern direction for 2 miles on the north side of the principal entrance. The western side of the shoals are steep-to, but broken ground on the eastern side extends to within a mile of the shore; some spots have depths of 18 feet.

Arrecife Algarrobo, a mile northwestward of the terminal, has a few heads which show at low water; the sea frequently breaks on the reef.

Bajo Mondongo, 500 yards southwestward of the terminal, is a small shoal partly awash. A sunken wharf is off **Punta Algarrobito,** 0.4 mile southward of the terminal.

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 northward and southward across the entrance to Bahía de Mayagüez.

Storm warning displays are shown from the customhouse at Mayagüez; see appendix.

Routes.—From southward: When abeam of Arrecife Tourmaline lighted buoy 8, steer **060°** for about 8 miles

then head in on the lighted range bearing **109°** and anchor according to draft. If proceeding to the shipping terminal, leave the range when Manches Grande lighted buoy 2 bears about 268° and steer **088°** on the white-red sector of the terminal light.

From northward: When Punta Higuero Light bears 120°, distant 2.3 miles, steer **153°** for about 10.1 miles and enter on the lighted range.

Pilotage.—Vessels usually are boarded by a pilot in a motorboat a mile outside the entrance buoys.

Quarantine.—A representative of the quarantine service enforces the national laws. The nearest Public Health Service facilities are at Ponce and San Juan.

Customs and Immigration.—Mayagüez is a port of entry and marine documents are issued. The customhouse is located in Mayagüez near the range rear light. The deputy collector of customs and his inspectors act as immigration officers.

Harbor regulations.—A Commonwealth Captain of the Port with an office near the customhouse enforces the local rules and regulations for Bahía de Mayagüez.

Wharves.—The Port Authority Terminal, located in the northern part of the bay, is administered by a public service corporation with a manager at the terminal.

The 2,500-foot terminal bulkhead wharf has a depth of about 28 feet alongside. There is a 20-foot apron at the southeastern end of the bulkhead in front of the transit shed and pipelines for water, fuel oil, and molasses. Tractors, trailers, finger-lift tows, and conveyor belts are available for handling cargo. There are storage tanks for molasses and fuel oil close to the terminal.

About 500 yards northwestward of the terminal wharf are two privately owned and controlled bulkhead wharves. The Starkist Cannery Packing Co., wharf, the more easterly one, is about 250 feet long with 18 feet alongside; covered storage, water, and diesel fuel are available at the wharf.

The Delmonte Cannery Packing Co. wharf, immediately adjoining the Starkist wharf to the northwestward, is 595 feet long with about 30 feet alongside; water is available. Arrangements for the use of these wharves can be made through ship's agents on advance notice.

Supplies.—Most supplies are available at Mayagüez If necessary, supplies man 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 Mayagüez can do repairs to vessels above the waterline.

Small-boat facilities.—A small-boat pier with 10 feet at the end is 1.2 miles southeastward of the shipping terminal. Water, gasoline, and electricity are available; diesel fuel can be trucked in.

Chart 901.—Bahía de Añasco, 4.5 miles northwestward of Bahía de Mayagüez, is somewhat foul in the northern 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 eastward, 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.

Mona Passage and the west coast of Puerto Rico northward of Punta Higuero have been described previously in this chapter.

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14. VIRGIN ISLANDS

The **United States Virgin Islands,** separated from the easternmost island of the Puerto Rico group by 8-mile-wide Virgin Passage, include the islands of St. Thomas, St. John, and St. Croix and about 40 small islets or keys. The islands were purchased from Denmark in 1917, and United States citizenship was 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 appointed by the President of the United States. The capital is Charlotte Amalie, on the island of St. Thomas.

The **British Virgin Islands** are north and east of the United States group. The United States-Great Britain boundary extends southeastward between Hans Lollik and Little Tobago Islands, thence through the narrows between St. John and Tortola Islands, and thence southward through Flanagan Passage between Flanagan and Norman Islands.

Prominent features.—Making the Virgin Islands from the north, 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 northward but rises to an elevation of about 1,800 feet. Immediately westward 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 northward 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 south.

Boundary lines of inland waters.—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.

Routes.—From Charlotte Amalie to Straits of Florida, proceed through Virgin Passage and thence as direct as safe navigation permits along the north coasts of Puerto Rico and Hispaniola, and then along the north 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 westward 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 southeastward and northwestward. 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 northwestward to westward.

WEATHER.—The appendix lists storm warning displays and radio stations that transmit weather information. Also included is a climatological table for St. Croix Island. The following description of general weather conditions in the Virgin Islands was prepared by the Office of Climatology, U.S. Weather Bureau.

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 easterly direction, or between north-northeast and south-southeast. 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 4 p.m. 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 frontal systems or easterly waves which may reach the area in these or other months. See chapter 3 for information about hurricanes.

Pilotage.—Vessels of and above 100 gross register tons must engage or pay for the services of an Insular Government pilot in order to enter, leave, or shift berth in a U.S. Virgin Islands port. Vessels of less tonnage and vessels of the United States or foreign governments are

exempt from pilotage unless a pilot is actually employed. Pilots will take vessels in or out day or night.

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. An outpatient clinic is at Charlotte Amalie, 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 from 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.

Immigration.—The United States immigration laws apply in the U.S. Virgin Islands. Passports and visas are required.

Wharves.—Deep-draft facilities are at Charlotte Amalie, St. Thomas Island, and on St. Croix Island at Frederiksted, and at the private facilities at Port Harvey 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.—Fuel, oil, and limited quantities of water and marine supplies are available at Charlotte Amalie. Limited marine supplies can be obtained at Christiansted and Frederiksted. Some supplies for small boats are available at other places.

Repairs.—There are no facilities at any of the ports for major repairs. Machine shops at Charlotte Amalie, Christiansted, and Frederiksted can make minor 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 U.S. 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 United States dollar.

Standard time.—The United States Virgin Islands use Atlantic standard time, which is 4 hours slow of Greenwich mean time.

Chart 920.—Most of the Virgin Islands are situated on the southern side of **Virgin Bank** which extends in an east and east-northeasterly direction for 86 miles from the eastern end of Puerto Rico. For about 50 miles the bank trends eastward, averaging 25 miles in width, and then swings slightly east-northeastward, increasing in width to 32 miles. It terminates close beyond the southeastern 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 northern side of the island group, westward 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. Eastward of this line, the depths gradually decrease until soundings of 6 fathoms are found about 0.8 mile off the western end of Anegada Island. On the southerly side of the island group, the depths differ considerably from those on the northern side. The southerly 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 northward of Tortola Island and 15 miles westward of Anegada Island, are two patches with depths of 12 to 20 fathoms on the northern bank and a least depth of 10 fathoms on the southern bank. **Turtle Head,** a coral reef covered 6 fathoms, is about 10 miles northward of Jost Van Dyke Island and 13 miles northwestward of Tortola Island. **Barracouta Banks,** about 8 miles northwestward of Jost Van Dyke, consist of several patches covered by 11 to 20 fathoms. **Kingfish Banks,** about 5 miles north-northeastward of Jost Van Dyke Island, are 2 coral patches with 8 fathoms over them.

Chart 904.—**Virgin Passage** is 8 miles wide between Savana Island and Isla Culebrita, with depths of from 11 to 17 fathoms in the southern part and up to 27 fathoms in the northern part. It is clear except for Bajo Grampus on the southwestern side and Sail Rock on the southeastern side.

Tidal currents.—In the middle of the passage the current velocity is about 0.5 knot and sets southward and northward. On the eastern side of the passage near Savana Island the velocity increases to about 2 knots.

Chart 905.—**Sail Rock,** on the easterly side of Virgin Passage about 7.6 miles east-southeastward 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 westward of the islet. A lighted buoy is about 0.5 mile west of the islet.

St. Thomas Island, commercially the most important of the U.S. Virgin Islands, is 34 miles east of Puerto Rico. It is 12 miles long and from 1 to 3 miles in width. 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 westward, is 1,550 feet high. Lights are shown from towers on the summit of each.

The western half of St. Thomas presents the appearance of a steep ridge sloping precipitously to the north and the south, 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, while the lower ones are for the most part dome shaped. The country is almost entirely wooded, the region west of Perseverance Bay presenting a forestlike appearance of a thick growth of trees, shrubs, and vines.

The eastern end of St. Thomas has the appearance of two main ridges, separated by a large basin which slope to the northward and southward 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 west-southwestward from the western end of St. Thomas, is nearly a mile in length and 0.5 mile in width. The island is covered with a dense growth of vines, small trees, and underbrush. The entire northwest 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 northwest extremity of the island. The southeastern 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 east side of the island. Just north of **Virgin Point,** the southwestern extremity of the island, the cliffs are of a crushed rock and sandstone formation and from offshore appear as red cliffs. Detached rocks extend 200 yards southward of Virgin Point. **Domkirk Rock,** a crag with twin steeple-shaped pinnacles which resemble a cathedral, is 100 yards southeast 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 northeastern point.

The currents in the vicinity of the northeastern 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 southeastward 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 west end of the island of St. Thomas by a sandspit. A 50-foot hill is near the northeast point and a 21-foot bluff is at the southern 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 southwest point of Little St. Thomas. Small boats stay in the small gravel cove south 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 northward.

Big Current Hole is a passage separating West Cay from Little St. Thomas. There are rocks awash extending easterly from West Cay; the outer one, **Drum Rock,** 2 feet high, constricts the channel, and strong currents and heavy tide rips render the passage difficult. Small boats using this passage, when passing through from southward, head for Drum Rock and leave it close-to on the port hand.

West Cay, 0.2 mile northwestward 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 eastern side of the cay is gravel. Landing may be made in the bight on the southern side.

Salt Cay, 242 feet high and 0.6 mile northwestward of Little St. Thomas, is generally rocky and rugged, particularly on the north coast where cliffs rise precipitously to 100 and 150 feet high. Many rocks awash are close-to on the southwest, west, and east 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 northwestward of Salt Cay, rises abruptly from the sea to 278 feet high, with cliffs 100 feet high on the north shore.

Cockroach Island, 3.3 miles north-northwestward 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 north 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 east-northeastward from Cockroach Island, is 46 feet high, bold, and steep-to, with sharp pinnacle rocks on top.

Dutchcap Passage, just southward 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 southward of Savana Island, so as to avoid the strength of the inshore current.

The **north 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 eastern half of the island are open to the prevailing easterly 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 west end of St. Thomas Island. Small-boat landings can be made during calm weather.

Santa Maria Bay, 2.5 miles eastward 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 northern side of St. Thomas about 4 miles from the western end. A 22-foot channel is between St. Thomas and Inner Brass Island, and **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 eastern side. There are detached rocks and rocks awash within that area. Northwestward of the southern tip is a fine sand beach with a fringing coral reef. There are several breaks in the reef through which small-boat landings can be made. A well-sheltered anchorage for local boats is off the southwestern side of the island.

The eastern shore of Outer Brass Island is bold and precipitous with rocky cliffs rising vertically from the water. The western shore is rocky and slopes up uniformly. **Cave Cove,** in about the middle of the western shore, has a large cave opening into it. The northern extremity of the island is sharp and jagged. A 15-foot spot lies 330 yards west of northern point.

Landings may be made on St. Thomas Island through breaks in the fringing coral reef in **Caret Bay** and **Neltjeberg Bay** southwestward and southward of Inner Brass Island. **Hull Bay,** southeastward 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 westward of Inner Brass Island, are a group of bare rocks and rocks awash. **Ornen Rock,** with 6 feet over it, is a mile eastward of Inner Brass Island.

Magens Bay is the only important bight on the north shore of St. Thomas. It is 1.6 miles in length and 0.6 mile wide. Its eastern side is formed by a long, narrow tongue of land, which terminates to the northwestward at **Picara Point,** nearly midway between Hans Lollik and the Brass Islands. However, it is open to the northwestward, 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 in the southern portion there is 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 west 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 northeastward of Picara Point. The western side of the island is precipitous and rocky, except in a bay on the west side which has a gravel beach. **Camp Bay,** on the southeast face, is protected by outlying reefs, through which small boats make the beach. **Hansa Rock,** close inshore at the south point, is 19 feet high. **Hans Lollik Rock,** awash and on which the sea always breaks, is over 0.3 mile east-southeastward of the southern point of Hans Lollik Island.

Little Hans Lollik Island is 0.2 mile northward 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 eastern shore of the island, is 25 feet high.

Pelican Cay, 200 yards northward 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 northeastward of Little Hans Lollik Island. With the exception of these dangers, the channels on either side of the Hans Lollik group are clear.

Chart 938.—Mandal Bay, 3 miles eastward of Picara Point, is shoal, with a sandy beach at its head. **Mandal Point,** just eastward of the bay, is 277 feet high, with cliffs 100 to 120 feet high at the water's edge. A reef which generally breaks is close northeastward. A 23-foot spot is 0.3 mile eastward from Mandal Point.

Coki Point, 1.9 miles east-southeast of Mandal Point, is 47 feet high. It forms the northern shore of **Water Bay.** A conspicuous 235-foot cone-shaped hill is just south of Water Bay. **Turtleback Rock,** 2 feet high, is off the entrance to Water Bay 0.3 mile southeastward of Coki Point. **Cabes Point** is a low rocky hook 1 mile southeast of Coki Point. **Shark Island,** 32 feet high, is about 0.3 mile east-southeastward of Cabes Point. Foul ground encircles the island with several visible rocks 125 yards off the northeastern end.

Redhook Bay, at the eastern end of St. Thomas Island, consists of a southern arm called **Muller Bay** and the western arm, **Vessup Bay.** A small L-wharf with 9 feet at its end on the north side of Redhook Bay is used by ferry boats to St. John Island. Gasoline, water, and some groceries can be obtained at a nearby pier; a small marine railway is available and repairs can be made to small boats. A National Park Service L-pier with 6 feet alongside is on the southern side of Vessup Bay.

Cabrita Point, the eastern 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 east-southeast of Cabrita Point.

Pillsbury Sound is the body of water between St. Thomas, St. John and the cays which bound the sound on the northern side, forming an excellent roadstead about 2 miles in extent east and west and 1.5 miles north and south. This area is quite secure against rollers and all winds except from the southward which blow only in the hurricane months. However, the current attains a velocity of 2 knots.

The depths in the sound are somewhat irregular, varying from 48 to 100 feet. All the main passages leading to it are deeper than the mean depth of the sound itself.

Thatch Cay, at the northwestern end of Pillsbury Sound, is 1.6 miles long. The island is in the form of a ridge, 482 feet high near the eastern end. **Bull Point** and **Mother East Point** are prominent projecting points on the north side. **Lee Point** is the western point and **Grouper Point** the eastern point of the island. **Grass Cay,** 0.5 mile eastward of Thatch Cay, is 0.8 mile long. The north shore consists of rocky cliffs in places 150 feet in height. A narrow rocky ledge, covered 12 feet at its eastern end, is close to shore near the west end, and a rock awash is 150 yards westward of the same point.

Mingo Cay, eastward of Grass Cay, is 186 feet high. Between Mingo and Grass Cays there is a narrow shoal passage with a bare rock 15 feet high close to the middle. **Lovango Cay** is eastward 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 south shore between **Murder Rock** and the southwestern point. **Blunder Rocks,** 250 yards eastward of Lovango Cay, are 4 feet high. **Congo Cay,** a narrow pointed cay northward of Lovango Cay, is separated from it by a channel with depths of 14 feet. **Carval Rock** is 0.3 mile eastward 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 northeastern 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 northeastward of Two Brothers, 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 western 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. In this channel, with the northeastward current running against the wind, there is a race which appears 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 steamers, the only dangers being a small rock awash nearly 200 yards westward from the west end of Grass Cay, which is easily seen. Sailing vessels generally use this passage in leaving the sound. It may be entered from the northward even on the ebb, provided the trades have not too much of a southerly slant.

Leeward Passage, between Thatch Cay and the northern side of St. Thomas, is about 0.4 mile wide, with depths of 70 feet or more.

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 southeastward for 2 miles from the eastern end of St. Thomas. The islands are rugged, with cliffs fronting much of the shores. **Dog Rocks,** 9 feet high, are the most easterly danger of the group close off the easterly 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 eastern approach and **The Stragglers,** on the western side.

St. James Bay, between Great St. James Island and the eastern end of St. Thomas Island, provides secure anchorage in depths of 23 to 50 feet, except in hurricanes. **Cow Rock,** 9 feet high, is the western one of a group of rocks in the southern approach to the bay. **Calf Rock,** 3 feet high, is close eastward of the same reef.

Current Hole, at the northern end of St. James Bay, provides a passage from the south 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 east of the rock. The current velocity is 3 knots or more through Current Hole and sets southward and northward. Sailing vessels using the passage should await a northward current and a steady breeze in order to stem the current.

The **south 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 southeastern 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 west-southwestward 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 south-southeast of the rock.

Capella Islands, of which the westernmost is **Buck Island,** lie 1.7 miles southwestward 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 easterly end. A shallow ledge extends 100 yards off the western end, and off the northern side the depth is 30 feet. At the head of the southwest bight is a small wharf and boat landing.

Between Capella Island and St. Thomas Island the currents are weak.

Chart 905.—Frenchcap Cay is about 3.6 miles southeastward 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 933.—St. Thomas Harbor, in about the middle of the south 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 south, it is well protected by the high hills surrounding the other sides, and provides safe anchorage except during a hurricane. The harbor is used as a fueling station for some trans-Atlantic shipping.

Charlotte Amalie, along the north shore of St. Thomas Harbor, is the most important city and capital of the U.S. Virgin Islands. During the winter months 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 facilities are at the West Indian Dock on the southern side of **Long Bay,** the eastern part of St. Thomas Harbor. The principal imports include foodstuffs, textiles, clothing, building materials, machinery, and petroleum products. Exports include rum, bay rum, bauxite, and sundry articles.

Prominent features.—Muhlenfels Point, the eastern entrance point to St. Thomas Harbor, is high and steep at the shoreline.

Hassel Island, on the western side of the harbor entrance is indented by shallow coves and has several high wooded hills. **Cowell Point** is the southern end of a ridge sloping up to **Cowell Battery,** the highest point on the island.

Signal Hill, about a mile northwestward of St. Thomas Harbor, is the second highest peak on the island with a lighted tower on top. From it the main ridge extends east-southeastward, passing less than 0.5 mile northward of Charlotte Amalie. The town is built around the three spurs that extend southward from the ridge. **Frenchman Hill** is the western spur. **Berg Hill** in the center, has a square white building on its southern slope near the top. On **Government Hill,** the eastern spur, stands **Blackbeard Castle,** a remarkable 47-foot stone tower.

To the eastward 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, southwestward 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 southern end consists of brown rocky 100-foot cliffs. North of Flamingo Point on the west 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 northeastward of the point, and a square tower is on 256-foot **Providence Hill,** 0.8 mile northward of the point.

