UNITED
STATES
COAST
PILOT

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7th ed.
(1964)

ATLANTIC COAST

Cape Henry to Key West

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SEVENTH (March 21, 1964) EDITION

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LUTHER H. HODGES, *Secretary*
COAST AND GEODETIC SURVEY
H. ARNOLD KARO, *Director*

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Preface

United States Coast Pilot 4, Atlantic Coast, Cape Henry to Key West, Seventh (March 21, 1964) Edition, is based mainly upon the work of the Coast and Geodetic Survey but includes special material supplied by the Coast Guard, the Weather Bureau, and the Corps of Engineers. The preceding (sixth) edition of this publication was dated September 12, 1959.

Most new editions of Coast Pilots are written only after thorough field inspection by special Coast Pilot ship and/or shore parties. Ship inspection of coastal and intracoastal waters from Cape Henry to Key West was made in 1963 from the USC&GS Ship SCOTT, a 73-foot vessel commanded by Chief Quartermaster-Surveyor Oliver C. Swindell, USC&GS. Marine Information Specialist John A. O'Pray furnished station-wagon support and directed technical activities of the ship during part of the field season.

Cumulative Supplements, containing revisions and new information reported since edition date of each Coast Pilot, usually are issued early each year. Free copies of each Supplement can always be obtained by writing to Director, Coast and Geodetic Survey, U.S. Department of Commerce, Washington, D.C., 20230.

JOHN A. MCCORMICK,
Chief, Coast Pilot Branch.

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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.

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. These are the vertical clearances approved by the Nautical Chart Division, C&GS. They may be as-built, authorized, or reported; see latest prints of nautical charts for possible modifier. 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.

Depth 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 commerical and industrial needs.

District 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. See Appendix for list of sales agents. The charts and books also may be purchased from the Washington Office or from the District Offices. Orders mailed to Washington, D.C., should be accompanied by check or money order, made payable to C&GS, Department of Commerce. Indexes of charts and books will be furnished free, upon receipt of request designating areas of interest.

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 collisions 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 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 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 specified in Rule 2(a) (i) and (ii), three lights in a vertical line one over the other not less than 6 feet apart. 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.

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 high water. Vessels with masts, stacks, booms, or aerials should allow for an additional clearance under power cables equal to the distance between adjacent cables.

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 civil time of sunrise and sunset for various latitudes, reduction of local civil time to standard time, and time of moonrise and moonset for various ports.

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

Tidal Current Tables for the coasts of the United States are issued annually by 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 and the Oil Pollution Act; inspection of vessels of the Merchant Marine; search and rescue; issuance of Merchant Marine licenses and documents; investigation of marine casualties and accidents, and suspension and revocation proceedings; destruction of derelicts; operation of aids to navigation, and 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. The local notices are

intended for local navigation interests operating within the limits of a Coast Guard district. Changes in aids to navigation of the United States are also contained in the weekly Notice to Mariners, prepared jointly by the Coast Guard and the Naval Oceanographic Office. The weekly notices are intended for mariners and others who have a definite need for them in connection with extended seagoing activities or for those operating in several Coast Guard districts.

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.

Lightships.—Courses should invariably be set to pass lighships with sufficient clearance to avoid the possibility of collision from errors of observation, current and wind effects, other vessels in the vicinity, defect in steering apparatus, and from other causes. Experience shows that lighships cannot be safely used as leading marks to be passed close aboard, but should always be left broad off the course, whenever searoom permits.

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. 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."

Station (watch) buoys are sometimes moored near lightships to mark the approximate station should the lightship be carried away or temporarily removed. 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 characteris-

tics, 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.

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.—The increasing use of radio directional bearings for locations of ships' positions at sea, especially during foggy weather, has made it particularly desirable to be able to apply these radio bearings directly to the nautical chart. These radio 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 **Bureau of Customs.** The bureau's functions also include issuing of commissions to yachts and the assignment of signal letters; the measurement of vessels, 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; the recording of sales, conveyances, and mortgages of vessels; the protection of steerage passengers, and the remission of fines, penalties, and the forfeitures incurred under the laws governing these matters. Collection districts and ports of entry located within the area covered by this Coast Pilot are tabulated in the Appendix.

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.—United States vessels engaged in minesweeping operations have their maneuvering powers considerably hampered. All other vessels, whether steamers or sailing craft, should keep out of the way of the sweepers, remembering especially that it is dangerous to pass between the vessels of a pair or group sweeping together.

All vessels towing sweeps are to show a black ball at the foremasthead, and at the yardarm on the side or sides on which it is dangerous to pass, **by day** and green lights instead of the black balls **by night;** the lights may only be exhibited when necessary to warn approaching friendly vessels. Other vessels are not to approach the sweepers nearer than 500 yards on either beam or 1,000 yards astern; under no circumstances is a vessel to pass through a formation of mine sweepers. The sweepers should be prepared to warn other vessels who persist in approaching too close by means of any of the appropriate signals from the International Code of Signals.

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 fluorescent 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 kcs if equipped. Attempt to contact the aircraft on this frequency.

2. Maintain a radiotelegraphy watch on 500 kcs. 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 kcs or 522 kcs.

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 simulate 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 communication. Advise U.S. Naval authorities.

A submarine marker messenger buoy, about 3 feet in diameter, is 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 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 addition 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 the 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 approval of plans of bridges, the alteration of obstructive bridges, the establishment of anchorage grounds and 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.

Anchorage areas and 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 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.—This is nautical-chart terminology for the artificial fishing reefs established (through 1962) 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 specifications 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, 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 material 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 sometimes 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, 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 admissable 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 alien may enter the United States until he has been inspected by an immigration officer. A list of the ports of entry for aliens is given in the Appendix.

The **PUBLIC HEALTH SERVICE** administers hospitalization and outpatient treatment to legal benficiaries 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 inspection 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 vesssels upon application to officers of the Service or to Chief, Division of Foreign Quarantine, Public Health Service, DHEW, Washington, D.C., 20201.

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 KTK, 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 scheludes 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:

A. By radiotelegraph on the station's medium frequency immediately following the first silent period after receipt of the message at the radio station (HH+18 or HH+48) preceded by an initial call on 500 kc. These safety broadcasts are preceded by the Safety Signal (TTT). Whenever this transmission occurs outside the watch hours for single radio operator ships, the message will be repeated at the end of the next silent period falling within the radio watch hours for such vessels. If a station makes daily broadcasts of marine information, the message will also be included in its next scheduled transmission.

B. By radiotelephone on 2182 kc. immediately following receipt of the message at the radio station and repeated at the station's next scheduled broadcast.

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 Bureau 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 Caribbean Sea area and small-craft, storm, and hurricane warnings when applicable.

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** near Washington, D.C., 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 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.

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

Improvements have been made in the quick determination and reporting of earthquake epicenters, but no method has yet been perfected for determining whether a sea wave will result from a given earthquake. The Honolulu Observatory of the 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 a 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.

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2. NAVIGATION REGULATIONS

THIS chapter contains the sections of **Code of Federal Regulations, Title 33, Navigation and Navigable Waters,** that are of most importance to the areas covered by Coast Pilot 4. 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.

PART 82—BOUNDARY LINES OF INLAND WATERS:

§ 82.1 General basis and purpose of boundary lines. By virtue of the authority vested in the Commandant of the Coast Guard under section 101 of Reorganization Plan No. 3 of 1946 (3 CFR, 1946 Supp. Ch. IV), and 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 tributary 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.

§ 82.30 Chesapeake Bay and tributaries. A line drawn from Cape Henry Light to Cape Henry Junction Lighted Whistle Buoy; thence to Cape Charles Light.

§ 82.35 Charleston Harbor. A line drawn from Charleston Light on Sullivans Island to Lighted Whistle Buoy 2C; thence to Charleston Day Beacon off Morris Island.

§ 82.40 Savannah Harbor. A line drawn from the southwesternmost extremity of Braddock Point to Tybee Lighted Whistle Buoy T; thence to the southernmost point of Savannah Beach, bearing approximately 278°.

§ 82.45 St. Simon Sound, St. Andrew Sound, and Cumberland Sound. Starting from the hotel located approximately ¾ mile, 63½° true, from St. Simon (rear) Light, a line drawn to St. Simon Lighted Whistle Buoy St. S; thence to St. Andrew Sound Outer Entrance Buoy; thence to St. Marys Entrance Lighted Whistle Buoy 1STM; thence to Amelia Island Light.

§ 82.50 St. Johns River, Fla. A line drawn from the east end of the north jetty to the east end of the south jetty.

§ 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.

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

(7) For that vessel which is engaged in operations in and out of the same port to sea and return without entering any other port, or on coastwise voyages between ports in the same Coast Guard District, or on voyages between ports in the First, Ninth, Thirteenth, or Seventeenth Coast Guard Districts and adjacent Canadian ports, or between ports in the Commonwealth of Puerto Rico and ports in the Lesser Antilles, 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 without the necessity for reporting each individual arrival.

(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, N.Y., 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) (Canceled.)

(4) A master of a vessel who reports in accordance with the U.S. Coast Guard's voluntary Atlantic Merchant Vessel Report (AMVER) System and who includes in this report an estimated time of arrival at the Snell Lock, Massena, N.Y., 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 that port shall be considered in constructive compliance with subparagraph (2) of this paragraph and no additional advance notice of arrival is required.

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

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

§ 124.20 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 sub-

ject 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 an 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:

§ 202.73 St. Johns River, Fla. (a) Area A. The waters lying within an area bounded by a line beginning at a point located at the west bank of St. Johns River at latitude 30°15′11″, longitude 81°41′23″; thence to latitude 30°15′13″, longitude 81°41′14″; thence to latitude 30°15′03″, longitude 81°41′11″; thence to latitude 30°15′04″, longitude 81°41′20″; and thence to the point of beginning.

(b) Area B. The waters lying within an area bounded by a line beginning at latitude 30°15′03″, longitude 81°41′28″; thence to latitude 30°15′02″, longitude 81°41′10″; thence to latitude 30°14′56″, longitude 81°41′08″; thence to latitude 30°14′54.5″, longitude 81°41′10.5″; and thence to the point of beginning.

Subpart B—Anchorage Grounds:

§ 202.173 Port of Charleston, S.C.—(a) The Anchorage grounds. The anchorage grounds for general use shall include all the navigable portions of the harbor and the portions of Cooper, Ashley, and Wando Rivers adjacent thereto, except the following:

(1) Areas of prohibited anchorage. (i) A ship channel 1,000 feet wide between the jetties, thence 800 to 400 feet wide (or as much wider as an improved channel may hereafter be dredged), following the established ranges and usual courses and passing east of Drum Island to Goose Creek. Between the north Customhouse Wharf and the northernmost building ways of the Todd Shipyard Corporation, this shall include all the area between the western limit of the channel and the eastern waterfront of Charleston.

(ii) A ship channel 500 feet wide from the northernmost building ways of the Todd Shipyard Corp. north through Town Creek, following the established ranges and usual courses and connecting at both ends with the main channel.

(iii) A ship channel in Ashley River from its mouth to Standard Wharf 300 feet wide following the established ranges and usual courses and widened at bends and at the upstream and downstream ends.

(iv) The commonly used channel in Wando River, with width of 200 feet.

(v) The commonly used channel in Hog Island Channel with a width of 200 feet from Cooper River to the area opposite Shem Creek.

(2) Anchorage for explosives. Vessels carrying explosives may anchor only in that section of the Wando River designated as "Anchorage for Explosives," which lies on the west side of that river in the area one mile upstream of the south end of Daniel Island: Provided, That vessels carrying explosives shall not anchor within 400 yards of each other, but this provision is not intended to prohibit lighters from lying alongside ships for the transfer of cargo.

(3) Special anchorages. Two special anchorages are provided in Cooper River along the eastern waterfront of Charleston. The use of these special anchorages is limited to loaded vessels for a period of not more than 72 hours. The bearings and distances for the centers of these special anchorages are from the tank atop the Fort Sumter Hotel on the Battery at Charleston:

(i) 30°30′ true; 2,687 yards; diameter of anchorage, 1,400 feet.

(ii) 37°00′ true; 2,017 yards; diameter of anchorage, 1,400 feet.

(b) The regulations. (1) Except in cases of great emergency, no vessel shall be anchored in the prohibited areas described in paragraph (a) of this section, nor shall any vessel be so anchored that it can swing within 400 feet of any wharf or pier on the eastern waterfront of Charleston.

(2) Vessels using the two special anchorages opposite the eastern waterfront of Charleston shall place their anchors as near as possible in the center of the anchorage. Vessels not using a special anchorage shall not place their anchors within the areas of prohibited anchorage, but vessels may be so anchored as to swing into these areas: Provided, That they are so placed, with reference to the customary winds, tides, and currents of the harbor,

that they will swing only during slack water, and at this period there shall remain in the waters adjacent to the channel an area providing sufficient depth so as to permit the safe passage of loaded vessels.

(3) Vessels must be anchored in such a way as not to interfere with the free navigation of channels of the port, including Cooper, Ashley, and Wando Rivers, Town Creek, and Hog Island Channel, or to obstruct the approach to any pier or entrance to any slip, or to impede the movement of any vessel or craft.

(4) Dragging of anchors in or across the areas of prohibited anchorage is prohibited.

(5) Vessels which, through force of great emergency, are anchored contrary to the foregoing regulations in this section shall be shifted to new berths in accordance with such regulations at the earliest opportunity.

(6) A vessel, upon notification from the Captain of the Port to shift its position in anchorage grounds or out of areas of prohibited anchorage, must get under way at once or signal for a tug, and must change position as directed with reasonable promptness.

(7) Vessels carrying explosives shall be anchored only within the anchorage ground described in paragraph (a) (2) of this section, which may be used also by vessels carrying other classes of freight when proper anchorage space is not available elsewhere in the harbor, including the connecting rivers.

(8) Vessels carrying explosives shall be at all times in charge of competent persons, and must display by day a red flag, of at least 16 square feet, at the masthead, or at least 10 feet above the upper deck if the vessel has no mast; at night a red light shall be displayed in the same positions specified for the red flag. No smoking will be permitted on or near such vessels, and no persons under the influence of liquor will be allowed on board any vessel, barge, or scow carrying explosives, nor will they be allowed to approach such vessels.

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

§ 202.178 Wilmington River, Ga. (a) The anchorage grounds. An area in the Wilmington River in the vicinity of Thunderbolt Harbor to the westward of a line from the southeasterly corner of the outer end of the wharf of the Shrine Club, bearing 183°, 480 feet, to a point marked with a buoy; thence 204°30′, 2,280 feet, to the Maggioni Packing Plant.

Note.—Temporary floats or buoys for marking anchors or moorings in place will be allowed in this area. Fixed mooring piles or stakes are prohibited.

(b) The regulations. (1) Except in cases of great emergency, no vessel shall anchor in Wilmington River between the State Highway bridge at Thunderbolt, and 4,000 feet to the southward, except in the anchorage area hereby defined and established: Provided, however, That vessels may moor to any lawfully constructed wharf.

(2) Anchors must not be placed outside the anchorage area, nor shall any vessel be so anchored that any portion of the hull or rigging shall at any time extend outside the boundary of the anchorage area.

(3) Any vessel anchoring under circumstances of great emergency outside of the anchorage area should be placed near the edge of the channel and in such position as not to interfere with the free navigation of the channel nor obstruct the approach to any pier nor impede the movement of any boat, and shall move away immediately after the emergency ceases or upon notification by the District Engineer, Corps of Engineers, Savannah, Ga., charged with the enforcement of the regulations in this section.

(4) A vessel, upon being notified to move into the anchorage limits or to shift its position on anchorage grounds, must get underway at once and must change position as directed, with reasonable promptness.

(5) Whenever the maritime or navigation interest of the United States so require, the District Engineer is hereby empowered to shift the position of any vessel anchored within the anchorage area and of any vessel which is so moored or anchored as to impede or obstruct vessel movements in any channel.

(6) Nothing in this section shall be construed as relieving the owner of or person in charge of any vessel from the penalties of the law for obstructing navigation or for not complying with the navigation laws in regard to lights, fog signals, or for otherwise violating the law.

§ 202.179 Skidaway River, Isle of Hope, Ga. (a) The anchorage ground. An area in Skidaway River beginning at a point on the mean low water line 400 feet south of Brady Boat Works, thence 76°30′, 300 feet to a buoy; thence 152°30′, 900 feet to a buoy; thence 251°00′, 450 feet to the mean low water line at Wymberly Yacht Club dock.

(b) The regulations. (1) Except in cases of great emergency, no vessels shall anchor in Skidaway River between the north end of Barbee's dock and southward to Day Marker 48 except in the anchorage area hereby defined and established: Provided, however, That vessels may moor to any lawfully constructed wharf.

(2) Except in cases of great emergency, no vessel shall be anchored where it can swing within 50 feet of any lawfully constructed wharf or within 50 feet of the mean low water line, nor shall any vessel be so anchored that any portion of the hull or rigging shall at any time extend outside the boundary of the anchorage area.

(3) Any vessel anchoring under circumstances of great emergency outside the anchorage area should be placed in such a position as not to interfere with the free navigation of the channel nor obstruct the approach to any lawfully constructed wharf nor impede the movement of any boat, and shall move away immediately after the emergency ceases or upon notification of the District Engineer, U.S. Army Engineer District, Savannah, Ga.

(4) No vessels with an overall length greater than 65 feet will use the anchorage area except in cases of great emergency.

(5) Vessels operating within the anchorage area will not exceed a speed of five (5) miles per hour.

§ 202.183 St. Johns River, Fla. (a) The anchorage grounds—(1) Anchorage A. Beginning at the west shore and at the south side of Fuller Warren Bridge, latitude 30°18′58″, longitude 81°40′30″; thence easterly along the south side of said bridge to the easterly shoreline at latitude 30°18′47″, longitude 81°39′52″; thence southerly along the easterly shoreline and along a portion of a straight line extending N. 00°15′ E. from Point La Vista to latitude 30°17′48″, longitude 81°39′52″; thence west to longitude 81°40′45″; thence to the westerly shoreline at Winter Point and northeasterly along the westerly shoreline to Fuller Warren Bridge.

(2) Anchorage B. Beginning at Point La Vista, latitude 30°16′48″, longitude 81°39′54″; thence to latitude 30°16′52″, longitude 81°40′54″; thence to latitude 30°17′48″, longitude 81°40′45″; thence east to longitude 81°39′52″; thence S. 00°15′ W. to Point La Vista.

(3) Anchorage C. Shoreward of a line located as follows:

Beginning at a point on the south shore westerly of the entrance to Miller Creek at longitude 81°38′15″; thence north 300 yards; thence east to longitude 81°37′40″; thence to latitude 30°19′06″, longitude 81°37′27″; thence east to longitude 81°37′02″; thence south to Empire Point.

(4) Anchorage D. Bounded on the west by a line along the easterly side of Terminal Channel and bounded on the east by a line along the westerly side of Arlington Cut. Beginning at a point at latitude 30°19′30″, longitude 81°37′25″; thence to latitude 30°20′07″, longitude 81°37′18″; thence to latitude 30°20′00″, longitude 81°37′05″; thence to latitude 30°19′20″, longitude 81°37′17″; thence to the point of beginning. No vessels shall anchor within 300 feet of Terminal Channel or Arlington Cut.

(5) Anchorage E. Beginning at a point near the easterly shore of the river at latitude 30°21′42″, longitude 81°36′52″; thence west to longitude 81°37′15″; thence north to latitude 30°22′07″; thence to the point of beginning.

(6) Anchorage F. Shoreward of a line located as follows: Beginning at a point on the east shore at latitude 30°21′42″, longitude 81°36′45″; thence west to longitude 81°36′52″; thence to latitude 30°22′07″, longitude 81°37′15″; thence N. 56°15′ E. to the east shore.

(b) The regulations. (1) Anchorages A, B, D, and F are permanent anchorages. Anchorage A is reserved for deep-draft vessels, Anchorage B is reserved for shallow-draft vessels, Anchorage D is reserved for light-draft barges and schooners, and Anchorage F is reserved for deep-draft barges and schooners.