Red Point, a mile northwestward of Water Island, is a rugged red cliff at the southern end of a peninsula with a 218-foot flat-topped crest that has an aero light 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 westward of Muhlenfels Point and close eastward 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 southwestern entrance to the narrow passage. A daybeacon is on the eastern side of the passage.

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 north of Water Island. A light, 16 feet above the water, is shown from a red triangular daymark on a dolphin, at the northeastern end of the channel.

Ruyter Bay, a shoal bay on the northwestern side of Water Island, has a privately owned L-shaped dock, about 100 feet long with a 30-foot length at the outer end; depths of about 6 to 10 feet are alongside. Small craft and inter-island traders use the dock; gasoline and diesel fuel are available. A depth of about 12 feet can be obtained with local knowledge through the dredged area when approaching the dock from the northwest.

Anchorages.—Limits and regulations of the anchorage areas in St. Thomas Harbor are given in **202.250,** chapter 2.

Krum Bay, northwestward 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 clearance of 63 feet crosses the narrow part of the bay.

Lindberg Bay, close westward 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 southeastward of Muhlenfels Point, is a small 24-foot islet covered with low underbrush. Several bare rocks and rocks awash lie up to 125 yards south of the islet; a reef partly awash extends northeastward from the islet to the shore.

Triangle is a group of dangerous rocks between Green Cay and Muhlenfels Point. The southwestern and outer rock group dries in places, while the northerly group is partly awash and frequently breaks. A detached coral rock covered 16 feet and marked by a bell buoy is nearly 0.7 mile south-southeastward of Muhlenfels Point. **Barrel of Beef,** 2-feet high, is the easterly foul area of the group.

Point Knoll, a coral head covered 3 feet, extends 175 yards southwestward from Muhlenfels Point; a depth of 19 feet is about 100 yards southwestward of the coral head. **Rohde Bank,** 0.2 mile northwestward 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 northward 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 westward from the rock. A lighted buoy and a daybeacon are westward 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 westward of the south end of Water Island, consist of three reefs with rocks bare or awash and depths of 2 to 17 feet. A buoy is on the southwest side.

A rocky ledge extends 0.3 mile southward 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 northwestward from the northerly end of Water Island, has a least depth of 3 feet and is marked by a light at the northwest end.

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 knots, 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 easterly wind.

Storm warning displays are made at several places in St. Thomas Harbor; see appendix.

Routes.—From westward: pass 0.5 mile or more off the south end of Water Island, then steer for Muhlenfels Point until on the entrance range, and then proceed into the harbor on bearing 344°. The prominent white catchment area on the west side of Berg Hill helps in picking up the range in the daytime. From southward: pass a mile or more westward of Buck Island and enter on the range. From eastward: set a course to pass about midway between Buck Island and St. Thomas Island and enter on the range.

Pilotage.—Pilotage is compulsory for vessels of and above 100 gross registered tons. Pilots must be engaged to enter, leave, or shift berth in the harbor; 24-hour service is available. Vessels are boarded by a pilot from a motorboat 1 to 3 miles southward of Hassel Island. Arrangements for pilots are generally made in advance through shipping agents or directly by shipping companies.

Reporting station.—All approaching vessels are reported to the harbormaster from the station on Cowell Battery on the south end of Hassel Island. Vessels should not proceed into the narrow entrance channel until previous arrangements have been made with the harbormaster. This station has no facilities for communicating with approaching vessels.

Towage.—Tugs are normally not required for docking, however, if required, tugs owned by Virgin Island Towing Corporation may be available upon 24-hour advance notice.

Quarantine.—Vessels subject to visitation are boarded at the docks or at anchorage. The Public Health Service maintains an outpatient clinic in the Post Office Building. Seamen requiring emergency hospital attention are taken to the municipal hospital.

Customs.—Charlotte Amalie is a port of entry and marine documents are issued. Vessels are boarded at anchorage or at the docks. The customs office is in the Post Office Building.

Immigration.—Vessels subject to inspection are boarded by immigration officers at the docks.

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 east of the waterfront at Charlotte Amalie.

Wharves.—The West Indian Dock, along the south side of Long Bay, is the only deepwater commercial terminal at Charlotte Amalie. The 2,250-foot bulkhead wharf has depths of 30 to 24 feet alongside. Mooring buoys mark the limits of a maneuvering area north of the dock. Open and covered storage is available. There are two 8-ton electric gantry cranes for handling bulk cargo and bauxite, and one 25-ton swing crane.

The waterfront of Charlotte Amalie, is a concrete bulkhead 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 east of the waterfront is used by vessels assigned to the Coast Guard station on the point.

The piers in **Little Krum Bay** are used by the U.S. Navy, inter-island cargo vessels, small fuel tankers, and a private towage company.

Pier A (Navy Pier), the most southerly, is used exclusively by the U.S. Navy.

Pier B, northward of the Navy Pier, is about 300 feet long, 27 to 20 feet alongside; used by VITOW Company of St. Thomas.

Pier C, northward of Pier B, is about 200 feet long, 19 to 23 feet alongside; used by vessels engaged in the inter-island trade; fork lifts are available.

U.S. Navy Tender and Fuel Pier, northward of Pier C, about 425 feet long, 28 to 30 feet alongside, is used by the Navy, and also as a pipeline transfer point for commercial tankers supplying the island's fuel needs.

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. Fuel (bunker C) and diesel oil are available at the West Indian Dock.

Repairs.—Some repairs can be made to vessels at the West Indian Dock, which has a machine shop and welding equipment. The nearest drydocks for large vessels are at San Juan and the Panama Canal.

Small-boat facilities.—A yacht club on the east side of Long Bay has berthing finger piers with water, electricity, and telephone service. Gasoline, diesel fuel, and marine supplies are available. Depths of 10 to 12 feet are alongside the piers.

Chart 905.—Saba Island, 202 feet high and triangular in shape, is 2.4 miles west of Flamingo Point. The northern part of the island is low, but the southern part has precipitous red cliffs 150 feet high along the south shore. Two small lagoons surrounded by mangroves are near the north end. A landing can be made on the sand beach along the northwest shore. About 150 yards east 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 southward of the western end of the island.

Turtledove Cay, 50 feet high, 100 yards northward of Saba Island, is connected with Saba Island by a reef bare

at low water. About 0.1 mile westward 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 southwestward of Saba Island, comprises a group of rocks bare and awash; the highest rock bares 2 feet. **Flat Cays,** 0.8 mile northeastward from Saba Island and 1.3 miles southwestward from Red Point, consist of 2 small islets, 32 and 11 feet high, respectively. About 300 yards eastward of the southern 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 east-southeastward and west-northwestward with velocities up to 1 knot.

Southwest Road, between Flat Cays and Perseverance Bay, affords an excellent anchorage with the wind as far southward as east-southeast.

Vessels may anchor as convenient after entering through any of the channels between the islands and shoals southward. Sailing vessels should enter from the eastward between Water Island and Porpoise Rocks, favoring Water Island, and pass between Flat Cays and the shoal south of Red Point.

Range Cay, an islet 21 feet high, lies close to the shore 0.7 mile northwestward of Red Point. **Black Point,** 1.2 miles northwestward of Red Point, terminates in rocky cliffs 40 to 50 feet high.

Perseverance Bay, between Black Point and **Lucas Point** to the westward, 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 eastward of St. Thomas Island, is 8 miles long, and up to 4 miles wide. Its eastern 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 southward, forming a deep bight which terminates at Ram Head, the southern point of the island. The central and western 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 and brush, and some patches of grass.

Most of the population of St. John Island is located in two small settlements, Cruz Bay at the west end and Coral Bay at the east 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 where a person is designated to act as customs and immigration inspector. Some groceries, gasoline, diesel fuel, and water can be obtained at the settlement. Small motorboats carry passengers and mail between St. Thomas Island and St. John Island. Land transportation is mostly by taxi or by small sightseeing buses. Telephone and radiotelephone services are available.

Chart 938.—Moravian Point, on the end of a peninsula southward of Cruz Bay, is the westernmost part of St. John Island. **Mingo Rock,** which is awash and breaks, is 175 yards west-southwest of Moravian Point. A group of 4 rocks awash, with surrounding depths of 17 to 30 feet, is about 0.1 mile west-southwest of Mingo Rock.

Steven Cay, 0.4 mile west of Moravian Point, is 28 feet high and marked by a light. A 31-foot rock is just south of **May Point,** the southern extremity of Steven Cay. **Skipper Jacob Rock** is 0.1 mile east of the south end of Steven Cay.

Cruz Bay, on the west side of St. John Island, is a small cove used by small interisland vessels bringing supplies and tourists to the island. Depths of 10 to 12 feet can be taken to the public pier. The entrance is marked by a light and by a privately maintained lighted range. 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 southeastward of Battery Point; a depth of 6 feet can be taken to the 80-foot pier and bulkhead. See appendix for **storm warning displays.**

Caneel Bay, 0.8 mile northeastward of Cruz Bay, is the site of the Caneel Bay Plantation resort development. A motorboat provides transportation to St. Thomas Island from a small pier in the bay.

Durloe Cays are three islets westward of Hawksnest Point. **Henley Cay,** the largest, is 70 feet high and about 300 yards wide. **Ramgoat Cay,** 310 yards northeast of Henley, is 30 feet high, and **Rata Cay,** the smallest, is 0.2 mile west-northwestward of Henley Cay.

Hawksnest Point, a projecting point forming the western shore of Hawksnest Bay, is wooded. In the northern part is a circular hill 130 feet high. Off the extreme point is **Hawksnest Rock,** bare and 25 feet high. **Hawksnest Bay,** eastward of the point, is small and of no commercial importance. Off its southern shore are numerous rocks.

Perkins Cay is an islet close to the eastern point of Hawksnest Bay. **Trunk Cay,** a grass-covered islet 48 feet high, is about 0.5 mile east of Perkins Cay. **Trunk Bay,** between the two cays, is used extensively by skin-divers. The limits of an anchorage area in the bay are marked by private buoys.

Johnson Reef, a coral formation 0.4 mile northeastward 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 southeast. The reef is marked by a buoy on its northerly end.

Cinnamon Cay, 32 feet high and covered with tall grass and cactus, is about 0.7 mile east of Trunk Cay. **America Point** is 2 miles east 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 east.

Francis Bay, southward of Mary Point, is somewhat protected to the northward by Whistling Cay, and affords good anchorage in 50 feet, sandy bottom.

Whistling Cay, the 202-foot islet 300 yards west of Mary Point, is covered with trees. Its north shore is precipitous, with cliffs 130 feet high. A gravel beach is along the southeast 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 905.—Mary Peninsula, 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 western end of the peninsula, has bluffs 135 feet high. The north shore consists of high weather-beaten cliffs with large boulders along the waterline.

The Narrows, a channel about 0.3 mile wide between the 10-fathom curves, is the western entrance to the passage between the northern coast of St. John and the southwestern coast of Tortola. This passage leads into Flanagan Passage and Sir Francis Drake Channel. Tidal currents in The Narrows and the passage eastward attain velocities of 2 to 4 knots.

Leinster Bay is a double indentation between Mary Peninsula on the west and **Leinster Point,** 48 feet high, on the east; it is about 0.8 mile in length. **Mary Creek,** the western part of this bight, makes well in behind the high land to northward. The eastern part, **Waterman Bay,** is partially protected by **Waterlemon Cay,** 30 feet high, 250 yards westward 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, southwestward of Waterlemon Cay, is faced by a conspicuous landslide.

Threadneedle Point, 0.5 mile eastward of Leinster Point, is precipitous, with cliffs up to 70 feet high. From Threadneedle Point the coast trends in a general east-southeasterly direction for 3.5 miles to **East End Point,** the eastern extremity of the island. **Haulover Bay,** 3 miles southeastward of Leinster Bay, offers the best anchorage of the small bights along the north coast.

Privateer Point, 0.4 mile south of East End Point, is a projecting point 164 feet high, separating **East End Bay** from **Privateer Bay,** 2 small bights open to the southeastward. **Red Point,** a headland westward of Privateer Bay, is the southern end of a high ridge.

Flanagan Island, 127 feet high, lies 0.7 mile southeast of Privateer Point. A rock off the west side is 45 feet high.

Flanagan Passage, the westernmost of the passages leading into Sir Francis Drake Channel from southward, 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 eastward, haul close around the western side of Norman Island, inside Santa Monica Rock, which may be done at a distance of 300 yards. From westward, line up the Indians and Mount Bellevue, the highest hill on the eastern end of Tortola, and enter westward of Santa Monica Rock on bearing about **016°.**

Coral Bay, the large bay extending northward into St. John between Red Point and Ram Head, is open to the southeastward. 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. See appendix for **storm warning displays.**

Currents.—The current velocity is about 0.7 knot and sets southwestward and northeastward 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 southwestern extremity of East End Peninsula. **Turner Point** is the knob at the end of the peninsula separating Round Bay and Hurricane Hole. **Fortberg Hill,** north of Harbor Point, is nearly circular in shape, 426 feet high, covered with trees, and very prominent. **Lagoon Point,** the southern entrance point of Coral Harbor, is fringed by a coral reef 200 yards wide and bare at low water. **Sabbat Point,** 0.5 mile southward of Lagoon Point, is the end of a long high rock forming the buttress of **Sabbat Hill,** 101 feet high.

Ram Head, the southern point of St. John, is a bold headland, with two conspicuous hills. The eastern side of the head has rocky cliffs 100 to 150 feet in height. 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 southward of Leduck Island. The shoal consists of 3 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 southward. There are no towns in Coral Bay. The community is scattered among several points along the shore.

Round Bay, the northeastern 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 northeastern part of the bay. The best anchorage in Round Bay is off Moor Point.

Hurricane Hole, the northern arm of Coral Bay, is 0.6 mile wide at the entrance westward 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 western side of Hurricane Hole.

Coral Harbor, the northwestern 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 south 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 northwestward 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 westward of Lameshur Bay consists of 150-foot white cliffs which are very prominent.

Chart 938.—Reef Bay, 2.7 miles westward 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 westward 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 905.—St. Croix Island, 32 miles southerly of St. Thomas and St. John Islands and 50 miles southeastward 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 northern side is somewhat mountainous, particularly in the western part. **Mount Eagle,** 1,165 feet high and about 5 miles from the western end, is the highest point on the island. Southward from the mountains the land is composed of fertile undulating valleys. The southern side is nearly straight and generally low.

Water commerce with St. Croix Island is handled through two ports, Christiansted on the north coast, and Frederiksted on the west coast. Tourism accounts for a good part of the commerce while the raising of sugarcane and the manufacturing of sugar and rum are the principal industries. 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 westerly current between St. Croix Island and St. Thomas Island. No perceptible current has been observed at Christiansted Harbor, but a moderate westward flow is reported outside Fort Louise Augusta Light.

Coast and Geodetic Survey parties have reported that off East Point tidal currents of about 1 knot velocity set northwestward and southeastward in calm weather. Close to East Point strong currents set north and south. Trade winds increase the northwestward flow and decrease the southeastward flow. A very strong westward current setting around East Point and through Buck Island Channel was noted when the trade wind was blowing. A strong northwestward 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 southwestward blow across the island, with much rain. Northers, with the accompanying heavy ground swell, do not appear to reach the island.

See appendix for **storm warning displays.**

Pilotage.—At Christiansted, pilots meet vessels off Buoy 1; at Frederiksted, a mile off the pier.

Quarantine, Customs, and **Immigration.**—Both Christiansted and Frederiksted are ports of entry. Vessels are boarded at the docks by representatives of these services as required. Both places have municipal hospitals.

Harbor regulations.—Local rules and regulations for the ports of St. Croix Island are enforced by a harbormaster whose office is on the waterfront at Christiansted.

Supplies and repairs.—At Christiansted and Frederiksted some marine supplies and a limited amount of water are available; gasoline and diesel fuel can be obtained from trucks or barrels. Facilities for repairs are limited.

Hams Bluff, the northwestern 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 north 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 eastward to **Salt River,** the shore consists of low rocky cliffs.

Salt River Point is 1.7 miles eastward of Baron Bluff. Westward 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 northward 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 southeastward 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 935.—Christiansted Harbor, on the north coast of St. Croix Island 10 miles east of Hams Bluff and 7.7 miles west 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 southeastern part of the harbor. Most of the harbor is shoal.

Christiansted, on the south 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 east 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 north 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 northward of Fort Louise Augusta through a crooked channel marked by buoys, lights, and a **164°** lighted entrance range, thence east and south of Protestant Cay to a turning basin and to Gallows Bay Dock. In 1965, it was reported that 16 feet could be carried to Gallows Bay Dock.

A 15-foot passage over the southern portion of Scotch Bank is used by small vessels coming from eastward; local knowledge is necessary. A 13-foot channel eastward of Round Reef is sometimes used by schooners and small boats with local knowledge.

Anchorages.—Vessels anchor northeastward of Protestant Cay in depths of 9 to 30 feet according to draft. Small boats anchor in Gallows Bay and along the east 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 northeastward from Fort Louise Augusta, is on the east 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 northwesterly side of the harbor. Shoal water extends eastward from the reef to the channel marked with buoys.

Round Reef, westward of Fort Louise Augusta, is circular in shape 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 northeastward, give Buck Island a berth of 2 miles or more to avoid the bar north of it. From westward all dangers wil be avoided by staying a mile or more off the north coast. The entrance is marked by a lighted range bearing **164°** and buoys mark the entrance channel into the harbor.

Strangers are advised to take a pilot and should not attempt to enter at night without one.

Wharves.—Gallows Bay Dock, in the eastern part of Gallows Bay, has berthing space of 400 feet on the western side and 300 feet on the eastern side; depths of 16 feet are reported alongside. A roll-on-roll-off ramp with 16 feet alongside is eastward of the dock. Fork lifts, and covered and uncovered storage are available.

Kings Wharf, the 600-foot bulkhead stone quay about 300 yards westward of Gallows Bay Dock and west of the fort, has depths of about 8 feet alongside; this bulkhead is used occasionally by auxiliary powered schooners engaged in the interisland trade.

Small-boat facilities.—St. Croix Marina, northeastward 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 handle craft up to 75 feet in length, and 10-foot draft; a transfer lift can handle craft up to 40 tons, 60 feet in length, and 10-foot draft. Gasoline and diesel fuel are available; water when available. Limited small-boat engine repairs can be effected at the marina.

Chart 905.—Beyond Fort Louise Augusta, the north coast trends easterly for 7.3 miles to East Point, the easterly end of the island. The coast is fringed by coral reefs, behind which in several places small vessels may find protection.

Punnett Point (chart 935) 1.4 miles east of Fort Louise Augusta, forms the eastern side of **Punnett Bay,** a semicircular cove 0.2 mile wide. Northeastward of Punnett Point, at a distance of about 0.4 mile, is **Green Cay,** an islet 55 feet high at its southern end. Southward to the beach and between Green Cay and Pull Point, the area has depths of only 6 to 18 feet with numerous coral head.

Pull Point, 2.3 miles east-northeastward of Fort Louise Augusta, is a small projecting point terminating in cliffs 35 feet high. **Chenay Bay** is the bight westward of the point.