(2) Anchorage C is a temporary anchorage for deep-draft vessels. This anchorage shall be an anchorage for vessels exceeding 24 feet in draft. No vessel shall remain in the anchorage more than 24 hours without obtaining a permit from the Captain of the Port.

(3) Anchorage E shall be used only by vessels awaiting quarantine inspection, or by special permit from the Captain of the Port.

§ 202.188 Atlantic Ocean off Miami and Miami Beach, Fla. (a) The anchorage grounds. The area to the eastward of a line bearing 12° (N. 12° E.) through a point X, which is 1½ nautical miles due east of the intersection of the Miami Beach shore line with the north jetty; to the northward of a line bearing 102° (S. 78° E.) and intersecting the 12° line at a point A, one-half nautical mile north of the said point X; and to the southward of a line bearing 102° (S. 78° E.) and intersecting the 12° line at a point B, 2½ nautical miles north of the said point X. The northern and southern extremities of the 12° line are marked by spar buoys. The entire anchorage area lies north of the entrance channel to Miami Harbor.

(b) The rules and regulations. (1) Except in cases of great emergency, no vessel shall be anchored in the Atlantic Ocean in the vicinity of the entrances to the approach channels leading to the cities of Miami Beach and Miami, Fla., outside of the anchorage area hereby defined and established—that is, they shall not anchor shoreward of the line first named nor southward of the second nor northward of the third line—but may anchor as far to the eastward as may be desired.

(2) Any vessel anchoring under circumstances of great emergency outside of the anchorage area shall be shifted to new berths within the area, immediately after the emergency ceases.

(3) All vessels shall lie at anchor with as short a cable as conditions will permit.

(4) A vessel upon being notified to move into the anchorage limits or to shift its position on the anchorage ground must get under way at once or signal for a tug, and must change position as directed with reasonable promptness.

(5) Whenever the maritime or commercial interests of the United States so require, the Captain of the Port, U.S. Coast Guard, Miami, Fla., is hereby empowered to shift the position of any vessel anchored on the anchorage ground or outside thereof, or of any vessel moored or anchored so as to impede or obstruct vessel movements or obstruct or interfere with range lights.

(6) Vessels carrying explosives shall be anchored only under a written permit issued by the Captain of the Port and at such point as he may direct.

(7) Vessels carrying explosives shall be at all times in charge of a competent person, and must display by day a red flag, of not less than 16 square feet, at the masthead, or not less than 10 feet above the upper deck if the vessel has no mast; at night a red light shall be displayed in the positions specified for the red flag.

(8) Nothing in this paragraph shall be construed as relieving the owner or person in charge of any vessel from the penalties of the law for obstructing navigation,

or for obstructing or interfering with range lights, or for not complying with the navigation laws in regard to lights, fog signals, or other aids to navigation, or for otherwise violating law.

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 interests 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 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 applicances 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 operation of a drawspan, but all passage over, through, or under a drawbridge shall be prompt, to prevent delay to either land or water traffic.

Note.—The special regulations contained in §§ 203.245 to 203.462 prescribed where local conditions require to govern the operation of certain bridges, supplement the general regulations contained in § 203.240.

§ 203.241 The Intracoastal Waterway from the Virginia-North Carolina boundary to Key West, Florida, and the Gulf Intracoastal Waterway from Rigolets, Louisiana, to Apalachee Bay, Florida, and tributaries thereto; bridges. (a) Bridges over the above-captioned navigable waters will be operated in accordance with § 203.240. The regulations contained in this section shall be considered as additional to those contained in § 203.240.

(b) Drawbridges shall not be required to open for craft carrying appurtenances unessential to navigation and any vessel operator who causes a bridge to be opened in order to clear appurtenances unessential for navigation shall be considered in violation of the regulations of this section.

(c) Appurtenances unessential for navigation shall include but not be limited to fishing outriggers, radio or

television antennae, false stacks, and masts purely for ornamental purposes. Appurtenances unessential to navigation will not include flying bridges, sailboat masts, pile driver leads, spud frames on hydraulic dredges, or other items of equipment clearly necessary to the intended use of the vessel.

(d) Owners of drawbridges shall report to the proper District Engineer the names of any vessels requiring bridge openings considered to be in violation of this section. The District Engineer may at any time cause an inspection to be made of any craft utilizing the above-captioned navigable waters 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 the 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 on the above-captioned navigable waters in such a manner as to require drawbridge openings shall be deemed in violation of the regulations of this section, unless the necessary alterations shall have been made.

§ 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 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) Applies to waterways discharging into Chesapeake Bay.

(g) Waterways discharging into Atlantic Ocean between Chesapeake Bay and Charleston—(1) Pasquotank River, N.C.; Norfolk Southern Railway Company bridge at Elizabeth City; from 3:30 p.m. to 11:30 p.m., the bridge will be operated in full open position. Between 11:30 p.m. and 3:30 p.m., the regulations prescribed in § 203.240 shall govern the operation of the drawspan.

(2) Kendrick (Mackay) Creek, N.C.; Norfolk Southern Railway Company bridge at Mackeys. At least eight hours' advance notice required.

(3) Scuppernong River, N.C.; North Carolina State Highway Commission bridge at Columbia.

(i) The owner of, or agency controlling the bridge will not be required to keep a bridge tender in constant attendance between the hours of 7:00 p.m. and 7:00 a.m.

(ii) Whenever, in the event of an emergency, a vessel requires passage through the drawspan between the hours stated in subdivision (i) of this subparagraph the authorized representative of the owner of, or agency controlling the bridge shall be given at least six (6) hours' advance notice of the time the opening is desired.

(3-a) Scuppernong River, N.C.; North Carolina State Highway and Public Works Commission bridges at Creswell and Cross Landing. At least 24 hours' advance notice required.

(4) Pamlico and Tar Rivers, N.C.; North Carolina State Highway Commission bridges at Washington and near Grimesland. At least 24 hours' advance notice required: Provided, That the bridge owner will restore constant attendance when, in the opinion of the District Engineer, Corps of Engineers, river traffic warrants additional service.

(5) Neuse River, N.C.; Atlantic and East Carolina Railway Company bridge at Kinston and drawbridges upstream therefrom. At least 24 hours' advance notice required.

(6) Trent River, N.C.; Atlantic Coast Line Railroad Company bridge at Pollocksville, and drawbridges upstream therefrom. At least 24 hours' advance notice required.

(7) Newport River, N.C.; Atlantic and East Carolina Railway Company bridge at Newport. 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.

(8) New River, N.C.; Atlantic Coast Line Railroad Company bridge at Jacksonville. At least 24 hours' advance notice required.

(9) Smiths Creek, N.C.; North Carolina State Highway and Public Works Commission bridge in Wilmington. At least 24 hours' advance notice required.

(10) Northeast River, N.C.; Atlantic Coast Line Railroad Company bridge at Castle Hayne. Between 7:30 a.m. and 4:30 p.m. Monday through Friday of each week, the draw will be opened for the passage of vessels on signal. At all other times, the draw will be closed and the bridge unattended: Provided, That the draw will be opened for tugs with tows upon 24 hours' advance notice.

(11) Kingston Lake, S.C.; South Carolina State Highway Department bridge near Conway. At least 24 hours' advance notice required.

(12) Pee Dee River, S.C.; Seaboard Air Line Railway Company bridge near Poston. 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.

(13) Pee Dee River, S.C.; South Carolina State Highway Department bridge near Georgetown (Pee Dee River drawspan of the Lafayette Bridge). At least 12 hours' advance notice required.

(14) Black River, S.C.; South Carolina State Highway Department bridge near Georgetown. At least 12 hours' advance notice required. South Carolina State Highway Department bridge at Brown's Ferry near Rhems. At least 24 hours' advance notice required. The agency controlling the above bridges shall arrange for its representative to be reached at the same place that the representative for the Lafayette Bridge (Great Pee Dee River) may be reached in order that one notice may suffice to secure the prompt opening of any or all of these bridges.

(15) Santee and Congaree Rivers, S.C.; drawbridges upstream from South Carolina State Highway Department bridge near Lanes. At least 24 hours' advance notice required.

(16) Wando River, S.C.; South Carolina State Highway Department bridge near Cainhoy. At least 12 hours' advance notice required.

(17) Cooper River, S.C.; Seaboard Air Line Railway Company bridge near Cordesville. At least 24 hours' advance notice required: Provided, That a draw tender shall be placed in constant attendance on 10 days' notice in writing from the District Engineer, Corps of Engineers.

(18) Ashley River, S.C.; South Carolina State Highway Department bascule bridges at mile 2.4 and mile 2.5 above the mouth of the river at Charleston. Between 7:00 a.m., and 9:00 a.m., Monday through Friday, and between 4:00 p.m., and 7:00 p.m., daily, at least 12 hours' advance notice required: Provided, That the draw shall be opened at any time for a vessel in an emergency involving danger to life and property. Such emergency shall be indicated by four blasts of the signalling device.

(h) Waterways discharging into Atlantic Ocean south of Charleston. (1) Rantowles Creek, S.C.; Atlantic Coast Line Railroad Company bridge near Rantowles. 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.

(2) Edisto River, S.C.; Seaboard Air Line Railway Company bridge near Fenwick. At least 24 hours' advance notice required.

(3) Ashepoo River, S.C.; South Carolina State Highway Department bridge at Brickyard Ferry near Bennetts Point. At least 24 hours' advance notice required. Any vessel navigating Ashepoo River with the intention of making repeated trips shall notify the authorized representative of the owner of or agency controlling the bridge of the expected frequency of such trips. The bridge shall then be maintained in readiness to open promptly upon signal from the vessel without any further notice. Repeated trips shall be understood to mean trips not more than 24 hours apart.

(4) Ashepoo River, S.C.; Seaboard Air Line Railway Company bridge near Fenwick. At least 96 hours' advance notice required: Provided, That a draw tender shall be placed in constant attendance on 10 days' notice in writing from the District Engineer, Corps of Engineers.

(5) Harbor River, a tidal estuary in St. Helena Sound, S.C.; South Carolina State Highway Department bridge on State Highway No. 285 at Hunting Island. At least 24 hours' advance notice required.

(6) Combahee River, S.C.; Seaboard Air Line Railway Company bridge near Wiggins and South Carolina State Highway Department bridge near Sheldon. At least 12 hours' advance notice required.

(7) North Wimbee Creek, S.C.; Seaboard Air Line Railway Company bridge near Lobeco. At least 24 hours' advance notice required.

(8) Coosaw River (Whale Branch), S.C.; Charleston and Western Carolina Railway Company bridge near Seabrook and the South Carolina State Highway Department bridge on State Highway No. 28 between Beaufort and Yemassee near Lobeco. From 8:00 p.m., Saturday to 6:00 a.m. Monday and from 8:00 p.m. to 6:00 a.m. on all other days, at least 24 hours' advance notice required.

(9) Battery Creek, S.C.; South Carolina State Highway Department bridge between Beaufort and Parris Island. At least 24 hours' advance notice required.

(10) Broad River, S.C.; South Carolina State Highway Department bridge near Beaufort. At least 24 hours' advance notice required.

(11) Broad River, S.C.; Seaboard Air Line Railway Company bridge near Whale Branch. At least 24 hours' advance notice required.

(12) Savannah River, S.C., and Ga.; Charleston & Western Carolina Railway Company bridge near Augusta, Ga. At least three hours' advance notice required.

(13) Ogeechee River, Ga. The Atlantic Coast Line Railroad Company bridge near Richmond Hill (Ways Station). At least 15 days' advance notice required.

(14) Ogeechee River, Ga. The State Highway Department of Georgia bridge near Richmond Hill. 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.

(15) Altamaha River, Ga.; all drawbridges except the Atlantic Coast Line Railroad Company bridge at Doctortown. At least 24 hours' advance notice required. The

Atlantic Coast Line Railroad Company bridge at Doctortown. At least seven days' advance notice required: Provided, That the bridge owner will restore constant attendance, when in the opinion of the District Engineer, Corps of Engineers, river traffic warrants additional service.

(16) Oconee River, Ga.; drawbridges downstream from Central of Georgia Railroad Company bridge at Oconee. At least 24 hours' advance notice required.

(17) Oconee River, Ga.; Central of Georgia Railway Company bridge at Oconee. At least seven days' advance notice required. Paragraph (e) of this section shall not apply to this bridge.

(18) Ocmulgee River, Ga.; all drawbridges. At least 24 hours' advance notice required.

(19) Satilla River, Ga.; Seaboard Air Line Railroad Company bridge at Woodbine. (i) The owner of, or agency controlling, the bridge will not be required to keep a bridge tender in constant attendance between the hours of 7:00 p.m. and 3:00 a.m.

(ii) Whenever, in the event of an emergency, a vessel requires passage through the drawspan between the hours stated in subdivision (i) of this subparagraph the authorized representative of the owner of, or agency controlling, the bridge shall be given at least six (6) hours' advance notice of the time the opening is desired.

(iii) Upon receipt of such 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.

(iv) 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 it can easily be read at any time, a copy of the regulations of this subparagraph, together with a notice stating exactly how the representative specified in subdivision (ii) of this subparagraph may be reached.

(20) Satilla River, Ga.; State Highway Department of Georgia bridge near Burnt Fort. (Revoked).

(21) St. Marys River, Ga. and Fla.; State Road Department of Florida and Seaboard Air Line Railway Company bridges at Kingsland, Ga. At least 48 hours' advance notice required.

(22) Nassau Sound, Fla.; Fernandina Port Authority bridge on Toll Road No. 105 between Fernandina and Jacksonville. From one hour after sunset to one hour before sunrise, the times of sunset and sunrise being as published by the United States Hydrographic Office for latitude 30° north, the draw need not be opened for the passage of vessels.

(23) Clapboard Creek and Broward River (Cedar Creek), Fla.; bridges on Heckscher Drive. At least 12 hours' advance notice required.

(24) Trout River, Fla.; Seaboard Air Line Railroad Company bridge at Panama. Between 10:00 p.m. and 6:00 a.m., at least 12 hours' advance notice required. At all other times the regulations contained in § 203.240 shall govern the operation of this bridge.

(25) Jupiter (Loxahatchee) River, Fla.; Florida East Coast Railway Company bridge at Jupiter. Between 7:00 p.m. and 7:00 a.m., at least three hours' advance notice required.

(26) Kissimmee River, Fla.; State Road Department of Florida bridge 0.5 mile above the mouth of the river on State Road 78, C. H. Carlton bridge 2.7 miles above the mouth, State Road Department of Florida bridge 19.5 miles above the mouth on State Road 70, and Seaboard Air Line Railroad bridge 37 miles above the mouth at Fort Basinger. At least 48 hours' advance notice required.

(27) Kissimmee River, Fla.; State Road Department of Florida bridge near Basinger (at Fort Bassenger). At least 96 hours' advance notice required. Paragraph (e) of this section shall not apply to this bridge.

(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.

§ 203.355 Bogue Sound (Atlantic Intracoastal Waterway), N.C.; North Carolina State Highway Commission bridge at Atlantic Beach. (a) During the period from June 15 to Labor Day, inclusive, on Saturdays and Sundays, and on Independence Day, the owner of or agency controlling this bridge will not be required to open the drawspan for the passage of vessels between the hours of 12 noon and 6:00 p.m., e.s.t., except at 2:00 p.m. and 4:00 p.m. when the bridge shall be opened to allow all accumulated vessels to pass, and except as provided in paragraphs (b) and (c) of this section.

(b) The drawspan shall be opened promptly upon the prescribed signal being given for the passage of towboats with tows, freight boats, and vessels owned or operated by the United States.

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

(d) The owner of or agency controlling the bridge shall erect and maintain on both sides thereof, signs acceptable to the District Engineer setting forth the salient features of the special regulations of this section.

§ 203.404 Turner Creek, Tybee (Bull) River, Ga.; highway bridges on U.S. Highway 80 between Savannah Beach and Thunderbolt. (a) The owner or agency controlling the above described bridges may keep the drawspans closed to navigation between 7:00 a.m. and 10:00 a.m., and between 4:00 p.m. and 7:00 p.m., except on the hour, when the bridges shall be opened to allow all accu-

mulated vessels to pass, with the exception that on Saturdays, Sundays, and holidays, during the period 1 April to 30 September, both dates inclusive, the drawspans will remain closed to navigation between 7:00 a.m. and 10:00 p.m., except on the hour, when the bridges shall be opened to allow all accumulated vessels to pass.

(b) The draws shall be opened at any time to allow the passage of a tow, common carrier, Air Force Crash Boat, or vessel in distress.

(c) The owner of or agency controlling the bridges shall keep a copy of these regulations conspicuously posted on both the upstream and downstream sides of the bridges in such manner that it can easily be read at any time.

§ 203.430 St. Johns River, Fla.; Main Street, Acosta and Fuller Warren bridges, Jacksonville. (a) Between 7:30 a.m. and 9:00 a.m., and between 4:30 p.m. and 6:00 p.m., on all days other than Sundays and legal holidays, the draws need not be opened for the passage of vessels: Provided, That the draws shall be opened at any time for the passage of a vessel in an emergency involving danger of life or property, which shall be indicated by four blasts of a whistle, horn, or megaphone.

(b) In all other respects, the regulations contained in § 203.240 of this part shall govern the operation of these bridges.

§ 203.430a St. Johns River, Fla.; Florida State Road Department bridge between Sanford and Osteen. (a) The owner of or agency controlling the bridge will not be required to keep a draw tender in attendance or to open the drawspan between the hours of 7:00 p.m. and 7:00 a.m. except on 12 hours' advance notice to be given to the authorized representative of the owner of the bridge. Regular draw tender service will be maintained between 7:00 a.m. and 7:00 p.m.

(b) The owner of or the agency controlling the bridge shall keep conspicuously posted on both the upstream and downstream sides of the bridge, in such a manner that they can easily be read at any time, signs setting forth the salient features of the regulations and stating exactly how the authorized representative specified in paragraph (a) of this section may be reached for opening the bridge.

§ 203.431 Ortega River, Fla.; State Road Department of Florida bridge (Roosevelt Boulevard) near Jacksonville, Florida. (a) Except as otherwise provided in paragraphs (b), (c), and (d) of this section, the owner or agency controlling the bridge shall not be required to open the drawspan for the passage of vessels between 6:30 a.m., and 8:30 a.m., and between 3:30 p.m. and 5.00 p.m. except that during these closure periods the bridge shall be opened on the hour and half-hour to allow any accumulated vessels to pass.

(b) The regulations in this section shall not be in force or effect on Saturdays, Sundays, or the following legal holidays:

New Year's Day.
Washington's Birthday.
Memorial Day (May 30).
Independence Day.
Labor Day.
Veterans Day (November 11).
Thanksgiving Day.
Christmas Day.

(c) 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.

(d) The draw shall be opened at any time for the passage of a tow or vessel in an emergency caused by rough weather or otherwise to an extent sufficient to endanger life or property. Such an emergency shall be indicated by four blasts of a whistle, horn, or megaphone.

(e) The owner of, or the 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.

§ 203.432 Matanzas River (Intracoastal Waterway), Fla.; Bridge of Lions (State Road No. A1A) in St. Augustine. (a) Except as otherwise provided in paragraph (b) of this section, the owners or agency controlling the bridge shall not be required to open the drawspan for the passage of vessels between 7:30 a.m. and 8:15 a.m. and between 5:00 p.m. and 5:45 p.m., Monday through Friday of each week.

(b) The drawspan shall be opened promptly at any time to allow the passage of tugboats with tows, vessels owned or operated by the United States, and vessels in distress. Such vessels desiring to pass shall so indicate by four blasts of a whistle or similar device.

(c) The owners 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.