Buck Island, 340 feet high, is 4.3 miles east-northeastward of Fort Louise Augusta and about 1.5 miles off St. Croix. The island is on the southern edge of a coral bank which extends westward about 0.8 mile, then sweeps around a mile north of the island. This forms **Buck Island Bar,** 1.5 miles in length. Shoals extend about 1.8 miles eastward of Buck Island. The island lies on the route from eastward to Christiansted Harbor. A light, 360 feet above the water, is shown from a red skeleton tower on the summit of the island.

Diedrichs Point, the southern extremity of Buck Island, is low. Several spots with 12, 17, and 20 feet lie from 1 mile east of the island to 1.7 miles east-southeast of it. **Buck Island Channel** lies between Buck Island and the adjacent reefs and St. Croix. Moderate-draft vessels may approach it from either northward or eastward. **Channel Rock,** awash, lies 1.8 miles westward of East Point.

The north 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 eastward 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 eastward of Pull Point, is rocky with a 130-foot hill 250 yards inland. **Tague Point,** 1.1 miles eastward of Pow Point, is sharp and rocky with a 155-foot hill 0.2 mile south-southwestward. **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 northeastward of Tague Point.

Cottongarden Point, a prominent rocky point with a 55-foot knoll, is 1.6 miles eastward of Tague Point and opposite the eastern end of the long reef paralleling the coast. **Cramer Park,** a public beach and park operated by the Insular Government, is westward of the point.

East Point, the eastern extremity of St. Croix, is a bluff. A 225-foot hill is 100 yards west-northwest, and **Morne Rond,** 380 feet high, is a conspicuous round hill near the point.

Lang Bank, an extensive bank from 3 to 5 miles in extent, stretches 9 miles northeastward from the east end of St. Croix Island. Along its edge is a wall-sided narrow coral ledge which, commencing about 3 miles eastward of Buck Island, sweeps around in a convex form for about 14 miles, terminating 2 miles southward from East Point. Its northern part is from half a mile to 1 mile wide, with depths of 5½ to 10 fathoms. The southern 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 south coast of St. Croix Island trends west-southwestward 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 eastward 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 aero light on the southwestern part of the island are prominent.

Point Cudejarre, a sharp point with a 25-foot bluff and a 120-foot hill north-northwest, is 0.3 mile southwest of East Point. **Grass Point,** 3 miles west-southwest of East Point, is a long narrow point marked by a 43-foot knob.

Mount Fancy, about 4.7 miles westward of East Point, is a conspicuous double hill, 245 feet high, which forms the east 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 east tangent of Milord Point in line with Sight Mill; when about 100 yards off the point haul around to **064°**, pass west of a 7-foot shoal 200 yards east 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 west-southwestward of East Point. **Canegarden Bay,** 1.2 miles wide, forms an irregular crescent to the west of Vagthus Point.

Limetree Bay, close westward of Canegarden Bay, is the site of a private oil facility. A channel, reported dredged to 40 feet, leads through the reefs from deep-water to a basin and oil dock at the read of the bay. The facility was nearing completion in 1967. The channel is well marked by privately-maintained aids and a lighted range. The approach to the channel entrance is marked by a lighted buoy.

Point Harvey (Krause Point), 12.3 miles west-southwestward of East Point, is the western entrance point to Port Harvey.

Port Harvey (Krause Lagoon), a deep-water port indenting the south shore of St. Croix Island, is entered eastward of Point Harvey; it is the site of a privately owned bauxite refining facility.

Channels.—A privately maintained dredged 35-foot channel with dikes on either side paralleling the channel in the northern part, leads through the reefs to a large turning basin and pier at the head. The channel is privately marked by buoys, daybeacons, and a lighted range. In 1965, the controlling depth in the channel, turning basin, and to the pier was 35 feet.

Wharves.—The concrete bulkhead pier at the terminal has 625 feet of berthing space along both the east and west sides. Depths alongside are 37 feet; recommended berthing depth is 32 feet.

Supplies.—Emergency supplies of bunker fuel oil, fresh water, and diesel oil are available. There are no ballast disposal facilities at the terminal.

Officials board at the dock. **Documents** required are the same as at U.S. ports.

Pilots and towage.—One towboat is available. A pilot is available upon advance notice through ship's agent and will board 1 mile south of the harbor entrance; daylight entry and departure only.

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 937.—Long Point, 3.6 miles eastward of Southwest Cape, is a low projecting point covered with grass. Westward of the point is **Long Point Bay,** which is shoal. **Southwest Shoal,** 1.2 miles southward of Long Point, has only 6 feet of water over it, and eastward to Krause Point the outlying reefs are the most dangerous along the south coast. They generally break, but as several shoal spots are southward, 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 easterly direction to mooring buoys about 1.1 miles eastward 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 southwestern extremity of St. Croix Island, is a low point projecting 1.2 miles in a southwesterly direction. The point is covered by low bushes and trees. A coral reef extends southward, with a least

depth of 9 feet, at a distance of 0.8 mile from the shore. A buoy marks the southwest extremity of this shoal. The 5-fathom curve is 1.6 miles southward of Long Point and nearly a mile south of Southwest Cape, but westward of the point it is only 200 yards off. The 100-fathom curve lies nearly 2.5 miles southwest 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 western extremity of the island, is 0.5 mile north-northwest of Southwest Cape.

The west coast of St. Croix Island trends north-northeastward from Southwest Cape for 2.4 miles to Frederiksted, thence northwestward for 2 miles, and then curves northeastward for 2 miles to Hams Bluff. The coast consists mostly of sand beach with the land back of it sloping gently upward in the southern part and the hills gradually working westward to the shore in the northern 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 west coast of St. Croix Island 2.4 miles northward of Southwest Cape and 3.7 miles southward 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 roadsted. The principal imports include foodstuffs, building materials, petroleum products, and clothing. Exports include sugar, 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 daymark with black rectangular center on a small wharf at the northerly part of the waterfront. **Fort Frederik** is 125 yards northeastward of the light.

See appendix for **storm warning displays.**

Anchorages.—Vessels anchor in depths of 30 to 60 feet northwestward and southwestward of the long pier according to draft. Small boats anchor near the waterfront.

Routes.—From southward, the shoals south 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.

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 eastern end of the loading platform; breasting dolphins are along both sides of the pier. Two warping buoys are on each side of the pier to assist ships in maneuvering alongside.

A roll-on-roll-off facility with a landing craft ramp, and a 250-foot breasting platform to the northward, is on the south side of the inshore end of the pier; depths alongside the platform and at the outer end of the landing ramp are about 17 to 20 feet. Covered and uncovered storage areas, and mobile cranes up to 20-ton capacity are available. A small-boat stone landing pier is on the north side of long pier.

Mooring facilities and pipelines for vessels unloading petroleum products and molasses extend 300 yards offshore 0.5 mile south of the long pier. Depths of 12 to 15 feet are at the outer end of the pipelines.

Submarine cables extend west-southwestward to the 100-fathom contour from **Sprat Hole,** 1.6 miles northward of Frederiksted. Mariners are requested not to anchor in this area.

Chart 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 U.S. Naval Oceanographic Office, and West Indies Pilot, Vol. II, published by the British Admiralty.

Little Tobago Island, 3.5 miles northeast of Hans Lollik Island, is nearly 0.5 mile in length and 279 feet high. It is steep-to except on its southeast side. **Tobago Island,** 1 mile northeast of Little Tobago Island, is 0.8 mile in extent and about 538 feet in height. A small rock, awash and steep-to, is about 100 yards off the northern point. The southeastern side of the island is fringed with coral, but elsewhere the coastal cliffs are steep-to. A few rocks lie close off the northwestern point.

Watson Rock, steep-to and 89 feet high, is about 0.3 mile westward of the southwestern point of Tobago Island. **King Rock,** 0.6 mile south of the southwest point, is awash and steep-to. It is near the southern end of a bank, over which are general depths of 6 to 9 fathoms, extending about 0.7 mile southward of Tobago Island.

Mercurius Rock, 0.8 mile east of the northern end of Tobago Island and the only danger between that island and Jost Van Dyke Island, is small and steep-to. It is covered by 7 feet. When using the passage between Tobago and Jost Van Dyke Islands, the eastern side should be favored.

Jost Van Dyke Island, about 2 miles east of Tobago, is 3.5 miles long, lofty, rugged, and steep-to. Near the middle of the northern part a summit rises to 1,070 feet. **Great Harbor** and **Little Harbor,** on the southern 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 northeastern end of Jost Van Dyke Island, is 367 feet high. **Green Cay,** 108 feet high, is a small islet close east of Little Jost Van Dyke Island. **Sandy Cay,** nearly 1 mile south of Green Cay, is 66 feet high at its eastern end. It is surrounded by shoal water, and foul ground extends 200 yards from the eastern and western 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 western extremity, is about 2 miles northeastward of Mary Point, St. John. The highest summit in the Virgin Islands is 1,780-foot **Mount Sage** in the western part of the island; rugged hills rise somewhat abruptly from the shores on all sides.

Great Thatch Island, about 0.6 mile north of Mary Point from which it is separated by The Narrows, is 1.7 miles in length, and near its center rises to a peak 613 feet high. The eastern point is bold and steep-to. **Thatch Island Cut,** the channel between Great Thatch Island and the West End, is deep. Sailing vessels should not attempt Thatch Island Cut from the northward except with a southward 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 Frances Drake Channel and Flanagan Passage. Tidal currents in The Narrows and the passage eastward attain velocities of from 2 to 4 knots.

Little Thatch Islet, 0.4 mile southward of The West End, is about 0.5 mile long. **Frenchman Cay,** about 0.3 mile eastward of Little Thatch Island, is 400 feet high. **Sopers Hole** is a deep little basin, 1 mile in length and about 0.3 mile in width, between Frenchman Cay and Little Thatch Island, on the south, and the western end of Tortola, on the northern side. At the eastern end of Sopers Hole the muddy bottom is the best holding ground. There is a small pier on the north 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 southward may enter Sopers Hole by the passage between Frenchman Cay and Little Thatch Island, or by that between the latter island and the western end of Tortola. These passages are not difficult, but the western 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 southward current, which will shoot a vessel into it. A vessel coming from the eastward will find the passage eastward of Little Thatch Island the best, as she will have a leading wind, can luff up closer under the western end of Frenchman Cay, which is steep-to, and shoot into Sopers Hole with either a southward or northward current. When leaving, pass out to the northward through Thatch Island Cut, or, if bound into Sir Francis Drake Channel, round the western end of Little Thatch Island at a distance of somewhat more than 200 yards and haul to the wind. With the eastward 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 westward 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 northwestern side of Tortola there are numerous small bays or bights, of which Canegarden Bay, the largest, is the only one on the northern 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 northward of the southern entrance point.

H.O. Chart 0137.—Road Harbor, on the southern side of Tortola 6 miles east of its western end, is the only port of entry in the British Virgin Islands for all vessels. Sopers Hole at the west end of Tortola, is a limited port of entry. The harbor is exposed southeastward, but the other sides are surrounded by high hills with their spurs reaching the shores.

Road Town, on the western 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.—Burt Point Light (18°24.9′ N., 64°36.7′ W.), on the west side of the entrance to Road Harbor, 18 feet above the water, is shown from a white concrete structure close to the outer limits of the coral reef about 400 yards eastward of **Burt Point.** There are four prominent landmarks in Road Town, these being Fort Burt Hotel, a group of four pink buildings, situated on Burt Point, the Administration Building (Customhouse), a white flat-roofed 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 north of the Administration Building, the white belfry of the Anglican church shows above Wickham Cay, a low mangrove covered islet, in the northwestern part of the harbor.

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 light off 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 northern part of the harbor, northward 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 Burt Point Light is abeam. Ships desiring to make the northern anchorage should proceed as to the deep-draft anchorage until the Commissioner's House is abeam. Ships desiring to anchor southward of Harber 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 southward 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 southward of Hog Valley Point and 1.1 miles southward of Slaney Point. A 17-foot patch is about 0.5 mile southeastward of Hog Valley Point, and an 18-foot patch is about 0.75 mile southwestward of Slaney Point.

Denmark Banks, 0.5 mile southeastward of Burt Point, have two rocky patches with a least depth of 13 feet. The Bluff, bearing 073° and open southward of Nora Hazel Point, leads southward of these banks. **Lark Bank,** 0.4 miles eastward of Burt Point, has a least depth of 15 feet over a coral head. **Scotch Bank,** 0.8 mile eastward of Burt Point and marked by a buoy at its southern edge, has a least depth of 10 feet.

Harbor Spit, 0.4 mile northward of Burt Point, is an extension of the shoal water in the northwestern part of the harbor. Depths on the spit are from 4 to 17 feet; a buoy marks the southeastern end of the spit. **Harbor Rock,** 250 yards southeastward 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.—An 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 southward has depths of 7 feet alongside. Small sloops are used for lighterage when necessary.

Supplies.—A limited amount of groceries and water are available. Gasoline and diesel fuel can be obtained from offshore pipelines on the northeastern side of Road Harbor.

Repairs.—A small marine railway in Careening Cove can haul out boats about 80 feet in length, or 80 tons and 8 feet in draft. Another marine railway in **Bauger Bay,** on the northeastern side of Road Harbor, can haul out 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.

Chart 905.—Guana Island, 810 feet high and 1.7 miles long, is about 0.3 mile northward of Tortola. The passage between these islands has a depth of about 29 feet in the fairway. On the western 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 Island, a mile east 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 east of Great Camanoe Island, from which it is separated by a narrow channel with many shoals and rocks.

Little Camanoe and **Marina Cay** are southwest and southeast, respectively, of the southern end of Great Camanoe Island. They are all connected to the northern side of Beef Island by a shoal bank on which are several rocks and reefs. The channel north of Beef Island is quite open and easily navigated by large yachts. **Shallow Rock** is a 3-foot shoal off the western point of **Trellis Bay** on the north 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 in length and 660 feet high in its eastern part, is separated from the eastern end of Tortola by a narrow shoal channel which should be used only with local knowledge. **The Bluff,** the southern extremity of the island, is a good landmark for vessels bound to Road Harbor. During strong northeasterly winds excellent anchorage will be found in the lee of Beef Island, about 0.7 mile westward of The Bluff. An airfield is on Beef Island. **Buck Island,** 1.1 miles southwest of Beef Island and close off the southeastern side of Tortola, is 170 feet high at its southeastern end.

Sir Francis Drake Channel is a passage bounded on the northwest by Tortola and the islands off its eastern end, and on the southeast 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 Islets.

Eastward of Buck Island the depths are regular, about 13 to 14 fathoms, but westward of that island the bottom is very irregular, especially in the approach to Road Harbor. In the southern portion of the western 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 eastward 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 northeastward flow.

Flanagan Passage, the westernmost of the passages leading into Sir Francis Drake Channel from the southward, 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 eastward of Flanagan Island, is about 2.3 miles long and 440 feet high near its southwestern extremity. Foul ground is close off its northeastern and southwestern ends. **Ringdove Rock,** covered by 2 fathoms, is about 300 yards westward of the northwestern point of Norman Island. **Santa Monica Rock,** 0.7 mile southwest of Norman Island, is a small patch 1¾ fathoms deep.

Pelican Islet, 180 feet high, is about 0.5 mile north of Ringdove Rock. About 200 yards westward of it are the **Indians,** four remarkable small pinnacle rocks, 50 feet high. A 6½ fathom shoal lies 0.7 mile north-northwest of Pelican Islet.

The Bight, a small inlet in the western 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 the northwestward, 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 western side of Treasure Point.

Peter Island, northeast of Norman Island, is in the form of an elbow, 440 feet high at its western part. **Carrot Rock,** 84 feet high, lies about 0.3 mile off the southern end of the island, and **Carrot Shoal,** covered 1¾ fathoms, is about 0.4 mile southwest of the rock. Some 6-fathom patches lie within 0.5 mile of the northern side of the island.

Great Harbor, a small bight on the northern 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 westward 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 aboard.

Dead Chest, nearly 0.5 mile off the northeastern end of Peter Island, is an islet 200 feet high; a group of rocks extends about 0.2 mile southward from its eastern end. A 5½ fathom patch lies about 0.7 mile northwestward of the islet.

Blonde Rock, covered 2 fathoms, is about 0.6 mile east-northeastward 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 eastern side of the passage.

Salt Island, about 2 miles northeast of Peter Island, rises to a height of 380 feet in its northern part. A rock awash lies close off its northeastern end. The passage between Salt and Cooper Islands is contricted 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,** northeast of Salt Island, is 1.7 miles in length and 530 feet high at its southern end. **Dry Rocks** are 300 yards off the northeastern side of Cooper Island, and **Carval Rock,** 110 feet high and steep-to, is 0.8 mile east-northeastward of **Markoe Point,** the southern point of Cooper Island.

Ginger Island, about 1 mile eastward of Cooper Island, is 500 feet high and steep-to at its northeastern and southeastern ends. A light is shown on the northeastern extremity of the island. Some rocks lie close off its western end. The passage between Ginger and Cooper Islands may be taken by steamers, but sailing vessels may meet trouble.

Round Rock, 220 feet high, is the southernmost of a chain of islets and rocks extending south-southwestward from the southwestern 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 southward. It is the best for vessels coming from southward. The passage is about 0.7 mile wide and easily located from its position in relation to Fallen Jerusalem, 1.2 miles to the northeastward. 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 southeast and northwest tidal currents attain a velocity of about 1 knot.

H.O. Chart 3904.—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 eastward and south-southwestward. The eastern peninsula consists of irregular rugged hills which terminate at **Pajaros Point** in an astounding pinnacle rock 120 feet high. The southwestern 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 west side of the southwestern peninsula consists of immense granite blocks which lie scattered about on the shore. **Colison Point** is the northwestern extremity of the peninsula. The islets and rocks to the southward as far as Round Rock, 2 miles distant, are also of granite; the largest, about 140 feet high, nearly 0.5 mile from the southern end of the island, is named **Fallen Jerusalem** because of its resemblance to a town in ruins.

Several islets are in the northern part of Sir Francis Drake Channel. **Great Dog,** the southeasternmost, is 270 feet high and steep-to at its western end; rocks fringe its northern and southern sides. **George Dog,** the northernmost, is 250 feet high and has some detached rocks about 0.2 mile north of it. **Cockroach Rock** lies about 0.2 mile westward of it. **West Dog,** the westernmost, is 150 feet high, with its western side bold and steep-to.

Tow Rock, 1.2 miles west-northwest 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 northeast of George Dog and 1 mile westward of **Mountain Point,** the northwestern extremity of Virgin Gorda, are a cluster of three small islets. The northern 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 western side of Virgin Gorda, are two excellent anchorages for vessels of any draft. The northern is situated in the bight between Mountain and Colison Points, and is partially protected to the northwestward by Dog Islets. It seldom, however, blows hard to the westward of north, and the only thing to be prepared for is the ground swell in the winter months, at

which season 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 southern 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 westward with more ease than from the northern 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 west of Colison Point, and **Burrow Rock,** with 1½ fathoms, is 1 mile south of Colison Point. The anchorages may be approached from either north or south as the passages are clear except between West Dog and Scrub Island, where Tow Rock lies. On the northern side of Virgin Gorda are several small slightly wooded islets and cays.