§ 203.434 Oklawaha River, Haines Creek, and Dead River, Fla.; Bridges over Oklawaha River on State Road S–316 at Eureka, States Road 40 at Delks Bluff (Colbys Landing), State Road 464 at Moss Bluff, and State Road 42 at Starkes Ferry, and over Haines Creek on State Road 44 near Lisbon. (a) The owner of or agency controlling these bridges will not be required to keep a draw tender at the bridges between the hours of 7:00 p.m. and 7:00 a.m. Operators of vessels unable to pass under the bridges in closed position shall give the authorized representative of the owner of the bridges by telephone at least 3 hours' advance notice for passages between 7:00 p.m. and 7:00 a.m. Regular draw tender service will be maintained between 7:00 a.m. and 7:00 p.m.

(b) Bridges over Dead River: (1) Bridge on State Road 500 near Tavares. The owner of or agency controlling the bridge will not be required to keep a draw tender at the bridge and operators of vessels unable to pass under the bridge in closed position shall give the authorized representative of the owner of the bridge by

telephone at least 3 hours' advance notice of the time at which such opening will be required. The bridge will be opened at any time upon receipt of the required notice.

(2) Seaboard Air Line Railway Company bridge near Tavares. The owner of or agency controlling the bridge will not be required to open the drawspan between 10:00 p.m. and 6:00 a.m. the following day.

(c) The owners of or agency controlling the bridges shall keep conspicuously posted on both the upstream and downstream sides of the bridges, in such manner that they can easily be read at any time, copies of the regulations together with a notice stating exactly how the representatives specified in paragraphs (a) and (b) of this section may be reached for opening the bridges.

§ 203.435 Indian River (Intracoastal Waterway), Fla.; automatic operation of Florida East Coast Railway bridge near Jay Jay north of Titusville. (a) The bridge will not be manned by a regular attendant.

(b) The bascule span will normally be in the open position, displaying flashing green signals, to allow the movement of water traffic.

(c) When a train approaches the bridge, the navigation signals will go to flashing red, and a horn starts four blasts, pauses and then continues four blasts, etc.

(d) After an eight (8) minute time delay, the bridge will lower and lock providing the scanning equipment reveals nothing under the bridge.

(e) After the train has cleared, the bridge will raise and the signals will return to flashing green for navigation.

(f) Train crews can hold the bridge down by pushing a hold button, and the bridge will remain down for a period of eight (8) minutes or while the approach track circuit is occupied.

§ 203.436 Indian River, Fla.; State Road Department of Florida bridges at Titusville, Cocoa, Eau Gallie and Melbourne. (a) Except as provided in paragraphs (b) and (c) of this section, the owner of or agency controlling the bridges at Titusville, Cocoa, Eau Gallie and Melbourne shall not be required to open the drawspans between 6:45 a.m. and 7:45 a.m. and between 4:15 p.m. and 5:45 p.m., Monday through Friday of each week.

(b) The draws shall be opened promptly upon the prescribed signal being given for the passage of towboats with tows and vessels owned or operated by the United States.

(c) The draws shall be opened promptly for the passage 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 similar device.

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

§ 203.437 Canaveral Harbor Barge Canal, Fla.; Florida State Road Department bridge (State Road No. A1A), on Merritt Island. (a) Anyone requiring the drawspan to be opened for the passage of a vessel or tow shall give the authorized representative of the owner of the bridge by telephone at least 3 hours advance notice of the time at which such opening will be required.

(b) The owner of or operator of 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, copies of the regulations together with a notice stating exactly how the representative specified in paragraph (a) of this section may be reached for opening the bridge.

§ 203.439 St. Lucie Canal, Fla.; Seaboard Air Line Railroad Company bridge near Indiantown. (a) The owner of or agency controlling the bridge shall not be required to keep a drawtender in constant attendance or to open the drawspan between the hours of 8:00 p.m., and 6:00 a.m., except as provided in paragraph (b) of this section.

(b) Owners and operators of vessels unable to pass under the bridge in a closed position are urged to schedule their trips to pass the bridge between the hours of 6:00 a.m., and 8:00 p.m. The drawspan will be opened between the hours of 8:00 p.m., and 6:00 a.m., however, for the passage of commercial tows when it can be shown that the passage could not be scheduled during regular hours of operation without extreme inconvenience and added cost: Provided, That at least 3 hours' advance notice of the time at which such opening will be required is given to the Chief Dispatcher, Seaboard Air Line Railroad Company, Jacksonville, Fla.

(c) The owner of or agency controlling the bridge shall keep conspicuously posted on both 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 and the current telephone number of the authorized representatives specified in paragraph (b) of this section, and shall keep the Area Engineer, Corps of Engineers, Clewiston, Florida, and the Locktender at St. Lucie Lock notified of the current telephone number.

§ 203.439a Lake Worth (Intracoastal Waterway), Fla.; Singer Island Bridge, at Riviera Beach. (a) The owner of or agency controlling the bridge shall not be required to open the drawspan between the hours of 7:30 a.m., and 9:30 a.m., and between the hours of 4:30 p.m. and 6:30 p.m., daily except on the hour and half-hour when the bridge shall be opened to allow all accumulated vessels to pass, and except as provided in paragraph (b) of this section.

(b) The draw shall be opened to allow the passage of a vessel in distress or a commercial tow at any time upon sounding by the vessel of four blasts of a whistle or horn.

(c) The owner of or agency controlling the bridge shall place conspicuously on both sides of the bridge signs of such size that they can be easily read at any time, clearly indicating the nature of the regulations.

§ 203.440 Lake Worth (Intracoastal Waterway), Fla.; Flagler Memorial and Royal Park bridges, Palm Beach, Florida. (a) During the period 15 November to 30 April, both dates inclusive, the owners of or agencies controlling these bridges will not be required to open the drawspans between the hours of 7:30 a.m. and 9:30 a.m., and between the hours of 4:30 p.m. and 6:30 p.m., except that the drawspan of the Flagler Memorial Bridge shall be opened on the hour and half-hour and the drawspan of the Royal Park Bridge shall be opened 15 minutes before and 15 minutes after the hour to allow all accumulated vessels to pass, and except as provided in paragraph (b) of this section.

(b) The draws shall be opened to allow the passage of a vessel in distress or of a commercial tow at any time upon the sounding by the vessel of four blasts of a whistle or horn.

(c) The owner of or agencies controlling the bridges shall place conspicuously on both sides of each bridge signs of such size that they can be easily read at any time, clearly indicating the nature of the regulations.

§ 203.442 Hillsboro Inlet, Fla.; State Road Department of Florida highway bridge (State Road No. A1A) near Pompano Beach, Fla. (a) During the period 1 December to 30 April, both dates inclusive, 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 7:00 a.m. and 7:00 p.m., except on the hour and half-hour when the drawspan shall be opened to allow all accumulated vessels to pass, and except that from 7:30 to 8:30 a.m., from 11:45 a.m. to 1:30 p.m., and from 4:45 to 5:30 p.m., the bridge will be opened at any time upon request.

(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 a manner that it can be easily read at any time.

§ 203.443 Intracoastal Waterway, Fla.; State Road Department of Florida highway bridge at Atlantic Boulevard in Pompano Beach, Fla. (a) During the period November 1 to May 31, both dates inclusive, except as provided in paragraphs (b) and (c) of this section, the owner of or agency controlling this bridge shall not be required to open the drawspan between the hours of 7:00 a.m. and 6:00 p.m., both inclusive, except on the hour and the half-hour.

(b) The draw shall be opened promptly upon the prescribed signal being given for the passage of towboats with tows and vessels owned or operated by the United States.

(c) The draw shall be opened promptly for the passage 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 similar device.

(d) The owner of or agency controlling the bridge shall erect and maintain on both sides thereof, signs acceptable to the District Engineer setting forth the salient features of the special regulations of this section.

§ 203.446 New River Sound (Intracoastal Waterway), Fort Lauderdale, Fla., bridges. (a) East Las Olas Boulevard Bridge across New River Sound. During the period November 15 to May 15, both dates inclusive, except as provided in paragraph (c) of this section, the owner of or agency controlling this bridge will not be required to open the drawspan between the hours of 7 a.m. and 6 p.m., except on the hour and half-hour when the bridge shall be opened to allow all accumulated vessels to pass.

(b) Sunrise Boulevard Bridge across New River Sound. During the Period November 15 to May 15, both dates inclusive, except as provided in paragraph (c) of this section, the owner of or agency controlling this bridge will not be required to open the drawspan between the hours of 7:15 a.m. and 6:15 p.m., except on the quarter-hour and three-quarter hour when the bridge shall be opened to allow all accumulated vessels to pass.

(c) The draws of the bridges listed in paragraphs (a) and (b) of this section shall be opened at any time upon a signal of 4 short blasts of a whistle, horn or similar device to allow the passage of a tow or vessel in distress.

(d) The owner of or agency controlling the bridges shall place signs, of a size and description designated by the District Engineer, at each side of these bridges and at a distance of one-half mile above and below each bridge indicating the nature of the regulations.

§ 203.446a Intracoastal Waterway, Fla.; Hollywood Boulevard bridge, Hollywood, Fla. (a) During the period November 15 to May 15, inclusive, the owner of or agency controlling the Hollywood Boulevard bridge will not be required to open the drawspan between the hours of 10:00 a.m. and 6:00 p.m., except on half-hour intervals, on the hour and half-hour when the bridge shall be opened to allow all accumulated vessels to pass, and except as provided in paragraph (c) of this section.

(b) During the period May 16 to November 14, inclu-

sive, on Saturdays, Sundays, Memorial Day, Independence Day, Labor Day and Veterans Day, the owner of or agency controlling the bridge will not be required to open the drawspan between the hours of 9:00 a.m. and 7:00 p.m., except on the hour and half-hour when the bridge shall be opened to allow all accumulated vessels to pass, and except as provided in paragraph (c) of this section.

(c) Upon receipt of the proper signal the draw shall be opened at any time to allow the passage of a tow, sailing vessel, vessel in distress, and cruise boats operating on regular schedule. The proper signal for such openings shall be indicated by four blasts of a whistle, horn or similar device.

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

§ 203.446b Intracoastal Waterway, Fla.; Hallandale bridge at Hallandale, Fla. (a) During the period November 15, to May 15, both dates inclusive, the owner or agency controlling this bridge will not be required to open the drawspan between the hours of 10:15 a.m., and 6:15 p.m., except on half-hour intervals, on the quarter hour and three-quarter hour when the bridge shall be opened to allow all accumulated vessels to pass, and except as provided in paragraph (b) of this section.

(b) Upon receipt of proper signal the draw shall be opened at any time to allow the passage of a tow, sailing vessel, vessel in distress, and cruise boats operating on regular schedule.

(c) The owner of or agency controlling this bridge shall erect and maintain, on both sides thereof, signs acceptable to the District Engineer, Corps of Engineers, setting forth the salient features of the special regulations of this section.

§ 203.446c South Fork of New River, Fla.; State Road Department of Florida bridge (State Road No. 84) at Mile 4.4, near Fort Lauderdale, Fla. The owner or agency controlling the bridge will not be required to keep a draw tender constantly on duty. An advance notice of at least 24 hours will be required to open the drawspan.

§ 203.447 Biscayne Bay, Fla.; State Road Department of Florida highway bridge (MacArthur or 13th Street Causeway) and Dade County Port Authority highway bridge (Venetian or 15th Street Causeway), Miami, Fla. (a) During the period from November 1 to April 30, both dates inclusive, the owners of or agencies controlling these bridges shall not be required to open the west drawspans of the MacArthur and Venetian Causeways between 7:00 a.m. and 9:00 a.m. or between 4:30 p.m. and 6:30 p.m., except that both drawspans shall be opened on the half hour and even hour for sufficient time to pass any vessels awaiting passage.

(b) During the period from November 1 to April 30, both dates inclusive, the owner of or agency controlling Venetian Causeway shall not be required to open the east drawspan between 7:15 a.m. and 8:45 a.m. or between 4:45 p.m. and 6:15 p.m., except that the drawspan shall be opened at 7:45 a.m. and 8:15 a.m., 5:15 p.m. and 5:45 p.m. for sufficient time to pass any vessels awaiting passage.

(c) Any of the drawspans shall be opened at any time when required by a tow, or in an emergency. An emergency shall be indicated by four blasts of the signalling device.

(d) Officers of the Police Departments of Miami and Miami Beach shall be stationed at the respective draws and at the ends of the causeways during the above hours to regulate traffic in conjunction with the bridge tenders.

(e) Boat owners shall cooperate insofar as possible to facilitate the operation of the draws of the bridges.

(f) Signs indicating the nature of the regulations will be placed by the State Road Department and the Dade County Port Authority where and as directed by the District Engineer, Corps of Engineers, in charge of the locality.

§ 203.447a Biscayne Bay, Fla.; Dade County Bridge (Rickenbacker Causeway), Miami, Fla. (a) Except as otherwise provided in paragraphs (b), (c), and (d) of this section, the owner or agency controlling the bridge shall not be required to open the drawspan for the passage of vessels from 4:00 p.m. to 5:00 p.m. and from 5:15 p.m. to 6:00 p.m. on Saturdays, Sundays and the following legal holidays:

New Year's Day.
Independence Day.
Labor Day.
Veterans Day (November 11).
Thanksgiving Day.
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) During the display of small craft warnings or warnings for winds of greater force by the United States Weather Bureau affecting the area, the bridge shall be opened for the passage of vessels giving the usual signal at any time.

(d) 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.

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

§ 203.448 Miami River, Fla.; highway bridges from mouth to and including City of Miami bridge at Northwest 27th Avenue, Miami. (a) Except as otherwise provided in paragraphs (b), (c), and (d) of this section, the

owners of or agencies controlling these bridges shall not be required to open the drawspans for the passage of vessels from 7:30 a.m. to 9:00 a.m. and from 4:30 p.m. to 6:00 p.m. on all days other than Sundays and the following legal holidays: New Year's Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, and Christmas Day.

(b) 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 any bridge at any time on giving the usual signal.

(c) During the existence of a hurricane alert duly issued by the United States Weather Bureau affecting the Miami area, all of the bridges shall be opened for the passage of vessels giving the usual signal at any time.

(d) The draw of any bridge shall be opened at any time for the passage 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.

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

(f) This section shall remain in full force and effect until revoked or modified by the Secretary of the Army.

§ 203.449 Miami River, Fla.; Seaboard Air Line Railroad Company Bridge, Miami. The owner of or agency controlling the bridge will be required to provide bridge tender service only between the hours of 8:30 a.m. and 5:30 p.m., Monday through Friday. At all other times the draw will be opened for the passage of vessels upon three hours' advance notice.

§ 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.

PART 204—DANGER ZONE REGULATIONS:

§ 204.52 Atlantic Ocean south of entrance to Chesapeake Bay; firing range.—(a) The danger zone. A sector extending seaward for a distance of 12,000 yards between two radial lines bearing 30° true and 75° true, respectively, from a point on the shore at latitude 36°46′48″, longitude 75°57′24″; and an adjacent sector extending seaward for a distance of 15 miles between two radial lines bearing 75° true and 150° true, respectively, from the same shore position.

(b) The regulations. (1) Fishing vessels may enter the danger zone only between the hours of midnight and 8:00 a.m. and shall be clear of the area by 8:00 a.m. Other vessels shall proceed through the area with caution and shall remain therein no longer than absolutely necessary for purposes of transit.

(2) On days when firing is in progress, red flags will be displayed at conspicuous locations on the beach. During night firing a red flag, illuminated by a vertical white light, will be shown from the tower controlling the fire.

(3) This section shall be enforced by the Commanding Officer, Antiaircraft Training and Test Center, Dam Neck, Va., and such agencies as he may designate.

§ 204.53 Atlantic Ocean south of entrance to Chesapeake Bay off Camp Pendleton, Va.; naval prohibited area. (a) *The area.* Beginning at a point on the shore at Camp Pendleton at latitude 36°48′19″ N., longitude 75°57′49″ W.; thence easterly 200 yards to latitude 36°48′20″ N., longitude 75°57′42″ W.; thence northerly 400 yards to latitude 36°48′32″ N., longitude 75°57′45″ W.; thence westerly 200 yards to latitude 36°48′31″ N., longitude 75°57′53″ W.; and thence southerly 400 yards along the shore to the point of beginning.

(b) The regulations. (1) Vessels other than those owned and operated by the United States shall not enter the area except by permission of the Commanding Officer, U.S. Naval Amphibious Base, Little Creek, Norfolk, Va.

(2) This section shall be enforced by the Commanding Officer, U.S. Naval Amphibious Base, Little Creek, Norfolk, Va., and such agencies as he may designate.

§ 204.54 Albemarle Sound, Pamlico Sound, and adjacent waters, N.C.; danger zones for naval aircraft operations. (a) Target areas—(1) North Landing River (Currituck Sound). The waters of North Landing River within a radius of 1,000 yards from a target located at latitude 36°31′00″, longitude 76°01′40″.

(2) Northern part of Currituck Sound. Beginning at a point bearing 65°30′, 1,025 yards, from Currituck Sound Light 69; thence 86°, 6,000 yards; thence 193°, 4,425 yards; thence 267°30′, 2,775 yards; and thence to the point of beginning. The target is located at latitude 36°27′16″, longtitude 75°56′30″.

(3) North of Currituck Beach Light. The waters of Currituck Sound and the Atlantic Ocean within a radius of 1,000 yards from a target located at latitude 36°25′24″, longtitude 75°50′09″

(4) South of Caffey Inlet Coast Guard Station. The waters of Currituck Sound and the Atlantic Ocean within a radius of 1,000 yards from a target located at latitude 36°12′15″, longitude 75°45′57″.

(5) Southeast of Caffey Inlet Coast Guard Station. The waters of Currituck Sound and the Atlantic Ocean within an area described as follows: Beginning at a point bearing 170°, 5,900 yards, from Caffey Inlet Coast Guard Station; thence 55°30′, 7,650 yards; thence 177°, 8,700 yards; and thence to the point of beginning. The target is located at latitude 36°10′28″, longitude 75°45′04″.

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

(b) Target and bombing areas—(1) Along north shore of Albemarle Sound—(i) Western area. Beginning at a point on the north share of Albemarle Sound where the eastern highway bridge intersects the shore at Sandy Point; thence southerly along the eastern side of the bridge to the northern end of the draw; thence northeasterly to latitude 36°02′18″, longitude 76°19′30″; thence northwesterly to latitude 36°04′18″, longitude 76°20′20″; thence 23°15′ true to the shore; and thence southwesterly along the shore and across the mouth of Yeopim River, to the point of beginning.

(ii) Eastern area. Beginning on the north shore of Albemarle Sound at the easternmost tip of Harvey Point; thence southeasterly to Perquimans Bluff Flats Buoy; thence southeasterly to latitude 36°03′06″, longitude 76°16′43″; thence southwesterly to latitude 36°02′18″, longitude 76°19′30″; thence northwesterly to latitude 36°04′18″, longitude 76°20′20″; thence 23°15′ true to the shore; and thence northeasterly along the shore to the point of beginning.

(2) Along south shore of Albemarle Sound; target and bombing area. Beginning at the northernmost point of Laurel Point; thence to Laurel Point Light; thence to latitude 36°02′40″, longitude 76°04′26″; thence to Lewis Point; thence westerly along the shore to a point bearing 68°, 2,200 yards from Scuppernong River Entrance Light; thence 263° to the south shore of Bull Creek entrance; thence northerly along the shore and across the entrance to Bull Creek to the point of beginning; excluding from this area a passage 600 yards in width the center line of which extends due north from Scuppernong River Entrance Light.

(c) Naval Aviation Ordnance test area in Pamlico Sound in vicinity of Long Shoal. A circular area with a radius of one and one-half miles having its center at latitude 35°32′18″, longitude 75°40′39″.