H.O. Chart 0569.—Mosquito Island, about 0.6 mile long and 290 feet high, the highest of the islets off the northern side of Virgin Gorda, is 1 mile east-northeastward of Mountain Point. The channel separating it from **Anguilla Point,** on Virgin Gorda, is shoal and only 175 yards wide. The northeastern end is fringed by a reef, and a chain of small detached rocks extends 300 yards north-northeastward. **Mosquito Rock,** the outermost, is 23 feet high.

Colquhoun Reef, which dries in patches, extends nearly 0.6 mile southeastward from Mosquito Rock, and is steep-to on its northeastern side. On the southwestern side there 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 northern side of Virgin Gorda, is about 0.8 mile east of Mosquito Island. It is 1 mile in length and 237 feet high. **Asbestos Point,** its eastern end, is 0.2 mile from the nearest part of a small peninsula of the eastern 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 westward of Cactus Point, the northwestern end of Prickly Pear Island, is steep-to on its northern side; the sea breaks on it even with a slight swell.

Gorda Sound is an excellent and roomy harbor between Virgin Gorda on the south and Mosquito Island, Colquhoun Reef, and Prickly Pear Island on the north. 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 western 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 southeast of Colquhoun Reef, has a least depth of 30 feet. **Creek Shoal,** off the southern 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 southern 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 southeastern corner of Gorda Sound.

The tide in Gorda Sound is chiefly diurnal. The tidal currents at the entrance are seldom more than 0.5 knot, but the inward current sets toward Prickly Pear Island. Between Mosquito Island and Anguilla Point, the east-going current has a velocity of from 1 to 1.5 knots.

Routes.—Steamers coming from the eastward 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 northern extremity of Necker Island bears 279°, distant 6.8 miles. Then alter course to pass at least 0.5 mile northward 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 northward it is better to pass westward of Anegada and approach with Virgin Peak on a bearing between 132° and 155°.

Sailing vessels can follow the direction for steamers, but if coming from the northward and passing eastward 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 east of Prickly Pear Island, is 172 feet high and 0.3 mile long. Its northern 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 east-northeastward and the other about 0.5 mile eastward of the eastern 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 eastward 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 northward of Prickly Pear and Eustatia Islands and those southward 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 eastward and westward with a velocity of about 0.5 knot.

Necker Island, 0.7 mile north of Eustatia Island, is nearly 0.5 mile in extent and 107 feet high at its northern

part. The northeastern side is fairly bold and steep-to, with depths of 6 to 10 fathoms within 300 yards. The southeastern and western 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 southward of Necker Island.

The Invisibles, about 0.8 mile eastward 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 eastern side of Necker Island; greater depths are close off the eastern end. Caution is required when navigating in this area as the rocks do not always break, and are hard to see.

H.O. Chart 3904.—Anegada, the northeasternmost island of the Virgin Group, lies with **East Point,** its southeastern end, about 12 miles north-northeastward of Pajaros Point. Anegada is 9 miles in length, about 30 feet high, and covered with brushwood except at a few places cleared for cultivation. Numerous salt-water lagoons are in the westerly interior. The principal settlement is on the southern 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 northern side by a narrow barrier reef which is about 0.1 mile off at **Soldier Point,** the northerly point, and 1.5 miles eastward at East Point. Thence **Horse Shoe Reef,** a most dangerous reef upon which many vessels have been lost, extends southeastward for nearly 8 miles. From its southeastern end detached coral heads and shoal ledges extend 4.5 miles southwestward, 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 westward of the elbow of Horse Shoe Reef.

The edge of the bank is 2.5 miles eastward 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 southern end lies 5.5 miles east-northeast of Pajaros Point. A detached 5-fathom patch is 0.7 mile southward of the reefs.

Robert Reef, 3.5 miles westward of Herman Reefs, is a small rocky patch with 4½ fathoms on it. Another small rocky head, with 3¾ fathoms, is 1.1 miles north-northeastward of this reef. **Hawks Bill Bank,** about 2 miles north-northwestward of Robert Reef, is a small rocky ledge with 2¾ to 5½ fathoms.

The reef skirting the northern side of Anegada terminates about 300 yards off **West End,** but the southern 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 west 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 south of the island. The bank westward of Anegada is chiefly fine sand, and in good weather vessels may anchor on it in safety, taking care to avoid the dangers.

APPENDIX

COAST AND GEODETIC SURVEY.—Coast Pilots, Nautical Charts, Tide Tables, Tidal Current Tables, and Tidal Current Charts are sold by the Coast and Geodetic Survey, Environmental Science Services Administration, Rockville, Md. 20852 (Counter sales: Room 1125, Commerce Building, Washington, D.C.), or its distribution centers at New York and San Francisco, and by authorized sales agents located in many ports of the United States and in some foreign ports.

Distribution centers: New York Field Office, Coast and Geodetic Survey, Room 1407, Federal Office Bldg., 90 Church Street, New York, N.Y. 10007; West Coast Field Director, Coast and Geodetic Survey, Room 121, Customhouse, San Francisco, Calif. 94126.

Field offices:

Norfolk: Atlantic Marine Center and East Coast Field Director, 439 West York Street, Norfolk, Va. 23510.

New Orleans: Chief, New Orleans Field Office, 315 Customhouse, 423 Canal St., New Orleans, La. 70130.

Coast Pilot books:

U.S. Coast Pilot 1, Atlantic Coast, Eastport to Cape Cod, 1965.

U.S. Coast Pilot 2, Atlantic Coast, Cape Cod to Sandy Hook, 1966.

U.S. Coast Pilot 3, Atlantic Coast, Sandy Hook to Cape Henry, 1966.

U.S. Coast Pilot 4, Atlantic Coast, Cape Henry to Key West, 1964.

U.S. Coast Pilot 5, Atlantic Coast—Gulf of Mexico, Puerto Rico, and Virgin Islands, 1967.

U.S. Coast Pilot 7, Pacific Coast and Hawaii, 1963.

U.S. Coast Pilot 8, Alaska—Dixon Entrance to Cape Spencer, 1962.

U.S. Coast Pilot 9, Pacific and Arctic Coasts, Alaska—Cape Spencer to Beaufort Sea, 1964.

Distances Between United States Ports, Third (1961) Edition.

A Coast Pilot should be used only by reference to the latest supplement which can be obtained free from the headquarters office and distribution centers of the Coast and Geodetic Survey, and from the 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.
Long Island Sound and Block Island Sound.
New York Harbor.
Delaware Bay and River.
San Francisco Bay.
Puget Sound, Northern Part.
Puget Sound, Southern Part.

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 U.S. Coast and Geodetic Survey: for sale by C&GS and its agents.

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 U.S. Lake Survey, Detroit, Mich.

Foreign countries: Published by U.S. Naval Oceanographic Office; for sale by that office and its sales agents.

Coast Pilots.—Coasts of the United States and Possessions: Published by U.S. Coast and Geodetic Survey; for sale by C&GS and its sales agents.

Great Lakes Pilot: Published and for sale by U.S. Lake Survey, Detroit, Mich.

Foreign countries (Sailing Directions): Published by U.S. Naval Oceanographic Office; for sale by that office and its sales agents.

Tide and Tidal Current Tables, and Tidal Current Charts.—Published by U.S. Coast and Geodetic Survey; for sale by C&GS and its sales agents.

Notices 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—U.S. Naval Oceanographic Office; Weekly Notice

to Mariners, Great Lakes—Commander, Ninth Coast Guard District, Cleveland, Ohio.

Light Lists.—United States and Possessions: Published by U.S. Coast Guard; for sale by the Superintendent of Documents and his sales agents.

Foreign countries: Published by U.S. Naval Oceanographic Office; for sale by that office and its sales agents.

Radio.—Radio Navigational Aids, Atlantic and Mediterranean Area (H.O. Pub. No. 117A); Radio Navigational Aids, Pacific and Indian Oceans Area (H.O. Pub. No. 117B); Radio Weather Aids, Atlantic and Mediterranean Area (H.O. Pub. No. 118A); Radio Weather Aids, Pacific and Indian Oceans Area (H.O. Pub. No. 118B); Weather Station Index (H.O. Pub No. 119); and International Code of Signals, Vol. II—Radio (H.O. Pub. No. 104); Published by U.S. Naval Oceanographic Office; for sale by that office and its sales agents.

Miscellaneous.—The Nautical Almanac, and American Ephemeris and Nautical Almanac: Published by United States Naval Observatory: for sale by Superintendent of Documents and his sales agents.

American Practical Navigator (Bowditch) (H.O. Publication No. 9), and International Code of Signals, Volume I—Visual (H.O. Publication No. 103): Published by U.S. Naval Oceanographic Office; for sale by that office and its sales agents.

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 I (port administration and services) published by Maritime Administration, U.S. Department of Commerce; Part II (port conditions and facilities) published by Corps of Engineers, U.S. Army. Both parts are for sale by the Superintendent of Documents.

CORPS OF ENGINEERS, U.S. Army.—Jacksonville District Office: 575 Riverside Ave., Jacksonville, Fla. 32201. The district includes the coastal waters and tributaries of Florida eastward of St. Marks, and Puerto Rico and the Virgin Islands.

San Juan Area Office: Stop 7½, Fernandez Juncos Ave., San Juan, P.R.

Mobile District Office: 2301 Airport Blvd., Mobile, Ala. 36601. The district includes the coastal waters and tributaries of Florida westward of St. Marks; Alabama, Mississippi, and Louisiana to and including Pearl River.

New Orleans District Office: Foot of Prytania St., New Orleans, La. 70160. The district includes the coastal waters and tributaries of Louisiana westward of Pearl River, and the Mississippi River to Vicksburg, Miss.

Port Arthur Resident Office: P.O. Box 72, Pleasure Pier, Port Arthur, Tex. 77640.

Galveston District Office: 606 Santa Fe Bldg., Galveston, Tex. 77550. The district includes the coastal waters and tributaries of Texas.

COAST GUARD.—Commander, Seventh Coast Guard District, 51 Southwest First Ave., Miami, Fla. 33130. The district includes South Carolina, Georgia, Florida to the Apalachicola River Entrance; and Puerto Rico and the United States Virgin Islands:

Commander, Greater Antilles Section: Coast Guard Base, San Juan, P.R.

Key West Captain of the Port Office: Coast Guard Base, Key West, Fla. 33040.

Tampa Captain of the Port Office: 500 Zack St., P.O. Box 3172, Tampa, Fla. 33601.

San Juan Captain of the Port Office: Coast Guard Base, San Juan, P.R.

Commander, Eighth Coast Guard District: 328 Customhouse, New Orleans, La. 70130.

The district includes Florida westward of the Apalachicola River Entrance; Alabama, Mississippi, Louisiana, and Texas.

Mobile Captain of the Port Office: Federal Bldg., Mobile, Ala. 36601.

New Orleans Captain of the Port Office: 1201 Lakeshore Drive, New Orleans, La. 70124.

Sabine Captain of the Port Office: P.O. Box 459, Port Arthur, Tex. 77641.

Galveston Captain of the Port Office: Coast Guard Base, Galveston, Tex. 77550.

Houston Captain of the Port Office: P.O. Box 446, Galena Park, Tex. 77547.

Corpus Christi Captain of the Port Office: Federal Bldg., Corpus Christi, Tex. 78401.

Port Isabel Captain of the Port Office: Box 38, Port Isabel, Tex. 78578.

Coast Guard Stations.—The stations listed here are in the areas 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. Aerial identification numbers, where assigned, follow the name of the station.

St. Thomas, V.I. 18°20.5′ N., 64°55.8′ W. At the head of Kings Wharf at Charlotte Amalie.

Key West, Fla., 24°33.4′ N., 81°48.5′ W. West side of Key West.

Fort Myers Beach, Fla., 26° 27.5′ N., 81°57.2′ W. Near the bridge on the west side of San Carlos Island.

Panama City, Fla., 30°10.1′ N., 85°42.3′ W. Northwest side of Buena Vista Point.

Santa Rosa, Fla. (No. 212) 30°19.1′ N., 87°15.3′ W. About 2.5 miles east of west end of Santa Rosa Island.

Pascagoula, Miss., 30°20.6′ N., 88°33.8′ W. East side of the entrance of Pascagoula River.

Grand Isle, La. (No. 214) 29°13.8′ N., 89°59.9′ W. About 3 miles southwest of Barataria Pass, in center of Grand Isle.

New Canal, La. (No. 215) 30°01.6′ N., 90°06.8′ W. East side of New Canal entrance, on Lake Pontchartrain.

Sabine, Tex. (No. 216) 29°43.7′ N., 93°52.3′ W. West side of Sabine Pass, about 5.6 miles north-northwest of Sabine Pass East Jetty Light.

Galveston, Tex. (No. 217) 29°20.0′ N., 94°46.2′ W. East side of Galveston Channel, about 4 miles west of Galveston Jetty Light.

Freeport, Tex. (No. 219) 28°56.5′ N., 95°18.2′ W. Northeast side of Freeport Harbor entrance.

Port O'Connor, Texas (No. 220) 28°26.0′ N., 96°25.6′ W. North bank of Intracoastal Waterway about a mile west of Port O'Connor.

Port Aransas, Tex. (No. 221) 27°50.2′ N., 97°03.5′ W. Northeast end of Mustang Island at east end of Corpus Christi Channel.

Port Isabel, Tex. (No. 222) 26°04.3′ N., 97°09.8′ W. South end of Padre Island, at Brazos Santiago Light.

Ports authorized to issue **marine documents** in the area covered by this volume are located in the Seventh and Eighth Coast Guard districts, as follows:

Seventh Coast Guard District: Key West, Fla., Tampa, Fla., Apalachicola, Fla., San Juan, P.R., Mayaguez, P.R. Ponce, P.R., Charlotte Amalie, St. Thomas V.I.

Eighth Coast Guard District: Pensacola, Fla., Mobile, Ala., Gulfport, Miss., Biloxi, Miss., Pascagoula, Miss., New Orleans, La., Baton Rouge, La., Morgan City, La., Houma, La., Lake Charles, La., Port Arthur, Tex., Beaumont, Tex., Galveston, Tex., Corpus Christi, Tex., Houston, Tex., Brownsville, Tex.

CUSTOMS.—The Customs Districts described in this volume are within the Miami, New Orleans, or Houston Regions. In the following listing of **ports of entry,** the first port in each district is the headquarters port.

MIAMI REGION:

Tampa, Fla., District: Tampa (Including Port Tampa and Port Tampa City); Boca Grande; St. Petersburg.

Miami, Fla., District: Miami; Key West.

San Juan, P.R., District: San Juan; Aquadilla; Fajardo; Guanica; Humacao; Jobos; Mayaguez; Ponce.

St. Thomas, V.I., District: Charlotte Amalie, St. Thomas; Christiansted, St. Croix; Coral Bay, St. John; Cruz Bay, St. John; Frederiksted, St. Croix.

NEW ORLEANS REGION:

Mobile, Ala., District: Mobile; Apalachicola, Fla.; Carrabelle, Fla.; Gulfport, Miss.; Panama City, Fla.; Pascagoula, Miss.; Pensacola, Fla.; Port St. Joe, Fla.

New Orleans, La., District: New Orleans; Baton Rouge, La.; Morgan City, La.

HOUSTON REGION:

Port Arthur, Texas District: Port Arthur; Beaumont, Tex.; Lake Charles, La.; Orange, Tex.; Sabine, Tex.

Galveston, Texas District: Galveston; Corpus Christi, Tex.; Freeport, Tex.; Port Lavaca-Point Comfort, Tex.

Houston, Texas District: Houston.

Laredo, Texas District: Brownsville, Tex. (Not headquarters port).

PUBLIC HEALTH SERVICE.—Quarantine stations where supervision of quarantine and medical examination of aliens are performed:

Tampa, Florida: U.S. Quarantine Station, 155 Columbia Drive.

New Orleans, Louisiana: U.S. Quarantine Station, 3819 Patterson Road, Algiers.

Galveston, Texas: U.S. Quarantine Station, 45th St. and Avenue North.

San Juan, Puerto Rico: U.S. Quarantine Station, P.O. Box 3788.

Other ports where quarantine services are performed. ALABAMA: Mobile; FLORIDA: Apalachicola, Boca Grande, Bradenton, Cedar Key, Clearwater, Fort Myers, Fort Myers Beach, Key West, Naples, Panama City, Pensacola, Port St. Joe, Sarasota, St. Petersburg, Tarpon Springs; LOUISIANA: Baton Rouge, Belle Chasse, Berwick, Burnside, Destrehan, Golden Meadows, Good Hope, Gramercy, Lake Charles, Morgan City, Myrtle Grove, Norco, Ostrica, Port Allen, Port Sulphur, Slidell; MISSISSIPPI: Gulfport, Pascagoula; TEXAS: Baytown, Beaumont, Brownsville, Freeport, Houston, Orange, Port Arthur, Port Isabel, Port Lavaca-Point Comfort, Port Neches, Sabine, Texas City; PUERTO RICO: Aguadilla, Central Aguirre, Fajardo, Guanica, Guayanilla, Humacao, Mayaguez, Ponce; VIRGIN ISLANDS: Charlotte Amalie, St. Thomas; Christiansted, St. Croix; Frederiksted, St. Croix.

Hospitals:

Galveston: 4400 Avenue N; Galveston, Tex. 77550.

New Orleans: 210 State St., New Orleans, La. 70118.

Outpatient clinics:

Charlotte Amalie; Post Office and Customhouse Bldg., Charlotte Amalie, V.I. 00802.

Houston: 204 U.S. Customs Bldg., 701 San Jacinto St., Houston, Tex. 77002.

Mobile: 125 Federal Bldg., Mobile, Ala. 36602.

Port Arthur: 209 Federal Office Bldg., 5th St. and Austin Ave., Port Arthur, Tex. 77640.

Tampa: 155 Columbia Dr. (Davis Island) Tampa, Fla. 33606.

San Juan; P.O. Box 3788, San Juan, P.R. 00904.

Outpatient offices:

Apalachicola, Fla.: 142 Avenue E.

Biloxi, Miss.: 423 Lameuse St.

Brownsville, Tex.: 108 Medical Arts Center, 105 West Elizabeth St.

Chattahoochee, Fla.: 401 High St.

Corpus Christi, Tex.: 2512 Medical Center, 2400 Morgan Ave.

Gulfport, Miss.: Hewes Bldg.

Key West, Fla.: 420 Simonton St.

Morgan City, La.: 1122 8th St.

Panama City, Fla.: 456 Grace Ave.

Pensacola, Fla.: 1003 North 12th St.

Ponce, P.R.: 82 Salud St.

Port St. Joe, Fla.: 201 20th St.