(d) The regulations—(1) Target areas. The area described in subparagraph (1) of paragraph (a) of this section will be used as a dive bombing target by naval aircraft. In peacetime, munitions will be limited to miniature bombs which contain only small explosive charges for producing smoke puffs to mark points of impact. All operations will be conducted during daylight hours, and the area will be open to navigation at night. No vessel shall enter this area during the hours of daylight without special permission from the enforcing agency. The area will be patrolled and vessels will be warned not to enter. "Buzzing" by plane will warn vessels that they are in a danger zone, and upon being so warned they shall immediately leave the area. The areas described in subparagraphs (2), (3), (4) and (5) of paragraph (a) of this section will be used as target areas by naval aircraft. The areas shall be closed to navigation at all times, except for vessels engaged in operational and maintenance work as directed by the enforcing agency. Prior to the conduct of operations the areas will be patrolled by naval aircraft. "Buzzing" by plane will warn vessels that they are in a danger zone, and upon being so warned vessels which have inadvertently entered one of the areas shall immediately leave the area or areas.

(2) Target and bombing areas. The areas described in paragraph (b) (1) (i) and (2) of this section will be used as target and bombing areas by naval aircraft during daylight only. The area described in paragraph (b) (1) (ii) of this section will be used as a target and bombing area for both day and night operations. No use will be made of these areas for target and bombing operations during the period 30 days prior to and during the annual duck hunting season as established by the State of North Carolina. Dummy ammunition, water-filled and smoke bombs will be used, except during wartime when live ammunition and bombs may be used. The areas will be open to navigation, except for brief periods when target and bombing exercises are being conducted by naval aircraft. The areas will be patrolled and vessels shall clear the area under patrol upon being warned by the surface patrol craft or when "buzzed" by patrolling aircraft. No vessel shall enter the areas described in paragraph (b) (1) (i) and (2) of this section until the surface patrol craft and patrol aircraft leave the area or areas. As a further means of warning vessels of naval aircraft operations in the area described in paragraph (b) (1) (ii) of this section a cluster of flashing red lights at night and a large red flag by day will be displayed from the range observation tower located in the approximate center of the shore side of this area. No vessel shall enter the area until the surface patrol craft and patrol aircraft leave the area and the tower signals are discontinued.

(3) Naval Aviation Ordnance test area. The area described in paragraph (c) of this section shall be closed to navigation except for such military vessels as may be directed by the enforcing agency to enter on assigned duties.

(4) Enforcing agency. The regulations in this section shall be enforced by the Commander, Naval Air Base, Fifth Naval District, and such agencies as he may designate.

§ 204.55 Pamlico Sound and adjacent waters, N.C.; danger zones for Marine Corps operations. (a) Bombing and rocket firing area in Pamlico Sound in vicinity of Brant Island—(1) The area. The waters within a circular area with a radius of 3.0 statute miles having its center on the southern side of Brant Island at latitude 35°12′30″, longitude 76°26′30″.

(2) The regulations. The area shall be closed to navigation at all times except for vessels engaged in operational and maintenance work as directed by the enforcing agency. Prior to bombing or firing operations the area will be "buzzed" by plane. Upon being so warned vessels working in the area shall leave the area immediately.

(b) Bombing, rocket firing, and strafing areas in Pamlico Sound and Neuse River—(1) The areas. (i) The waters within a circular area with a radius of 1.8 statute miles having its center at latitude 35°02′12″, longitude 76°28′00″.

(ii) The waters within a circular area with a radius of 0.5 statute mile having its center at latitude 35°00′30″, longitude 76°29′50″.

(iii) The waters within a circular area with a radius of 0.5 statute mile having its center at latitude 35°04′12″, longitude 76°28′24″.

(iv) The waters within a circular area with a radius of 0.5 statute mile having its center at latitude 35°01′42″, longitude 76°25′48″.

(v) The waters within a circular area with a radius of 0.5 statute mile having its center at latitude 34°58′48″, longitude 76°26′12″.

(2) The regulations. (i) The areas described in subparagraph (1) (i) and (ii) of this paragraph will be used as bombing, rocket firing, and strafing areas. Live and dummy ammunition will be used. The areas shall be closed to navigation at all times except for such vessels as may be directed by the enforcing agency to enter on assigned duties. The areas will be patrolled and vessels "buzzed" by the patrol plane prior to the conduct of operations in the areas. Vessels which have inadvertently entered the danger zones upon being so warned shall leave the area immediately.

(ii) The areas described in subparagraph (1) (iii), (iv), and (v) of this paragraph will be used as bombing, rocket firing, and strafing areas. Practice and dummy ammunition will be used. All operations will be conducted during daylight hours, and the areas will be open to navigation at night. No vessel shall enter these areas during the hours of daylight without special permission from the enforcing agency. The areas will be patrolled and vessels "buzzed" by the patrol plane prior to the conduct of operations in the areas. Vessels which have inadvertently entered the danger zones upon being so warned shall leave the areas immediately.

(c) Enforcing agency. The regulations of this section shall be enforced by the Commander, Marine Corps Air Bases, East, Cherry Point, N.C., or his authorized representatives.

§ 204.56 New River, N.C., and vicinity; Marine Corps Firing Ranges. (a) Atlantic Ocean east of New River Inlet. The waters of the Atlantic Ocean within a sector bounded on the north by a line bearing 105° from latitude 34°37′25″, longitude 77°10′35″; on the east and south by the arc of a circle having a radius of 25,000 yards centered at latitude 34°34′15″, longitude 77°16′10″; on the west by a line bearing 205° from latitude 34°32′37″, longitude 77°18′34″, and on the northwest by the shore.

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

(b) New River. The firing ranges include all waters to the high waterline within eight sections described as follows:

(1) Traps Bay Sector. Bounded on the south by a line running from Cedar Point 280° to New River Light 70, thence 254° to Hatch Point; and on the northwest by a line running from Wilkins Bluff 232° to Hall Point.

(2) Courthouse Bay Sector. Bounded on the southeast by the northwest boundary of the Traps Bay Sector and on the west by Sneads Ferry Bridge.

(3) Stone Bay Sector. Bounded on the east by Sneads Ferry Bridge and on the north by a line running from a point on the east side of New River opposite the head of Sneads Creek 291°30′ to the south side of the mouth of Stone Creek.

(4) Stone Creek Sector. The northwest portion of Stone Bay, bounded on the south by the north boundary of the Stone Bay Sector; and on the east by longitude 77°26′.

(5) Grey Point Sector. Bounded on the south by the north boundary of the Stone Bay Sector; on the west by the east boundary of the Stone Creek Sector; and on the northeast by a line running from Town Point 113° to the south side of the mouth of French Creek.

(6) Farnell Bay Sector. Bounded on the south by the northeast boundary of the Grey Point Sector, including French Creek up to longitude 77°20′; and on the north by a line running from Hadnot Point 285°30′ to Holmes Point.

(7) Morgan Bay Sector. Bounded on the south by the north boundary of the Farnell Bay Sector, including Wallace Creek up to longitude 77°22′; and on the northwest by a line running from Paradise Point 243°30′ to Ragged Point.

(8) Jacksonville Sector. Bounded on the southeast by the northwest boundary of the Morgan Bay Sector, including Southwest Creek up to the point where it narrows to 200 feet in width, and Northeast Creek up to longitude 77°23′30″; and on the north by an east-west line passing through New River Day Beacon 41.

(c) The regulations. (1) Sailing vessels and any watercraft having a speed of less than 5 knots shall keep clear of any closed sector at all times after notice of firing therein has been given. Vessels propelled by mechanical power at a speed greater than 5 knots may enter the sectors without restriction except when the firing signals are being displayed. When these signals are displayed, vessels shall clear the closed sectors immediately and no vessels shall enter such sectors until the signals indicate that firing has ceased.

(2) Firing will take place both day and night at irregular periods throughout the year. Insofar as training requirements will permit, underwater explosions will be restricted in the Atlantic Ocean sector (described in paragraph (a) of this section) during the periods May 1 and June 5, inclusive, and November 22 to December 15, inclusive.

(3) Two days in advance of the day when firing in any

sector except the Stone Creek sector is scheduled to begin, the enforcing agency will warn the public of the contemplated firing, stating the sector or sectors to be closed, through the public press and the United States Coast Guard and, in the case of the Atlantic Ocean sector, the Cape Fear Pilots Association at Southport, and the pilots association at Morehead City, N.C. The Stone Creek sector may be closed without advance notice.

(4) Towers at least 50 feet in height will be erected near the shore at the northeast and southwest limits of the Atlantic Ocean sector, and towers at least 25 feet in height will be erected near the easterly shore at the upper and lower limits of each New River sector. On days when firing is to take place a red flag will be displayed on each of the towers marking the sector or sectors to be closed. These flags will be displayed by 8:00 a.m., and will be removed when firing ceases for the day. Suitable range markers will be erected indicating the bearings of the north and west limits of the Atlantic Ocean sector.

(5) During the night firing, red lights will be displayed on the towers; and, in the case of the Atlantic Ocean sector, searchlights will be employed as barrier lights to enable safety observers to detect vessels which may attempt to enter the danger zone.

(d) Target and bombing area in Atlantic Ocean in vicinity of Bear Inlet—(1) The area. The waters within an area described as follows: Beginning at latitude 34°37′32″, longitude 77°12′03″; thence to latitude 34°36′58″, longitude 77°11′25″; thence to latitude 34°37′44″, longitude 77°10′35″; thence to latitude 34°32′27″, longitude 77°06′30″; thence to latitude 34°30′50″, longitude 77°10′20″; thence to latitude 34°36′00″, longitude 77°14′00″; and thence to the point of beginning.

(2) The regulations. Vessels may proceed along established waterways except during military training periods. Warning of military training periods will be given through Notices to Mariners and by displaying one hour prior to commencement a red danger streamer during daylight hours or a red light at night, from a flag pole 40 feet in height located at the U.S. Coast Guard Life Boat Station, Bogue Inlet, Swansboro, N.C., and from observation tower 40 feet in height located at the northern end of Onslow (Hurst) Beach. Prior to bombing and firing operations, the area will be searched by plane. Watercraft in the area will be warned by aircraft "buzzing" of the impending target practice. Upon being so warned, vessels shall leave the area as quickly as possible by the most direct route.