IMMIGRATION and NATURALIZATION.—Offices of these services are in the following places:

Florida:
Key West: P.O. Box 86.
Tampa: Room 537, 500 Zack St.
Pensacola: U.S. Post Office Bldg.

Alabama:
Mobile: 457 U.S. Court & Custom House Bldg.

Mississippi:
Gulfport: Faulk Bldg., 11th & 32d Sts.

Louisiana:
New Orleans: Federal Bldg., 701 Loyola Ave.
Baton Rouge: Room 858, Commerce Bldg.
Lake Charles, Federal Bldg., 931 Moss St.

Texas:
Port Arthur: U.S. Post Office & Customhouse Bldg.
Houston: Federal Bldg.
Galveston: U.S. Post Office Bldg.
Corpus Christi: Federal Court Bldg.
Port Isabel.
Brownsville: Gateway International Bridge.

Puerto Rico:
San Juan: 804 Ponce de Leon Ave., Santurce.

Virgin Islands:
Charlotte Amalie, St. Thomas: Federal District Court Bldg.
Christiansted, St. Croix: U.S. Post Office Bldg.

FEDERAL COMMUNICATIONS COMMISSION.—Distric field offices:
Tampa: Federal Office Bldg., 500 Zack St., Tampa, Fla.
Mobile: U.S. Court and Custom House, Mobile, Ala.
New Orleans: Federal Office Bldg., 600 South St., New Orleans, La.
Houston: Room 5636, New Federal Office Bldg., Houston, Tex.
Beaumont: Federal Bldg., 300 Willow St., Beaumont, Tex.
Puerto Rico: Federal Bldg., San Juan, P.R.

WEATHER BUREAU.—Offices: In the area covered by this Coast Pilot, the Weather Bureau operates marine centers from which personnel will visit ships to compare barometers and other weather instruments, and at other Weather Bureau offices barometers may be brought in for comparison with standards, as follows:

Marine centers:
Mobile: 516 U.S. Court & Custom House, Mobile, Ala.
New Orleans: 701 Loyola Ave., New Orleans, La.
Pensacola: Municipal Airport, Pensacola, Fla.
Houston: 1002 Federal Office Bldg., Houston, Tex.
San Juan, P.R.: Airport Station, Isla Verde International Airport, San Juan, P.R.

Comparison offices:
Tampa: Airport Station, Tampa International Airport, Tampa, Fla.
Fort Myers: Airport Station, Fort Myers, Fla.
Lake Charles: Airport Station, Lake Charles Air Force Base, Lake Charles, La.
Galveston: U.S. Post Office Bldg., Galveston, Tex.
Port Arthur: Airport Station, Jefferson County Airport, Port Arthur, Tex.
Corpus Christi: Airport Station, Cliff Maus Field, Corpus Christi, Tex.
Brownsville: Airport Station, International Airport, Brownsville, Tex.

Broadcasts by Coast Guard radio stations.—Urgent, safety, and scheduled marine information broadcasts are made by Coast Guard radio stations. In general, these broadcasts provide information vital to vessels operating in the approaches and coastal waters of the United States including Puerto Rico and the U.S. Virgin Islands. Transmissions are as follows:

Urgent and safety broadcasts:

(1) By radiotelegraph: (a) Upon receipt, except within 10 minutes of the next silent period, for urgent messages only; (b) during the last 15 seconds of the first silent period after receipt; (c) repeated at the end of the first silent period which occurs during the working hours of one-operator ships unless the original warning has been cancelled or superseded by a later warning message.

(2) By radiotelephone: (a) upon receipt; (b) repeated 15 minutes later, for urgent messages only; (c) 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 kc. and 2182 kc., respectively. Safety broadcasts are preceded by the safety signal. TTT for radiotelegraph; SECURITE for radiotelephone. After the preliminary signal 500 kc. and 2182 kc., the station shifts to its assigned working medium frequency for the radiotelegraph broadcast and 2670 kc. for the radiotelephone transmission.

Scheduled broadcasts.—The following Coast Guard radio stations make scheduled broadcasts, preceded by a preliminary call on 500 kc. and 2182 kc., at the times and frequencies indicated:

Radiotelegraph:
NMA, Miami, Fla., 440 kc. 1100 and 2000 e.s.t.
NMG, New Orleans, La., 428 kc. 1120 and 1820 e.s.t.
NOY, Galveston, Tex. (Emergency broadcasts on 500 kc. only)
NMR, San Juan, P.R., 466 kc. 1220 and 2020, A.s.t.

Radiotelephone:
NMA, Miami, Fla. 2670 kc. 1150 and 2350 e.s.t.
NOF, St. Petersburg, Fla. 2670 kc. 1120 and 2320 e.s.t.
NMG, New Orleans, La. 2670 kc. 0550, 1150, 1750, and 2350 c.s.t.
NOY, Galveston, Tex. 2670 kc. 0520, 1120, 1720, and 2320 c.s.t.
NMR, San Juan, P.R. 2670 kc. 1100 and 2300 A.s.t.

Voice distress, safety, and calling frequencies guarded by the Coast Guard.—The International radiotelephone distress and calling frequency 2182 kc. and the Inter-

national calling and safety frequency 156.8 mc. of the maritime mobile VHF-FM band are guarded continuously in the area covered in this book by the Coast Guard stations listed below. Stations preceded by an asterisk (*) guard 156.8 mc. only, and those preceded by a dagger (†) guard 2182 kc. only.

Florida: Key West, Fort Myers Beach, St. Petersburg, Panama City, †Cape San Blas, and Santa Rosa.

Alabama: Mobile.

Mississippi: Pascagoula and †Biloxi.

Louisiana: New Orleans, New Canal (New Orleans), Belle Chasse (CGRADSTA New Orleans), †South Pass (West Jetty), Grand Isle, †Point au Fer Reef, †Southwest Pass, and Calcasieu (Cameron).

Texas: Sabine, Houston, Galveston, Freeport, Port O'Connor, Port Aransas, and Port Isabel.

Puerto Rico: San Juan, †Cabo San Juan, †Punta Tuna, and †Isla Mona.

Weather broadcasts by commercial radio stations.—Taped or direct broadcasts of forecasts and storm warnings are made by commercial radio stations in the areas covered by this Coast Pilot. These usually are put on the air at least twice daily; broadcast times are published in local newspaper radio program schedules, and in the Coastal Warning Facilities Charts issued annually by the U.S. Weather Bureau. The charts are on sale, 10 cents each, by Superintendent of Documents, Washington, D.C. 20402.

STORM WARNING STATIONS.—Weather Bureau listings of the display stations in the area covered by this Coast Pilot follows: **DN** indicates day and night displays; **D** indicates daytime displays only; **N** indicates night display only, and **W** indicates no display, posted warnings only:

Florida:

D Key West, Sands Marine Station; 24°33.8′, 81°48.2′.
DN Key West, Lumley & Roberts Hdwe Co.; 24°33.6′, 81°48.1′.
D Key West, Eisner Yacht Basin; 24°33.5′, 81°47.3′.
D Key West, U.S. Navy Station; 24°33.4′, 81°48.5′.
DN Key West, Weather Bureau Airport; 24°33.1′, 81°45.4′.
D Flamingo Ranger Station; 25°08.5′, 80°55.5′.
D Everglades; 25°50.8′, 81°23.3′.
D Naples; 26°08.0′, 81°47.7′.
D Fort Myers Beach; 26°27.4′, 81°57.3′.
D Punta Rassa; 26°29.2′, 82°00.8′.
D Fort Myers; 26°38.8′, 81°52.3′.
D Port Boca Grande; 26°43.2′, 82°15.6′.
DN Punta Gorda; 26°56.1′, 82°03.2′.
DN Venice, Jetty; 27°06.7′, 82°27.9′.
D Sarasota No. 2; 27°20.0′, 82°32.7′.
D Cortez; 27°28.1′, 82°41.3′.
D Bradenton; 27°29.9′, 82°34.4′.
D St. Petersburg Beach; 27°41.1′, 82°44.2′.
DN St. Petersburg, O'Neill's Boat Marina; 27°42.4′, 82°40.9′.
DN St. Petersburg No. 2; 27°46.3′, 82°37.6′.
DN St. Petersburg, South Pasadena Marina; 27°45.3′, 82°44.2′.
D Gulfport; 27°44.3′, 82°41.7′.
DN Johns Pass; 27°47.0′, 82°47.0′.
D Clearwater Pass; 27°57.8′, 82°49.5′.
D Clearwater Beach Marina; 27°58.6′, 82°49.5′.
DN Dunedin; 28°00.7′, 82°47.6′.
DN Tarpon Springs; 28°09.3′, 82°45.7′.
D Port Richey; 28°16.3′, 82°43.5′.
N Cedar Keys; 29°08.1′, 83°02.1′.
DN Alligator Point; 29°54.3′, 84°25.2′.
DN Carrabelle; 29°50.9′, 84°39.8′.
D Apalachicola; 29°43.6′, 84°59.0′.
D Valparaiso; 30°30.3′, 86°29.4′.
D Pensacola, Florida Highway Patrol; 30°25.1′, 87°-11.6′.
DN Pensacola; 30°24.1′, 87°12.7′.
D Pensacola Yacht Club; 30°23.9′, 87°14.4′.
D Pensacola, Fort Pickens State Park; 30°19.8′, 87° 17.9′.

Alabama:

DN Gulf Shores; 30°16.5′, 87°41.0′.
D Mobile Point Range Rear Light Station; 30°13.5′, 88°01.5′.
D Bayou la Batre; 30°23.5′, 88°16.0′.

Mississippi:

DN Pascagoula; 30°22.2′, 88°33.9′
DN Biloxi; 30°23.5′, 88°53.1′.
DN Gulfport; 30°22.0′, 89°05.5′.
D Pass Christian; 30°18.8′, 89°15.0′.

Louisiana:

DN New Orleans, Inner Harbor Canal Locks; 29°58.0′, 90°01.6′.
D New Canal Coast Guard Station; 30°01.6′, 90°06.7′.
D Grand Isle Coast Guard Station; 29°13.8′, 89°59.9′.
DN Morgan City; 29°41.8′, 91°12.7′.
D Cameron; 29°46.7′, 93°20.5′.

Texas:

DN Port Arthur; 29°52.1′, 93°55.8′.
DN Sabine Coast Guard Station; 29°43.7′, 93°52.3′.
DN Galveston Coast Guard Station; 29°20.0′, 94°46.0′.
D Houston Yacht Club; 29°37.1′, 95°00.1′.
D Kemah; 29°32.8′, 95°01.6′.
D Freeport No. 2; 28°56.8′, 95°20.8′.
D Freeport Coast Guard Station; 28°56.5′, 95°18.1′.
DN Matagorda; 28°41.0′, 95°58.4′.
D Palacios; 28°41.9′, 96°13.0′.
D Port O'Connor Coast Guard Station; 28°26.8′, 96° 25.6′.

DN Port Lavaca; 28°37.3′,96°37.4′.
D Rockport; 28°01.2′, 97°03.0′.
D Aransas Pass; 27°53.9′, 97°08.4′.
DN Port Aransas Coast Guard Station; 27°50.3′, 97° 03.5′.
D Corpus Christi, T-head; 27°47.7′, 97°23.3′.
D Corpus Christi, Padre Island Toll House; 27°39.8′, 97°16.4′.
D Corpus Chrisii, Padre Island Causeway; 27°38.1′, 97°14.4′.
D Yarborough Pass; 27°12.2′, 97°22.5′.
D Port Mansfield; 26°33.4′, 97°25.6′.

Puerto Rico:

D Isla Mona Light Station; 18°05.3′, 67°50.8′.
D Aguadilla City; 18°26.0′, 67°09.3′.
D Punta Borinquen Light Station; 18°30.0′, 67°09.0′.
D Fort San Cristobal; 18°28.2′, 66°06.7′.
D San Juan, Coast Guard Base; 18°27.7′, 66°07.0′.
D San Juan, Club Nautico; 18°27.7′, 66°05.3′.
D Cangrejos Yacht Club; 18°27.5′, 65°59.5′.
D Cabo San Juan Light Station; 18°23.0′, 65°37.1′.
D Playa de Fajardo; 18°20.2′, 65°37.9′.
D Isla Marina; 18°20.7′, 65°37.2′.
D Punta Tuna Light Station; 17°59.4′, 65°53.1′.
D Ponce Yacht and Fishing Club; 17°58.0′, 66°37.1′.
D Playa de Ponce; 17°58.9′, 66°37.2′.
D Playa de Guayanilla; 18°00.5′, 66°46.0′.
D Guanica; 17°58.0′, 66°54.5′.
D Mayagüez No. 2; 18°12.5, 67°09.0′.

Virgin Islands:

D St. Thomas, Hassel Island; 18°19.6′, 64°56.0′.
D St. Thomas, Charlotte Amalie; 18°20.5′, 64°55.8′.
D St. Thomas, Bluebeard Castle; 18°20.5′, 64°55.5′.
D Cruz Bay, St. Johns; 18°20.0′, 64°47.9′.
D Coral Bay, St. Johns; 18°21.0′, 64°43.0′.
D Johns Folly, St. Johns; 18°19.2′, 64°42.2′.
D Fort Christiansted; 17°44.9′, 64°42.1′.
D Christiansted (Harbormaster Office); 17°44.9′, 64°42.2′.
D Frederiksted (inner end of pier); 17°43.0′, 64°53.1′.
D Frederiksted (Fort Frederik); 17°43.0′, 64°53.0′.
D Ham Bluff Light Station; 17°46.3′, 64°52.5′.

CLIMATOLOGICAL TABLES

These tables were compiled from Weather Bureau 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 ¼ 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. WB-1966

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. EST	1 p.m. EST	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)	14	14	(b)	18	18	18	18	13	3	18	8	14	14	14	14	18	18	18	18
Jan.	73.7	65.4	69.6	85	47	1.53	4.43	0.0	83	69	10.8	NE	62N	68	4.9	11	13	7	6	0	1	*
Feb.	74.6	66.1	70.4	85	47	1.98	2.54	0.0	82	68	10.8	SE	55WNW	75	4.5	12	10	6	5	0	1	*
Mar.	76.5	68.4	72.5	87	55	1.77	1.78	0.0	79	66	11.0	SE	41SW	78	4.5	14	11	6	5	0	2	0
Apr.	79.6	72.0	75.8	89	55	2.48	3.15	0.0	77	64	11.3	ESE	42NNW	80	4.6	13	12	5	5	0	2	0
May	82.7	75.3	79.0	91	66	2.73	8.89	0.0	76	64	9.6	ESE	44E	76	4.9	11	13	7	7	0	4	0
June	85.6	78.0	81.8	94	68	3.97	4.00	0.0	78	67	9.0	SE	52SE	65	6.3	5	14	11	11	0	9	0
July	87.4	79.1	83.3	95	69	4.16	2.78	0.0	76	66	8.8	ESE	45ESE	71	6.2	4	17	10	13	0	12	0
Aug.	88.0	79.1	83.6	95	68	4.33	3.23	0.0	77	66	8.2	ESE	49S	72	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	69	9.0	ESE	106NW	63	6.5	3	17	10	16	0	10	*
Oct.	82.5	75.4	79.0	93	60	5.82	4.07	0.0	82	69	10.2	ENE	73SE	64	5.7	8	13	10	12	0	4	*
Nov.	77.5	70.7	74.1	88	49	2.80	7.33	0.0	83	69	10.6	ENE	66NW	69	4.7	11	12	7	7	0	1	*
Dec.	74.5	66.7	70.6	85	46	1.69	4.60	0.0	84	70	10.6	NE	41N	68	5.1	11	12	8	8	0	1	*
Year	80.8	72.9	76.8	95	46	39.99	8.89	0.0	80	67	10.0	ESE	106NW	71	5.3	106	162	97	111	0	59	1

FORT MYERS, FLORIDA (Page Field) 26°35'N., 81°52'W.; Elevation (ground) 15 feet. WB-1966

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. EST	1 p.m. EST	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)	27	27	6	6	21	10			18	25	25	25	26	26	22	23
Jan.	74.8	52.2	63.5	88	28	1.52	2.25	0.0	88	60	7.5	E			4.8	12	10	9	5	0	1	5
Feb.	76.3	54.0	65.2	92	35	2.21	2.23	0.0	89	59	8.0	E			4.8	11	11	6	6	0	1	3
Mar.	79.6	56.8	68.2	90	39	2.62	4.91	0.0	87	54	8.3	SW			4.9	12	11	8	6	0	2	3
Apr.	84.1	61.4	72.8	92	45	2.64	3.82	0.0	87	49	7.8	E			4.8	11	13	6	6	0	4	2
May	88.6	66.1	77.4	98	56	3.85	3.65	0.0	86	48	7.0	E			4.9	10	14	7	8	0	8	1
June	90.5	71.0	80.8	97	64	8.96	6.67	0.0	87	60	6.5	E			6.2	5	15	10	15	0	16	*
July	91.0	73.3	82.2	97	70	9.08	4.06	0.0	85	60	6.1	ESE			6.6	2	17	12	19	0	24	*
Aug.	91.6	73.8	82.7	95	71	7.38	4.19	0.0	86	60	6.0	E			6.3	3	17	11	18	0	21	*
Sept.	89.7	72.9	81.3	95	70	8.50	9.34	0.0	89	61	7.0	E			6.3	4	14	12	16	0	14	*
Oct.	85.2	67.0	76.1	93	52	4.09	10.85	0.0	88	57	7.5	NE			5.1	11	12	8	9	0	4	*
Nov.	79.7	58.7	69.2	89	42	1.20	3.34	0.0	90	56	7.2	NE			4.5	12	11	7	4	0	1	2
Dec.	76.0	54.0	65.0	86	26	1.29	2.35	0.0	89	56	7.3	NE			4.9	11	12	8	5	0	1	4
Year	83.9	63.4	73.7	98	26	53.34	10.85	0.0	87	57	7.2	E			5.3	104	157	104	116	0	96	21

TAMPA, FLORIDA (International Airport) 27°58'N., 82°32'W.; Elevation (ground) 19 feet. WB-1966

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): 7 a.m. EST	1 p.m. EST	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)	3	3	(b)	20	20	3	3	20	14		20	20	20	20	20	20	20	20	20
Jan.	71.3	51.0	61.2	81	24	2.13	3.29	T	86	59	8.1	N		67	5.4	10	11	10	6	0	1	6
Feb.	72.8	52.6	62.7	84	27	2.84	3.25	T	86	58	8.6	E		68	5.4	9	10	9	7	0	1	3
Mar.	76.0	56.0	66.0	87	38	3.75	5.20	0.0	86	56	8.8	S		69	5.5	10	10	11	7	0	3	3
Apr.	81.4	61.3	71.4	92	45	2.84	3.70	0.0	88	49	8.6	ENE		72	5.2	10	11	9	6	0	4	2
May	87.0	66.6	76.8	95	52	2.85	3.45	0.0	86	49	8.0	E		76	5.1	11	12	8	6	0	6	1
June	89.4	71.7	80.6	97	61	7.28	4.31	0.0	87	58	7.4	E		67	6.1	6	13	11	12	0	14	*
July	89.7	73.4	81.6	97	69	8.62	12.11	0.0	86	63	6.8	E		60	6.8	2	16	13	17	0	22	*
Aug.	90.3	73.7	82.0	95	69	8.24	5.37	0.0	91	64	6.5	ENE		59	6.6	3	15	13	17	0	20	*
Sept.	88.7	72.3	80.5	95	65	6.89	4.67	0.0	88	61	7.6	ENE		60	6.5	4	13	13	14	0	12	*
Oct.	83.8	65.6	74.7	93	40	2.78	2.18	0.0	90	58	7.9	NNE		65	5.2	11	11	9	7	0	3	1
Nov.	76.8	56.8	66.8	86	35	1.46	4.22	0.0	90	55	7.9	NNE		67	4.8	12	9	9	5	0	2	3
Dec.	72.5	52.1	62.3	81	31	1.89	2.93	0.0	90	57	8.0	N		63	5.5	10	9	12	6	0	1	5
Year	81.6	62.8	72.2	97	24	51.57	12.11	T	88	57	7.8	E		66	5.7	98	140	127	110	0	90	25

APALACHICOLA, FLORIDA (Post Office Building) 29°44'N., 84°59'W.; Elevation (ground) 13 feet. WB-1966

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): 7 a.m. EST	1 p.m. EST	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)	37	37	(b)	37	37	25	21	31	22	32	30	33	37	37	37	37	37	37	37
Jan.	62.3	47.9	55.1	79	14	3.14	3.77	T	87	69	7.3	N	42E	59	5.4	11	8	12	9	0	1	6
Feb.	64.0	49.5	56.8	80	21	3.91	3.74	T	86	67	7.6	N	35SE	62	5.5	10	7	11	9	*	2	5
Mar.	68.0	54.0	61.0	82	26	4.52	8.17	0.0	85	66	7.9	SE	47E	63	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	66	7.6	SE	44SE	72	4.7	13	8	9	6	0	4	2
May	81.7	67.9	74.8	96	50	2.88	7.07	0.0	83	65	6.9	SE	41SE	77	4.4	14	10	7	5	0	5	1
June	86.7	73.7	80.2	101	58	5.30	5.34	0.0	84	68	6.3	SW	41NE	70	5.2	10	12	8	10	0	10	*
July	87.6	75.4	81.5	102	66	7.93	5.86	0.0	85	72	5.7	W	55N	63	6.1	6	14	11	15	0	16	*
Aug.	87.7	75.3	81.5	99	66	7.74	5.67	0.0	87	80	5.8	SW	51NE	63	5.7	8	12	11	14	0	15	0
Sept.	84.8	73.0	78.9	96	52	8.53	11.71	0.0	88	71	7.2	NE	58E	62	5.6	10	9	11	11	0	9	*
Oct.	78.5	63.8	71.2	93	39	2.44	6.32	0.0	86	64	7.2	NE	49NW	74	3.8	17	7	7	5	0	2	1
Nov.	69.1	53.4	61.3	87	24	2.58	5.84	0.0	85	64	7.2	N	41SE	67	4.4	14	8	8	6	0	2	2
Dec.	63.2	48.4	55.8	82	13	2.96	4.15	T	87	70	7.0	N	36SE	54	5.7	10	8	13	8	0	1	4
Year	75.7	61.9	68.8	102	13	56.23	11.71	T	86	68	7.0	N	58E	66	5.2	134	111	120	106	*	71	25

PENSACOLA, FLORIDA (Hagler Field) 30°28'N., 87°12'W.; Elevation (ground) 112 feet. WB-1966

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. CST	Noon CST	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)	3	3	(b)	3	3	2	2	3		3	3					3	3	1	
Jan.	62.3	44.6	53.5	77	11	4.22	3.69	T	79	62	7.6		42S	44					14	0	4	
Feb.	65.2	46.9	56.1	75	26	4.25	3.33	0.0	81	63	8.4		33SE	47					12	0	2	
Mar.	70.2	51.8	61.0	80	32	6.04	1.80	0.0	81	60	7.9		36SE	52					12	0	4	
Apr.	76.5	59.3	67.9	87	42	5.25	7.51	0.0	86	60	8.0		50SE	62					7	0	7	
May	84.0	66.9	75.5	96	52	4.56	1.62	0.0	87	57	6.5		34E	68					6	0	3	
June	89.3	72.8	81.1	96	57	5.43	3.14	0.0	86	61	6.0		41SW	63					10	0	9	
July	89.2	74.1	81.7	97	69	8.02	1.84	0.0	90	67	5.2		49E	51					17	0	16	
Aug.	89.2	73.8	81.5	96	66	6.97	3.05	0.0	92	69	5.5		30W	61					15	0	12	
Sept.	85.9	70.5	78.2	97	58	7.69	4.58	0.0	89	69	6.8		41E	57					9	0	4	
Oct.	79.6	61.1	70.4	90	38	2.98	3.77	0.0	85	58	6.9		38NW	66					6	0	3	
Nov.	69.3	49.7	59.5	81	29	3.24	2.96	0.0	84	57	6.4		37NW	62					8	0	2	
Dec.	63.2	45.3	54.3	78	24	4.22	4.52	0.0	82	64	7.4		35S	50					11	0	3	
Year	77.0	59.7	68.4	97	11	62.87	7.51	T	85	62	6.9		50SE	58					28	0	69	

MOBILE, ALABAMA (Bates Field) 30°41.0'N., 88°14.5'W.; Elevation (ground) 211 feet. WB-1966

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. CST	Noon CST	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)	25	25	4	4	18	14			18	18	18	18	25	25	25	25
Jan.	62.3	43.7	53.0	76	8	4.64	8.34	0.1	80	64	9.9	N			6.5	8	7	16	11	*	2	6
Feb.	64.7	45.7	55.2	79	11	4.59	5.00	0.1	78	57	10.3	N			6.5	7	7	14	10	*	2	5
Mar.	70.3	50.3	60.3	87	11	7.23	6.52	0.1	82	56	10.3	N			6.1	9	8	14	11	*	5	4
Apr.	77.5	57.6	67.6	90	38	6.36	13.36	0.0	90	56	9.6	S			5.8	9	9	12	8	0	5	4
May	85.9	65.3	75.6	99	52	4.88	4.33	0.0	88	53	8.2	S			5.6	9	12	10	8	0	7	2
June	91.4	71.5	81.5	100	56	6.23	7.38	0.0	89	56	7.1	S			5.8	7	14	9	12	0	13	1
July	92.0	73.1	82.6	99	69	9.67	3.92	0.0	89	63	6.4	S			6.7	3	15	13	17	0	19	1
Aug.	91.2	73.0	82.1	98	66	6.44	4.45	0.0	90	62	6.3	NE			5.8	7	15	9	13	0	14	1
Sept.	87.4	68.3	77.9	98	54	6.25	5.79	0.0	85	60	7.6	NE			5.8	9	10	11	10	0	8	2
Oct.	80.3	59.5	69.9	93	39	3.03	2.25	0.0	83	51	7.7	N			4.2	16	7	8	6	0	2	2
Nov.	69.6	48.2	58.9	81	26	3.35	3.11	T	84	56	8.9	N			5.2	11	8	11	7	0	2	4
Dec.	63.9	44.3	54.1	78	10	5.46	5.28	0.1	82	62	9.3	N			6.2	9	7	15	11	*	2	5
Year	78.0	58.4	68.2	100	8	68.13	13.36	0.4	85	58	8.4	N			5.9	104	119	142	124	*	82	36

NEW ORLEANS, LOUISIANA (International Airport) 29°59.2'N., 90°15.3'W.; Elevation (ground) 3 feet. WB-1966

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. CST	Noon CST	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)	20	20	(b)	20	20	18	18	18				18	18	18	18	18	18	18	18
Jan.	64.4	44.8	54.6	83	14	3.84	4.77	T	87	67	8.4				6.6	7	8	16	10	0	2	6
Feb.	66.7	47.5	57.1	84	19	3.99	5.60	0.1	87	65	9.0				6.4	7	7	14	10	*	2	5
Mar.	71.2	51.6	61.4	87	29	5.34	7.87	T	84	59	9.0				6.2	8	9	14	9	0	4	4
Apr.	77.7	58.1	67.9	91	38	4.55	4.35	0.0	88	60	8.5				5.6	8	12	10	7	0	5	2
May	84.4	64.4	74.4	96	41	4.38	9.86	0.0	90	60	7.2				5.1	11	12	8	8	0	6	1
June	89.6	70.5	80.1	100	55	4.43	4.19	0.0	90	63	6.2				5.1	10	13	7	10	0	10	*
July	90.6	72.6	81.6	99	65	6.72	4.30	0.0	91	66	5.6				6.1	5	16	10	15	0	17	*
Aug.	90.7	73.0	81.9	100	62	5.34	2.48	0.0	92	66	5.5				5.3	9	14	8	13	0	14	0
Sept.	87.2	69.3	78.3	97	54	5.03	5.46	0.0	90	65	6.7				5.2	11	10	9	10	0	7	*
Oct.	80.3	60.5	70.4	92	36	2.84	2.58	0.0	87	58	6.8				4.0	16	7	8	6	0	2	2
Nov.	70.3	49.6	60.0	86	28	3.34	6.38	T	85	59	7.9				5.0	11	8	11	6	0	2	5
Dec.	65.3	45.5	55.4	83	17	4.10	3.94	0.1	86	67	8.1				6.1	8	8	15	10	*	2	5
Year	78.2	59.0	68.6	100	14	53.90	9.86	0.2	88	63	7.4				5.6	111	124	130	112	*	72	32

PORT ARTHUR, TEXAS (Jefferson County Airport) 29°57'N., 94°01'W.; Elevation (ground) 16 feet. WB-1966

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. CST	Noon CST	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)	6	6	(b)	13	13	6	6	13	10	13	13	13	13	13	13	13	13	13	13
Jan.	63.5	43.7	53.6	80	14	4.23	4.92	T	88	68	10.2	N	43S	44	6.9	7	6	18	9	0	2	7
Feb.	65.8	46.2	56.0	84	25	4.45	5.05	0.6	89	63	10.9	S	51N	49	6.4	8	5	15	9	*	3	6
Mar.	71.3	50.8	61.1	84	27	3.44	4.21	T	88	59	10.9	S	57SW	53	6.4	7	9	15	8	0	2	6
Apr.	78.0	58.3	68.2	90	37	3.94	2.65	0.0	91	63	11.1	S	52NW	51	6.8	5	9	16	7	0	4	3
May	83.8	65.6	74.7	92	49	4.94	7.18	0.0	91	62	9.6	S	44SW	64	6.1	5	14	12	6	0	5	1
June	89.6	71.5	80.6	99	60	4.29	10.20	0.0	94	63	8.0	S	63NW	68	5.5	7	16	7	8	0	8	*
July	91.0	72.7	81.9	100	69	6.00	4.87	0.0	94	63	7.0	S	57SW	66	5.9	5	17	9	11	0	14	*
Aug.	91.2	73.3	82.3	107	64	5.49	8.45	0.0	94	63	6.8	S	63E	63	5.9	6	16	9	12	0	12	*
Sept.	88.4	68.0	78.2	99	54	4.88	13.17	0.0	92	62	7.9	NE	43SE	63	5.5	9	12	9	10	0	7	1
Oct.	81.7	58.8	70.3	95	37	2.88	5.63	0.0	92	54	8.2	N	56NW	68	4.7	12	12	7	6	0	3	3
Nov.	70.7	48.6	59.7	87	30	3.46	7.26	0.0	91	62	9.4	N	52NE	56	5.8	9	8	13	7	0	2	6
Dec.	64.9	44.6	54.8	81	17	5.09	6.24	T	90	68	9.6	N	60S	47	6.4	9	6	16	9	0	2	7
Year	78.3	58.5	68.5	107	14	53.09	13.17	0.6	91	62	9.1	S	63E	59	6.0	89	130	146	103	*	64	41

GALVESTON, TEXAS (Post Office Building) 29°18'N., 94°48'W.; Elevation (ground) 7 feet. WB-1966

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)		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)	96	96	(b)	96	96			94		95	76					95	95		
Jan.	60.5	49.3	54.9	76	11	3.46	5.38	T			10.1		46S	49					10	0		
Feb.	62.4	51.2	56.8	83	8	2.88	6.55	0.2			10.3		52N	50					9	*		
Mar.	66.6	56.2	61.4	85	27	2.86	4.58	T			10.3		43SE	56					8	0		
Apr.	73.0	64.0	68.5	92	38	2.59	9.23	0.0			10.5		50NW	62					6	0		
May	80.1	71.5	75.8	93	52	2.79	6.13	0.0			10.0		57W	69					6	0		
June	85.6	77.7	81.7	99	57	2.65	12.56	0.0			9.3		54SE	76					6	0		
July	87.3	78.9	83.1	101	66	4.79	14.35	0.0			8.5		59NW	73					9	0		
Aug.	87.5	79.0	83.3	100	67	4.39	9.05	0.0			8.2		79E	71					9	0		
Sept.	84.6	75.5	80.1	96	52	5.09	11.65	0.0			8.8		87NE	69					9	0		
Oct.	78.5	68.4	73.5	94	41	2.86	14.10	0.0			9.0		57SE	73					6	0		
Nov.	68.6	57.4	63.0	85	26	3.56	9.01	0.0			9.7		47N	61					8	0		
Dec.	62.7	51.6	57.2	80	18	3.89	5.43	T			9.8		43NW	50					10	0		
Year	74.8	65.1	69.9	101	8	41.81	14.35	0.2			9.6		87NE	64					97	*		

HOUSTON, TEXAS (Federal Office Building) 29°46'N., 95°22'W.; Elevation (ground) 41 feet. WB-1966

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)		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)	29	29	(b)	28	28											29	29		
Jan.	62.6	46.6	54.6	82	10	3.72	3.19	0.2											10	*		
Feb.	65.2	49.0	57.1	90	14	3.21	3.89	0.1											10	*		
Mar.	70.9	53.8	62.4	96	21	2.40	3.65	0.0											8	0		
Apr.	77.5	61.0	69.3	92	39	3.42	3.76	0.0											8	0		
May	84.4	67.9	76.2	96	46	4.43	5.45	0.0											8	0		
June	90.4	73.9	82.2	99	57	3.83	8.28	0.0											8	0		
July	92.0	75.8	83.9	105	68	5.15	6.92	0.0											9	0		
Aug.	92.4	75.7	84.1	106	63	3.55	9.06	0.0											9	0		
Sept.	88.3	71.3	79.8	99	45	3.81	5.19	0.0											9	0		
Oct.	81.6	63.1	72.4	97	37	3.60	7.63	0.0											6	0		
Nov.	70.4	52.7	61.6	89	28	4.04	10.83	0.0											8	0		
Dec.	64.6	48.4	56.5	83	20	4.10	3.38	T											9	0		
Year	78.4	61.6	70.0	106	10	45.26	10.83	0.3											104	*		

CORPUS CHRISTI, TEXAS (International Airport) 27°46'N., 97°30'W.; Elevation (ground) 41 feet. WB-1966

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. CST	Noon CST	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)	24	27	2	2	24	15	24	24	24	24	24	24	27	27	27	24
Jan.	67.4	47.4	57.4	87	26	1.63	6.38	0.1	91	68	10.4	SSE	51NE	48	6.6	7	7	17	8	*	1	5
Feb.	69.8	50.9	60.4	80	29	1.70	2.99	T	92	71	11.2	SSE	42SE	52	6.5	7	6	15	8	0	1	5
Mar.	74.4	55.9	65.2	88	29	1.44	2.67	T	85	62	12.0	SSE	49S	56	6.7	7	7	17	6	0	2	4
Apr.	80.4	63.0	71.7	97	43	2.14	7.19	0.0	91	69	12.3	SE	43SE	58	6.7	5	10	15	5	0	3	2
May	85.9	69.1	77.5	98	54	2.99	2.83	0.0	94	75	11.3	SE	56NW	63	6.3	6	13	12	6	0	5	1
June	90.5	74.0	82.3	97	59	2.39	3.89	0.0	95	66	10.4	SE	49SE	74	5.1	10	14	6	5	0	3	*
July	93.5	74.6	84.1	101	70	2.32	3.73	0.0	95	58	10.1	SSE	35S	84	4.7	11	15	5	4	0	3	*
Aug.	93.8	74.5	84.2	99	69	2.77	5.52	0.0	96	61	9.6	SSE	61N	80	4.6	12	13	6	5	0	4	*
Sept.	90.1	71.4	80.8	100	59	4.40	7.68	0.0	91	58	8.7	SE	55NW	70	5.0	11	11	8	9	0	5	*
Oct.	84.5	64.5	74.5	93	40	2.76	7.25	0.0	88	55	8.5	SE	40N	71	4.4	14	9	8	7	0	3	1
Nov.	73.8	54.3	64.1	92	36	1.72	3.44	T	90	60	9.7	SSE	40N	58	5.8	9	9	12	6	0	1	3
Dec.	68.8	49.5	59.2	89	29	2.08	3.86	0.0	85	63	9.6	SSE	41NW	48	6.4	8	7	16	7	0	1	5
Year	81.1	62.4	71.8	101	26	28.34	7.68	0.1	91	63	10.3	SSE	61N	65	5.7	107	121	137	75	*	32	27

BROWNSVILLE, TEXAS (International Airport) 25°54'N., 97°26'W.; Elevation (ground) 16 feet. WB-1966

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. CST	Noon CST	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)	28	28	(b)	27	27	26	26	24	14	24	24	24	24	24	24	24	24	24	24
Jan.	70.5	52.2	61.4	89	19	1.35	2.95	T	89	65	10.3	SSE	40S	47	6.6	7	8	16	7	0	*	5
Feb.	73.2	54.7	64.0	94	22	1.48	4.98	T	90	64	10.9	SSE	48NW	49	6.5	7	6	15	7	0	1	5
Mar.	76.8	59.0	67.9	99	32	1.04	1.85	T	88	61	11.9	SE	41S	49	6.7	6	9	16	5	0	1	3
Apr.	82.3	65.5	73.9	100	41	1.55	3.69	0.0	90	60	12.6	SE	45SE	54	6.6	5	11	14	4	0	2	2
May	87.1	70.8	79.0	100	53	2.36	4.13	0.0	91	61	12.1	SE	50SE	65	5.9	6	15	10	4	0	3	1
June	90.7	74.7	82.7	101	64	2.96	8.18	0.0	91	59	11.1	SE	45E	71	5.2	7	18	5	5	0	2	*
July	92.5	75.5	84.0	102	68	1.68	3.62	0.0	92	55	10.3	SE	32E	81	4.7	12	14	5	4	0	2	0
Aug.	92.8	75.3	84.1	102	66	2.77	4.39	0.0	92	56	9.6	SE	50NW	77	4.8	11	14	6	6	0	4	*
Sept.	89.8	72.6	81.2	104	55	4.99	5.76	0.0	92	60	8.5	SE	35SE	68	5.2	9	14	7	10	0	4	*
Oct.	85.1	66.6	75.9	96	44	3.53	6.67	0.0	90	60	8.6	SE	41NE	67	4.7	12	12	7	6	0	2	1
Nov.	77.0	58.2	67.6	94	34	1.32	3.64	0.0	88	61	9.6	SSE	36NW	54	5.8	9	9	12	6	0	1	2
Dec.	72.2	53.5	62.9	90	27	1.72	5.69	T	89	65	9.6	NNW	39NW	47	6.6	7	8	16	7	0	*	5
Year	82.5	64.9	73.7	104	19	26.75	8.18	T	90	61	10.4	SE	50SE	61	5.8	98	138	129	71	0	23	25

SAN JUAN, PUERTO RICO (Isla Verde Airport) 18°26'N., 66°00'W.; Elevation (ground) 13 feet. WB-1966

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): 8 a.m. AST	2 p.m. AST	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)	12	11	11	11	11	8	11	11	11	11	11	11	11	11	11	11
Jan.	81.3	67.4	74.4	90	61	4.70	1.90	0.0	86	66	7.3	ENE	30E	66	5.2	8	18	5	17	0	*	0
Feb.	81.8	67.0	74.4	91	62	2.90	2.53	0.0	83	63	7.9	ENE	35E	67	5.2	7	16	5	13	0	0	0
Mar.	83.1	67.5	75.3	93	60	2.20	3.48	0.0	81	60	8.1	ENE	30SE	72	5.1	9	18	4	12	0	*	0
Apr.	84.0	69.2	76.6	93	65	3.72	3.15	0.0	80	65	7.7	ENE	25NE	66	5.8	5	17	8	16	0	1	0
May	85.8	71.5	78.7	93	66	7.12	3.08	0.0	82	67	7.2	ENE	28E	59	6.9	2	16	13	20	0	5	0
June	87.1	72.9	80.0	94	69	5.66	3.55	0.0	82	68	7.6	ENE	28NE	57	7.0	2	14	14	19	0	6	0
July	87.1	73.7	80.4	93	69	6.25	2.14	0.0	81	68	8.3	ENE	30SE	64	6.3	3	18	10	21	0	5	0
Aug.	87.8	74.0	80.9	92	70	7.13	5.08	0.0	83	67	7.7	ENE	70NE	65	6.3	3	18	10	19	0	5	0
Sept.	87.8	73.2	80.5	93	69	6.76	3.08	0.0	84	68	6.4	ENE	30E	55	6.5	1	19	10	18	0	8	0
Oct.	87.1	72.8	80.0	93	67	5.83	3.42	0.0	85	67	5.6	ENE	31NE	62	6.5	2	18	11	17	0	6	0
Nov.	85.0	71.4	78.2	92	66	6.49	2.82	0.0	85	67	6.3	ENE	30NE	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	85	67	7.2	ENE	30NE	59	5.8	6	17	8	19	0	*	0
Year	85.0	70.9	78.0	94	60	64.21	5.08	0.0	83	66	7.3	ENE	70NE	63	6.0	52	207	106	209	0	38	0

SANTA ISABEL, PUERTO RICO (Santa Isabel Airport), 17°58' N., 66°24' W.; Elevation (ground) 28 feet. WB-1952

Month	Air temperature (°F.) Normal: Daily maximum	Daily minimum	Monthly	Extreme: Record highest	Record lowest	Precipitation (inches): Normal total	Maximum in 24 hrs.	Snow, sleet, mean total	Humidity (percent): 2:30 a.m. AST	2:30 p.m. AST	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)	7	7	7	7	7	7	7	7	7	7	7	7	.....		7	7	7	7	7	7	7	7
Jan.	84.3	65.9	75.1	89	59	0.49	0.91	0.0	82	58	6.0	ENE	.....		4.2	14	14	3	4	0	0	0
Feb.	83.3	65.3	74.3	88	57	0.33	0.54	0.0	84	61	5.5	NE	.....		5.0	12	14	3	5	0	0	0
Mar.	84.2	66.1	75.2	89	58	0.30	0.44	0.0	82	61	7.0	ESE	.....		4.6	14	14	3	3	0	0	0
Apr.	85.1	68.4	76.8	90	62	1.18	1.66	0.0	83	65	6.3	SE	.....		5.3	10	13	7	7	0	1	0
May	86.6	71.3	79.0	89	60	2.90	1.70	0.0	74	57	5.8	SE	.....		6.6	3	17	11	11	0	5	0
June	88.0	72.6	80.3	94	67	2.45	1.94	0.0	85	66	6.4	SE	.....		6.5	4	16	10	8	0	7	0
July	88.9	72.9	80.9	96	67	3.15	3.97	0.0	84	66	6.5	SE	.....		6.2	7	13	11	9	0	8	0
Aug.	89.1	72.9	81.0	95	68	4.22	2.85	0.0	86	66	6.0	E	.....		5.3	9	15	7	10	0	12	0
Sep.	87.6	72.4	80.0	93	68	6.66	6.62	0.0	87	69	5.0	E	.....		6.5	5	13	11	13	0	15	0
Oct.	87.9	71.7	79.8	91	67	6.16	4.02	0.0	89	70	4.6	N	.....		6.3	7	14	10	12	0	15	0
Nov.	86.9	69.9	78.4	91	63	2.72	5.17	0.0	89	65	4.5	NE	.....		5.1	9	15	6	9	0	8	0
Dec.	84.5	66.8	75.7	88	59	0.99	1.98	0.0	68	63	4.6	NE	.....		4.9	13	13	5	6	0	1	0
Year	86.4	68.0	77.2	96	57	31.55	6.62	0.0	83	64	5.7	SE	.....		5.5	107	171	87	97	0	72	0

ST. CROIX, VIRGIN ISLANDS, U. S. A. (Alexander Hamilton Field) , 17°42' N., 64°48' W; Elevation (ground) 53 feet. WB-1952

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 in 24 hrs.	Snow, sleet, mean total	2:30 a.m. AST	2:30 p.m. AST	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)	5	5	5	5	5	5	5	5	5	5	5		.....		5	5	5	5	5	5	5	5
Jan.	82.3	69.4	75.9	88	64	3.13	2.88	0.0	81	66	11.1	ENE	.....		5.7	4	21	6	20	0	0	0
Feb.	82.6	69.2	75.9	88	62	2.91	3.95	0.0	84	64	10.5	ENE	.....		5.8	5	18	5	13	0	0	0
Mar.	83.9	69.8	76.9	88	62	2.18	3.42	0.0	83	62	10.9	ENE	.....		5.6	5	21	5	13	0	1	0
Apr.	84.9	72.0	78.5	89	65	2.87	1.24	0.0	85	66	10.9	ENE	.....		6.1	4	18	8	14	0	1	0
May	86.3	74.3	80.3	90	68	5.31	2.84	0.0	87	70	10.3	ESE	.....		7.1	1	15	15	17	0	3	0
June	87.5	75.5	81.5	91	70	2.74	1.78	0.0	85	69	11.3	ESE	.....		6.9	1	18	11	15	0	5	0
July	88.0	75.6	81.8	95	69	3.25	2.00	0.0	85	69	11.3	ENE	.....		6.9	2	17	12	18	0	4	0
Aug.	88.7	75.5	82.1	92	70	4.69	2.19	0.0	87	69	10.8	ENE	.....		6.2	2	21	8	19	0	6	0
Sep.	87.6	74.3	81.0	92	68	7.82	5.39	0.0	88	73	9.4	ENE	.....		7.0	2	15	13	18	0	9	0
Oct.	87.3	74.1	80.7	90	67	6.05	2.35	0.0	90	73	8.2	ESE	.....		6.7	2	17	12	18	0	8	0
Nov.	85.3	72.9	79.1	89	64	3.63	2.89	0.0	89	72	8.4	ENE	.....		6.1	3	19	8	18	0	4	0
Dec.	83.9	71.0	77.4	87	63	2.03	1.16	0.0	86	68	9.7	ENE	.....		5.8	5	18	8	18	0	1	0
Year	85.7	72.8	79.3	95	62	46.61	5.39	0.0	86	68	10.3	ENE	.....		6.3	36	218	111	201	0	42	0

262-213 O—67——18

MEAN SURFACE WATER TEMPERATURES (T) AND SALINITIES (S)

Stations	Years	Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.		Mean	
		(T) °F	(S) °/oo	(T) °F	(S) °/oo	(T) °F	(S) °/oo	(T) °F	(S) °/oo	(T) °F	(S) °/oo	(T) °F	(S) °/oo	(T) °F	(S) °/oo	(T) °F	(S) °/oo	(T) °F	(S) °/oo	(T) °F	(S) °/oo	(T) °F	(S) °/oo	(T) °F	(S) °/oo	(T) °F	(S) °/oo
Key West, Fla. 24°33.2'N., 81°48.5'W.	36	71.1	36.0	72.2	36.2	74.8	36.4	78.4	36.7	82.3	37.0	85.3	36.6	86.8	36.7	87.1	36.6	85.4	36.2	81.5	35.8	76.0	36.3	72.0	36.2	79.4	36.4
St. Petersburg, Fla. 27°46.0'N., 82°37.0'W.	20	62.2	26.7	64.3	26.4	68.1	26.3	73.6	26.3	80.0	27.6	84.1	28.6	85.6	28.0	85.7	25.2	83.7	23.3	77.7	23.8	70.2	25.6	63.3	26.4	74.9	26.2
Cedar Keys, Fla. 29°08.0'N., 83°01.9'W.	26	58.1	27.1	60.9	26.1	65.6	24.8	73.1	24.4	79.5	26.0	84.1	27.5	85.4	27.1	85.6	25.9	82.8	25.8	75.3	25.8	66.7	27.6	59.4	27.2	73.0	26.3
Pensacola, Fla. 30°24.2'N., 87°12.8'W.	43	55.8	17.8	58.1	16.2	62.9	12.9	70.5	11.2	77.8	14.6	83.3	17.4	85.2	17.4	85.4	16.6	82.0	20.0	74.2	21.4	64.7	23.3	57.4	21.2	71.4	17.5
Grand Isle, La. 29°10.0'N., 89°55.0'W.	18	61.2	30.7	61.3	28.4	63.9	27.2	69.4	24.1	77.4	22.6	82.8	23.9	84.8	27.3	85.1	28.4	83.1	28.8	77.0	30.6	70.2	32.5	64.6	32.1	73.4	28.0
Eugene Island, La. 29°22.4'N., 91°23.1'W.	23	52.5	3.9	54.2	2.6	60.3	2.8	68.1	2.0	76.6	1.9	83.2	2.1	85.2	2.4	85.5	4.3	82.4	8.5	73.9	8.5	63.8	8.0	54.7	5.8	70.0	4.4
Galveston, Tex. 29°18.6'N., 94°47.6'W.	45	55.8	23.3	57.7	22.5	62.5	22.5	70.5	22.2	78.3	20.8	84.0	22.0	86.4	25.9	86.7	29.9	83.4	27.2	76.1	25.5	66.0	25.4	58.7	24.6	72.2	24.3
Freeport Harbor, Tex. 28°56.8'N., 95°18.5'W.	12	53.5	24.2	56.3	23.4	61.2	26.1	70.1	26.1	77.5	23.8	82.1	26.5	83.7	30.4	84.8	33.2	82.4	29.7	74.6	25.9	65.9	25.1	57.8	25.0	70.8	26.6
Rockport, Tex. 28°01.4'N., 97°02.8'W.	7	62.1	28.0	62.2	27.2	67.7	26.7	74.3	28.0	80.8	28.4	86.2	30.3	87.4	34.5	87.4	37.1	84.3	31.4	78.1	27.7	68.1	27.8	62.5	26.1	75.1	29.4
Port Aransas, Tex. 27°49.6'N., 97°03.5'W.	7	56.8	30.3	57.3	31.2	62.4	32.1	70.9	30.8	79.0	29.8	83.9	33.2	86.9	36.3	86.5	37.0	84.8	34.8	77.5	31.5	69.5	30.1	60.4	30.8	73.0	32.3
Port Mansfield, Tex. 26°33.3'N., 97°25.8'W.	4	58.6	39.7	59.5	41.6	65.3	42.3	74.9	39.6	79.7	33.6	82.9	34.2	85.2	38.4	84.9	42.1	84.1	42.1	75.4	39.3	71.1	39.6	59.3	40.2	73.4	39.4
Brazos Santiago, Tex. 26°04.1'N., 97°09.1'W.	9	57.9	32.9	58.5	33.7	62.9	34.2	69.8	34.2	76.2	34.9	79.3	36.3	78.5	36.8	79.9	37.1	82.9	37.0	78.2	35.0	71.3	34.9	62.2	33.5	71.5	35.0
Port Isabel, Tex. 26°03.6'N., 97°12.9'W.	23	60.8	33.5	63.1	33.6	67.6	33.3	74.3	34.1	80.2	34.1	84.2	35.4	85.3	37.0	85.4	37.1	84.3	34.6	78.7	32.8	70.5	33.8	63.5	34.1	74.8	34.4
San Juan, P. R. 18°27'N., 66°05.4'W.	5	78.8	35.0	78.5	35.3	79.2	35.3	79.7	35.1	80.2	35.0	81.6	35.1	82.1	34.9	82.9	34.4	83.6	33.2	83.6	32.4	81.9	31.8	80.0	33.3	81.0	34.2
Isla Maguey, P. R. 17°58.3'N., 67°02.7'W.	10	80.4	35.4	80.1	35.8	81.2	36.2	82.7	36.3	83.7	36.3	84.1	36.2	84.3	36.0	85.2	35.8	85.6	35.3	84.8	34.9	83.6	34.9	81.3	35.3	83.1	35.7

°/oo--This symbol denotes the salinity of sea water, and is defined as the number of grams of salts in 1,000 grams of sea water. For sea water temperature and salinity in greater detail, see Coast and Geodetic Survey Publication 31-1, Surface Water Temperature and salinity, Atlantic Coast, North and South America.

HOURS OF OPERATION OF FOG SIGNALS
(U. S. Coast Guard)

Light station	16 Calendar Years - 1950 thru 1965														Pre - 1950		
	Average													Max. 1 yr.	Ave.	For Yrs.	Max. 1 yr.
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year				
Egmont Key, Fla. 27°36.0'N., 82°45.6'W.	51	24	27	11	2	4	4	4	5	5	11	33	181	366	166	37	593
New Orleans Lightship, La. * 29°22.8'N., 88°55.3'W.	15	47	136	142	0	0	2	11	9	4	1	29	396	142	---	--	---
South Pass West Jetty, La. 28°59.4'N., 89°08.4'W.	126	139	160	69	20	4	2	2	5	6	15	70	618	991	647	7	1051
Southwest Pass Entrance, La. 28°54.4'N., 89°25.6'W.	106	101	119	62	6	1	2	1	8	2	14	51	473	940	506	17	843
Head of Passes West Jetty, La. 29°08.9'N., 89°15.1'W.	156	148	171	103	13	4	5	4	9	9	38	100	760	1452	573	41	968
Cubits Gap. La. ** 29°11.5'N., 89°15.8'W.	156	139	139	82	25	4	4	3	6	15	35	80	688	964	670	41	1031
New Canal, La. 30°01.6'N., 90°06.8'W.	48	20	18	6	2	1	1	1	2	8	20	41	168	332	248	41	604
Point Au Fer Reef, La. 29°22.3'N., 91°23.1'W.	100	79	66	27	3	6	3	4	30	12	24	82	436	1017	280	30	561
Sabine Pass East Jetty, Tex. ** 29°38.7'N., 93°49.4'W.	119	96	95	67	13	5	8	7	15	43	78	121	667	1117	698	17	1112
Galveston Jetty, Tex. 29°19.7'N., 94°41.5'W.	105	72	86	37	3	3	2	4	4	8	27	78	429	697	516	24	829

* 1 year - 1965
** 11 years (1950-1960)

ATLANTIC OCEAN DISTANCES FOR DEEP-DRAFT VESSELS MONTREAL, CANADA, TO PANAMA CANAL ZONE

July 1, 1967

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°49.5'N., 93°57.6'W.	Galveston, Tex. 29°19.0'N., 94°47.0'W.	Corpus Christi, Tex. 27°48.8'N., 97°24.0'W.	San Juan, P. R. 18°27.8'N., 66°06.7'W.	YUCATAN CHANNEL 21°50.0'N., 85°03.0'W.	Panama Canal (Atlantic Ent.) 9°23.5'N., 79°55.3'W.	PANAMA CANAL (Pacific Ent.) 8°53.0'N., 79°31.0'W.
Cabot Strait 47°07.0'N., 60°17.0'W.	681																													
Gut of Canso (Lock) 45°39.0'N., 61°25.0'W.	717	120																												
Portland, Maine 43°39.4'N., 70°14.7'W.	1276	595	484																											
Boston, Mass. 42°22.0'N., 71°03.0'W.	1318	637	526	100																										
NANTUCKET SHOALS 40°30.0'N., 69°25.0'W.	1311	630	519	203	163																									
NEW YORK, N. Y. 40°42.0'N., 74°01.0'W.	1534	853	742	426	386	223																								
Philadelphia, Pa. 39°56.8'N., 75°08.3'W.	1682	1001	890	575	535	372	240																							
Baltimore, Md. 39°16.0'N., 76°34.5'W.	1838	1157	1046	734	694	531	417	392																						
CHESAPEAKE BAY ENT. 36°56.3'N., 75°58.6'W.	1689	1008	896	584	544	381	267	242	150																					
Norfolk, Va. 36°50.9'N., 76°17.9'W.	1716	1035	923	611	571	408	294	269	173	27																				
DIAMOND SHOALS 35°08.0'N., 75°15.0'W.	1729	1048	936	628	588	425	345	322	267	117	144																			
Wilmington, N. C. 34°14.0'N., 77°57.0'W.	1948	1267	1155	847	807	644	564	541	486	336	363	219																		
Charleston, S. C. 32°47.2'N., 79°55.2'W.	2014	1333	1221	913	873	710	630	607	552	402	429	285	151																	
Savannah, Ga. 32°05.0'N., 81°05.7'W.	2088	1407	1295	987	947	784	704	681	626	476	503	359	227	102																
Jacksonville, Fla. 30°19.2'N., 81°39.0'W.	2172	1491	1379	1071	1031	868	788	765	710	560	587	443	315	197	145															
Key West, Fla. 24°33.7'N., 81°48.5'W.	2479	1798	1690	1387	1347	1184	1109	1086	1031	881	908	764	667	572	543	462														
STRAITS OF FLORIDA 24°25.0'N., 83°00.0'W.	2540	1859	1751	1448	1408	1245	1170	1147	1092	942	969	825	728	653	604	523	73													
Tampa, Fla. 27°56.5'N., 82°26.7'W.	2772	2091	1983	1680	1640	1477	1402	1379	1324	1174	1201	1057	960	865	836	755	305	232												
Pensacola, Fla. 30°24.0'N., 87°13.0'W.	2971	2290	2182	1879	1839	1676	1601	1578	1523	1373	1400	1256	1159	1064	1035	954	504	431	331											
Mobile, Ala. 30°42.5'N., 88°02.5'W.	3011	2330	2222	1919	1879	1716	1641	1618	1563	1413	1440	1296	1199	1104	1075	994	544	471	383	87										
NEW ORLEANS, La. (via SW Pass) 29°57.0'N., 90°03.7'W.	3080	2399	2291	1988	1948	1785	1710	1687	1632	1482	1509	1365	1268	1173	1144	1063	613	540	497	270	261									
Port Arthur, Tex. 29°49.5'N., 93°57.6'W.	3240	2559	2451	2148	2108	1945	1870	1847	1792	1642	1669	1525	1428	1333	1304	1223	773	700	691	465	456	430								
Galveston, Tex. 29°19.0'N., 94°47.0'W.	3242	2561	2453	2150	2110	1947	1872	1849	1794	1644	1671	1527	1430	1335	1306	1225	775	702	684	472	462	437	82							
Corpus Christi, Tex. 27°48.8'N., 97°24.0'W.	3347	2666	2558	2255	2215	2052	1977	1954	1899	1749	1776	1632	1535	1440	1411	1330	880	807	801	587	577	552	243	209						
San Juan, P. R. 18°27.8'N., 66°06.7'W.	2445	1764	1669	1531	1486	1334	1399	1395	1375	1225	1252	1114	1153	1138	1156	1121	966	1017	1249	1448	1488	1557	1717	1719	1824					
YUCATAN CHANNEL 21°50.0'N., 85°03.0'W.	2730	2049	1937	1629	1589	1426	1346	1323	1268	1118	1145	1001	904	809	780	699	251	192	404	531	558	587	691	696	769	1111				
Panama Canal (Atlantic Ent.) 9°23.5'N., 79°55.3'W.	3203	2522	2419	2189	2149	1986	1972	1955	1904	1754	1781	1637	1609	1563	1564	1513	1060	1001	1213	1340	1367	1396	1487	1493	1549	990	809			
PANAMA CANAL (Pacific Ent.) 8°53.0'N., 79°31.0'W.	3249	2568	2465	2235	2195	2032	2018	2001	1950	1800	1827	1683	1655	1609	1610	1559	1106	1047	1259	1386	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.

July 1, 1967

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: Tampa, Fla., is 801 nautical miles from Corpus Christi, Texas.

	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°37.8'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. (Lavaca Bay) 28°38.7'N., 96°33.3'W.	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.
192																													
251	73																												
332	150	223																											
389	219	292	100																										
399	228	301	109	8																									
404	232	305	113	18	18																								
495	369	442	281	240	248	252																							
506	361	454	294	252	261	265	42																						
531	431	504	359	318	327	331	121	100																					
558	471	544	408	370	379	383	182	163	87																				
549	469	542	410	372	381	385	186	166	90	72																			
558	485	558	429	394	403	407	209	191	115	96	52																		
575	513	586	472	441	450	455	272	255	184	170	137	140																	
579	524	597	489	459	467	472	308	295	235	225	197	200	---																
587	540	613	512	485	493	497	341	329	270	261	233	235	---	---															
602	581	653	564	539	548	552	397	385	326	317	288	290	302	299	291														
705	714	787	713	692	700	705	550	538	479	470	442	444	455	452	444	180													
691	700	773	699	678	687	691	536	524	465	456	428	430	441	438	430	184	80												
713	722	795	722	700	709	713	558	546	488	478	450	452	463	460	452	206	102	22											
717	726	799	726	704	713	717	562	550	492	482	454	456	467	464	456	210	106	26	27										
696	702	775	696	671	680	684	543	530	472	462	434	436	447	444	437	232	130	82	105	108									
702	707	780	701	676	685	689	548	535	477	467	439	441	452	449	442	237	135	87	110	113	9								
740	746	819	739	714	723	727	586	573	515	506	478	480	490	488	480	275	173	126	148	152	47	52							
706	719	792	715	692	701	705	558	545	487	478	450	452	462	460	452	265	163	116	138	142	82	86	125						
752	781	854	785	763	771	775	628	615	557	548	520	522	532	530	522	352	250	203	225	229	169	174	212	114					
763	802	875	811	782	791	795	659	647	582	572	544	546	557	554	546	387	285	238	260	264	204	209	247	149	114				
769	807	880	816	788	796	801	664	652	587	577	549	552	562	560	552	392	290	243	265	269	209	214	252	154	119	15			
718	782	855	814	801	810	814	680	663	609	600	572	574	584	582	574	408	353	306	328	332	272	277	315	221	194	139	145		
729	793	866	825	812	821	825	691	674	620	611	583	585	595	593	585	419	364	317	339	343	283	288	326	232	205	150	156	13	

*Baton Rouge, La. (30°27.0'N., 91°11.7'W.) ADD 115 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.

July 1, 1967

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.
Key West, Fla.																				
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.

June 16, 1962

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: Mobile, Ala., is 398 nautical miles from Beaumont, Tex.

	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

January 1, 1967

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.	Port Harvey, St. Croix, V.I. 17°42.5'N., 64°46.3'W.
San Juan, P. R.																				
Fajardo, P. R.	40																			
Ensenada Honda, P. R.	52	14																		
Humacao, P. R.	59	21	11																	
Bahia de Jobos, P. R.	103	65	56	48																
Ponce, P. R.	152*	83	74	65	31															
Bahia de Tallaboa, P. R.	145*	88	79	71	36	13														
Bahia de Guayanilla, P. R.	145*	89	80	72	37	14	5													
Bahia de Guanica, P. R.	138*	99	90	82	47	22	16	15												
Mayaguez, P. R.	92	121	133	131	96	74	67	67	60											
Bahia de Aguadilla, P. R.	74	103	115	123	105	83	76	77	70	23										
Puerto Arecibo, P. R.	43	72	84	92	140	118	112	112	105	58	40									
Ensenada Honda, Culebra	59	25	25	31	76	93	98	99	109	141	123	92								
Isabel Segunda, Vieques	55	18	12	17	62	79	85	86	96	136	118	87	15							
Charlotte Amalie, St. Thomas, V.I.	80	46	44	50	93	110	116	117	126	161	144	112	24	33						
Cruz Bay, St. John, V.I.	82	53	51	57	99	116	121	122	132	164	146	115	31	40	11					
Road Town, Tortola, B.V.I.	94	66	65	71	113	131	136	137	147	175	157	126	47	55	24	15				
Christiansted, St. Croix, V.I.	103	68	69	68	101	119	124	125	135	184	166	135	48	54	38	37	42			
Frederiksted, St. Croix, V.I.	96	61	60	58	89	106	111	112	122	171	159	128	42	46	38	39	46	19		
Port Harvey, St. Croix, V.I.	112	77	72	70	101	117	122	123	133	182	176	144	59	62	54	55	62	35	18	

* Via Mona Passage

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.

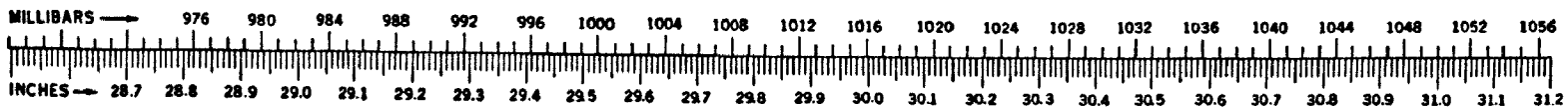
Height, feet	Nautical miles	Height, feet	Nautical miles	Height, feet	Nautical miles	Height, feet	Nautical miles	Height, feet	Nautical miles
6	2. 8	48	7. 9	220	17. 0	660	29. 4	2, 000	51. 2
8	3. 1	50	8. 1	240	17. 7	680	29. 9	2, 200	53. 8
10	3. 6	55	8. 5	260	18. 5	700	30. 3	2, 400	56. 2
12	4. 0	60	8. 9	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

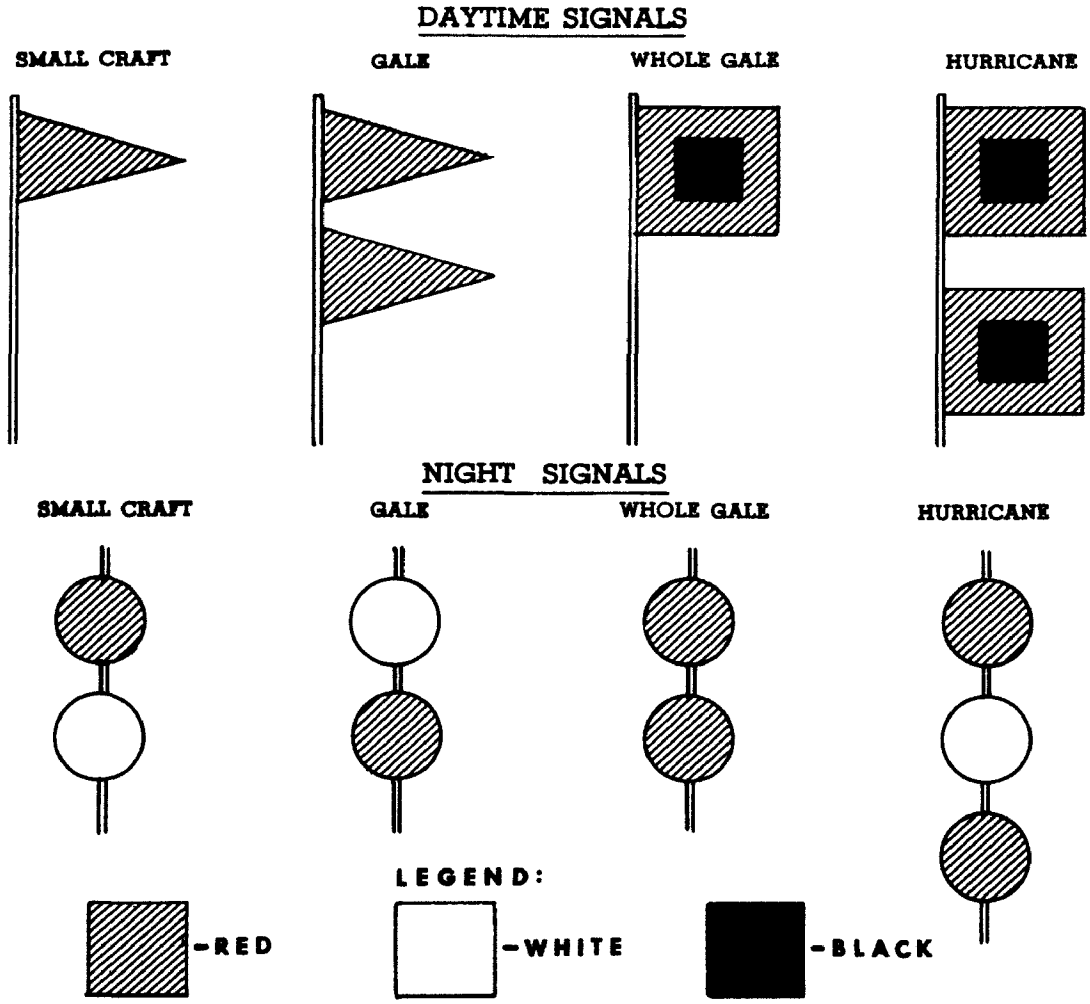
° ′	Points	° ′	Points	° ′	Points	° ′	Points
0 00	N	90 00	E	180 00	S	270 00	W
2 49		92 49		182 49		272 49	
5 38	N ½ E	95 38	E ½ S	185 38	S ½ W	275 38	W ½ N
8 26		98 26		188 26		278 26	
11 15	N x E	101 15	E x S	191 15	S x W	281 15	W x N
14 04		104 04		194 04		284 04	
16 53	N x E ½ E	106 53	ESE ½ E	196 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	

BEAUFORT SCALE OF WIND FORCE

Beaufort Number	Miles per Hour	Knots	Wind Effects Observed at Sea	Terms Used In U. S. W. B. Forecasts
0	Less than 1	Less than 1	Sea like a mirror	
1	1- 3	1- 3	Ripples with the appearance of scales formed, but without foam crests	Light
2	4- 7	4- 6	Small wavelets, short but pronounced; crests appear glassy, do not break	
3	8-12	7-10	Large wavelets with crests beginning to break; foam appears glassy. Perhaps scattered white horses (white foam crests).	Gentle
4	13-18	11-16	Small waves, becoming longer; fairly frequent white horses	Moderate
5	19-24	17-21	Moderate waves of a pronounced long form; many white horses, possibly some spray.	Fresh
6	25-31	22-27	Large waves begin to form; white foam crests more extensive everywhere; probably some spray.	Strong
7	32-38	28-33	Sea heaps up; some white foam from breaking waves blows in streaks along the direction of the wind.	
8	39-46	34-40	Moderately high waves. Edges of crests begin to break into spindrift. Well-marked streaks of foam blow along direction of wind.	Gale
9	47-54	41-47	High waves. Dense streaks of foam along direction of wind. Spray may affect visibility.	
10	55-63	48-55	Very high waves with long overhanging crests; great patches of foam blown in dense white streaks along direction of wind. Sea surface takes on a white appearance. Visibility affected.	Whole gale
11	64-72	56-63	Exceptionally high waves; sea completely covered with long white patches of foam lying along direction of wind; edges of wave crests everywhere blown into froth. Visibility affected.	
12 or more	73 or more	64 or more	Air filled with foam and spray; sea completely white with driving spray. Visibility very seriously affected.	Hurricane



SMALL CRAFT, GALE, WHOLE GALE AND HURRICANE WARNINGS



EXPLANATION OF DISPLAY SIGNALS

SMALL CRAFT WARNING: One red pennant displayed by day and a red light above a white light at night to indicate winds up to 33 knots and/or sea conditions dangerous to small craft operations are forecast for the area.

GALE WARNING: Two red pennants displayed by day and a white light above a red light at night to indicate winds ranging from 34 to 47 knots are forecast for the area.

WHOLE GALE WARNING: A single square red flag with a black center displayed during daytime and two red lights at night to indicate winds ranging from 48 to 63 knots are forecast for the area.

HURRICANE WARNING: 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.

Conversion Tables

INTERNATIONAL NAUTICAL MILES TO STATUTE MILES

1 nautical mile 6,076.10 feet or 1,852 meters 1 statute mile = 5,280 feet or 1,609.35 meters

Nautical miles	0	1	2	3	4	5	6	7	8	9
0	0.000	1.151	2.302	3.452	4.603	5.754	6.905	8.055	9.206	10.357
10	11.508	12.659	13.809	14.960	16.111	17.262	18.412	19.563	20.714	21.865
20	23.016	24.166	25.317	26.468	27.619	28.769	29.920	31.071	32.222	33.373
30	34.523	35.674	36.825	37.976	39.126	40.277	41.428	42.579	43.730	44.880
40	46.031	47.182	48.333	49.483	50.634	51.785	52.936	54.087	55.237	56.388
50	57.539	58.690	59.840	60.991	62.142	63.293	64.444	65.594	66.745	67.896
60	69.047	70.197	71.348	72.499	73.650	74.801	75.951	77.102	78.253	79.404
70	80.554	81.705	82.856	84.007	85.158	86.308	87.459	88.610	89.761	90.911
80	92.062	93.213	94.364	95.515	96.665	97.816	98.967	100.118	101.268	102.419
90	103.570	104.721	105.871	107.022	108.173	109.324	110.475	111.625	112.776	113.927

STATUTE MILES TO INTERNATIONAL NAUTICAL MILES

Statute miles	0	1	2	3	4	5	6	7	8	9
0	0.000	0.869	1.738	2.607	3.476	4.345	5.214	6.083	6.952	7.821
10	8.690	9.559	10.428	11.297	12.166	13.035	13.904	14.773	15.642	16.511
20	17.380	18.249	19.118	19.986	20.855	21.724	22.593	23.462	24.331	25.200
30	26.069	26.938	27.807	28.676	29.545	30.414	31.283	32.152	33.021	33.890
40	34.759	35.628	36.497	37.366	38.235	39.104	39.973	40.842	41.711	42.580
50	43.449	44.318	45.187	46.056	46.925	47.794	48.663	49.532	50.401	51.270
60	52.139	53.008	53.877	54.746	55.615	56.484	57.353	58.222	59.091	59.959
70	60.828	61.697	62.566	63.435	64.304	65.173	66.042	66.911	67.780	68.649
80	69.518	70.387	71.256	72.125	72.994	73.863	74.732	75.601	76.470	77.339
90	78.208	79.077	79.946	80.815	81.684	82.553	83.422	84.291	85.160	86.029

FEET TO METERS

Feet	0	1	2	3	4	5	6	7	8	9
0	0.00	0.30	0.61	0.91	1.22	1.52	1.83	2.13	2.44	2.74
10	3.05	3.35	3.66	3.96	4.27	4.57	4.88	5.18	5.49	5.79
20	6.10	6.40	6.71	7.01	7.32	7.62	7.92	8.23	8.53	8.84
30	9.14	9.45	9.75	10.06	10.36	10.67	10.97	11.28	11.58	11.89
40	12.19	12.50	12.80	13.11	13.41	13.72	14.02	14.33	14.63	14.93
50	15.24	15.54	15.85	16.15	16.46	16.76	17.07	17.37	17.68	17.98
60	18.29	18.59	18.90	19.20	19.51	19.81	20.12	20.42	20.73	21.03
70	21.34	21.64	21.95	22.25	22.55	22.86	23.16	23.47	23.77	24.08
80	24.38	24.69	24.99	25.30	25.60	25.91	26.21	26.52	26.82	27.13
90	27.43	27.74	28.04	28.35	28.65	28.96	29.26	29.57	29.87	30.17

METERS TO FEET

Meters	0	1	2	3	4	5	6	7	8	9
0	0.00	3.28	6.56	9.84	13.12	16.40	19.68	22.97	26.25	29.53
10	32.81	36.09	39.37	42.65	45.93	49.21	52.49	55.77	59.06	62.34
20	65.62	68.90	72.18	75.46	78.74	82.02	85.30	88.58	91.86	95.14
30	98.42	101.71	104.99	108.27	111.55	114.83	118.11	121.39	124.67	127.95
40	131.23	134.51	137.80	141.08	144.36	147.64	150.92	154.20	157.48	160.76
50	164.04	167.32	170.60	173.88	177.16	180.45	183.73	187.01	190.29	193.57
60	196.85	200.13	203.41	206.69	209.97	213.25	216.54	219.82	223.10	226.38
70	229.66	232.94	236.22	239.50	242.78	246.06	249.34	252.62	255.90	259.19
80	262.47	265.75	269.03	272.31	275.59	278.87	282.15	285.43	288.71	291.99
90	295.28	298.56	301.84	305.12	308.40	311.68	314.96	318.24	321.52	324.80

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