(e) Inland waters in the Browns Inlet area between Bear Creek and Onslow Beach Bridge over the Atlantic Intracoastal Waterway—(1) The area. Navigable waters between Bear Creek and Onslow Beach Bridge to include all inlets, streams, bays, and water therein contained, bounded on the north by Bear Creek, on the east and south by the Atlantic Ocean, to the meridian 77°16′20″; thence by this meridian to latitude 34°34′31″; and thence by a line bearing 44° from this point until the line intersects Bear Creek.

(2) The regulations. (i) Vessels may proceed through the Atlantic Intracoastal Waterway in the area without stopping except in cases of extreme emergencies.

(ii) All navigable waters in the area between the south bank of Bear Creek and the north bank of the north connecting channel between the Atlantic Intracoastal Waterway and Browns Inlet shall be closed to navigation at all times. There are highly sensitive unexploded projectiles within the limits of this area.

(iii) Vessels may proceed through the north connecting channel and the south connecting channel (Banks Channel) in the area between the Atlantic Intracoastal Waterway and Browns Inlet to the Atlantic Ocean without stopping during periods of nonmilitary use. Caution should be used when proceeding through these waters due to the presence of unexploded projectiles lying in this area.

(iv) Navigable waters in the area between the south connecting channel (Banks Channel) leading to Browns Inlet and Onslow Beach Bridge on both sides of the Atlantic Intracoastal Waterway are open to unrestricted navigation during periods of nonmilitary use. An unknown element of risk exists in this area due to the possible presence of unexploded projectiles.

(v) Warning of impending military use of the area will be contained in weekly Notice to Mariners.

(vi) Vessels having specific authority from the Commanding General, Marine Corps Base, Camp Lejeune, N.C., may enter the area.

(f) Enforcing agency. The regulations of this section shall be enforced by the Commanding General, Marine Corps Base, Camp Lejeune, N.C., or his authorized representatives.

§ 204.80 Archers Creek and Ribbon Creek, S.C.; United States Marine Corps Recruit Depot Rifle Range, Parris Island. (a) During periods when the rifle range on Parris Island is in use Archers Creek between Broad River and Beaufort River and Ribbon Creek from Broad River entrance will be restricted to navigation.

(b) Firing over this range will take place between the hours of 6 a.m. and 5 p.m. from Monday through Friday of each week and from 6 a.m. to 12 m. on Saturdays, legal holidays excepted.

(c) Vessels and other watercraft shall not enter the restricted waters when firing is in progress. At all other times these waters are open to navigation. Warning signs indicating the periods when the range is in use will be posted at the entrances to Archers Creek and Ribbon Creek.

(d) The regulations in this section will be enforced by the Commanding General, Marine Corps Recruit Depot, Parris Island, S.C., and such agencies as he may designate.

§ 204.81 Atlantic Ocean off Georgia Coast; air-to-air and air-to-water gunnery and bombing ranges for fighter and bombardment aircraft, United States Air Force. (a) The danger zones—(1) For fighter aircraft. An area approximately 30 miles offshore between Wassaw Sound and Brunswick, Georgia, described as follows: Beginning at latitude 31°55′30″, longitude 80°24′00″; thence 90° true to longitude 80°16′00″; thence south-

westerly to latitude 31°10′00″, longitude 80°43′00″; thence 270° to longitude 80°51′00″; and then northeasterly to the point of beginning.

(2) For bombardment aircraft. An area approximately 70 miles off shore between Savannah Beach and Brunswick, Ga., described as follows: Beginning at latitude 32°00′00″, longitude 79°43′00″; thence 90° true to longitude 79°07′00″; thence southwesterly to latitude 31°10′00″, longitude 79°24′00″; thence 270° true to longitude 80°00′00″; and thence northeasterly to the point of beginning.

(b) The regulations. (1) The danger zones shall be open to navigation except when aerial gunnery or bombing practice is being conducted.

(2) Prior to conducting each practice the entire area will be patrolled by aircraft to warn any watercraft found in the vicinity that such practice is about to take place. The warnings will be by "buzzing," i.e., by flying low over the watercraft. Any watercraft shall, upon being so warned, immediately leave the area designated and shall remain outside the area until practice has ceased.

(3) The regulations in this section shall be enforced by the Commanding Officer, 2d Bombardment Wing, Hunter Air Force Base, Savannah, Ga., and such agencies as he may designate.

§ 204.82 Lake George, Fla.; naval bombing area. (a) The danger zone. An area in the eastern part of Lake George described as follows: Beginning at latitude 29°13′16″, longitude 81°34′28″; thence along a line parallel to the navigation channel to latitude 29°20′05″, longitude 81°36′15″; thence along a line about three-fifths mile southerly from the Putnam-Volusia County line to latitude 29°20′19″, longitude 81°35′12″; thence to latitude 29°18′36″, longitude 81°33′53″; thence to latitude 29°13′22″, longitude 81°32′38″; and thence to the point of beginning. The area will be marked by appropriate warnings signs at the five corners and at the midpoint of the longer side.

(b) The regulations. (1) Bombing operations will be confined, as nearly as practicable, to the north-south center line of the danger zone, keeping well clear of the navigation channel.

(2) Prior to each bombing operation the danger zone will be patrolled by naval aircraft which will warn vessels to leave the area by "zooming" a safe distance to the side and at least 500 feet above the surface. Upon being so warned such vessels shall leave the danger zone immediately, and no vessels shall enter the danger zone until bombing operations have ceased.

(3) At intervals of not more than three months, public notices will be issued that bombing operations are continuing. Such notices will appear in the local newspaper and in "Notice to Mariners".

(4) The regulations in this section shall not deny passage through Lake George by regular cargo-carrying vessels proceeding along established lanes for such vessels. When any such vessel is within the danger zone the officer in charge of the bombing operations will cause the cessation or postponement of such operations until the vessel has cleared the area. The vessel shall proceed on its normal course and shall not delay its progress.

(5) The regulations in this section shall be enforced by the Commander, Naval Air Bases, Sixth Naval District, Naval Air Station, Jacksonville, Fla., and such agencies as he may designate.

§ 204.85 Atlantic Ocean off Cape Canaveral, Fla.; Air Force Missile Testing Area, Patrick Air Force Base, Fla. (a) The danger zone. An area in the Atlantic Ocean immediately offshore from Cape Canaveral defined by a line 3 nautical miles from shore, said area terminating in the north at a line on a bearing of 70° from a point on shore at approximate latitude 28°35′ north and in the south at a line on a bearing of 115° from a point on the shore at approximate latitude 28°25′ north.

(b) The regulations. (1) All unauthorized vessels are prohibited from operating within the danger zone during firing periods to be specified by the Commander, Air Force Missile Test Center, Patrick Air Force Base.

(2) Warning signals will be used to warn vessels that the danger zone is active. These signals will be in the form of a large red ball and a red flashing high intensity beacon. One signal will be located on a 90-foot pole near the shoreline at the north end of the danger zone, and one signal will be located on a 90-foot pole near the shoreline about one-half mile north of the south limit of the danger zone. An amber rotating beacon and warning sign will be erected on the north side of the Port Canaveral ship channel to indicate to vessels about to leave the harbor that the danger zone is in use.

(3) When the signals in subparagraph (2) of this paragraph are displayed, all vessels, except authorized patrol vessels, will immediately leave the danger zone by the most direct route and stay out until the signals are discontinued.

(4) The regulations in this paragraph shall be enforced by the Commander, Air Force Missile Test Center, Patrick Air Force Base, Fla., and such agencies as he may designate.

§ 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 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.

§ 204.95 Straits of Florida and Florida Bay in vicinity of Key West, Fla.; operational training area, aerial gunnery range, and bombing and strafing target areas, Naval Air Station, Key West, Fla. (a) The danger zones—(1) Operational training area. Waters of the Straits of

Florida and Gulf of Mexico southwest, west and northwest of Key West bounded as follows: Beginning at latitude 25°45′00″, longitude 82°07′00″; thence southeast to latitude 24°49′00″, longitude 81°55″00″; thence southwest to latitude 24°37′30″, longitude 82°00′30″; thence westerly to latitude 24°37′30″, longitude 82°06′00; thence southerly to latitude 24°28′30″, longitude 82°06′00″; thence southerly to latitude 24°25′00″, longitude 82°06′30″; thence easterly to latitude 24°25′00″, longitude 81°57′00″; thence southwesterly to latitude 23° 30′00″, longitude 82°19′00″; thence westerly to latitude 23°30′00″, longitude 82°46′00″; thence northwesterly to latitude 23°52′30″, longitude 83°11′00; thence northerly to latitude 24°25′00, longitude 83°11′00″; thence easterly to latitude 24°25′00″, longitude 83°08′00″; thence clockwise along the arc of a circle with a radius of 92 miles centered at latitude 24°35′00″, longitude 81°41′15″ to latitude 25°45′05″, longitude 82°23′30″; thence east to point of beginning.

(2) Bombing and strafing target areas.

(i) A circular area immediately west of Marquesas Keys with a radius of two nautical miles having its center at latitude 24°33.4′ and longitude 82°10.9′, not to include land area and area within Marquesas Keys. The target located within this area, a grounded LSIL will be used for bombing and aircraft rocket exercises.

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

(iii) Two circular areas located west of Marquesas Keys each with a radius of two nautical miles, one having its center at latitude 24°34′30″ and longitude 82°14′00″, and the other having its center at latitude 24°34′30″ and longitude 82°24′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, Fla., 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.

PART 207—NAVIGATION REGULATIONS:

§ 207.153 Elizabeth River, Southern Branch, Va., naval restricted areas. (a) The areas—(1) St. Helena Annex Area. Beginning at a point at St. Helena Annex of the Norfolk Naval Shipyard, on the eastern shore of Southern Branch of Elizabeth River, at latitude 36°49′43″, longitude 76°17′26.5″; thence in a southwesterly direction to a point on the eastern boundary of Norfolk Harbor 40-foot channel at latitude 36°49′42″, longitude 76°17′33″; thence in a southerly direction along the eastern boundary of Norfolk Harbor 40-foot channel to latitude 36°49′28″, longitude 76°17′27″; thence easterly to the shore at latitude 36°49′28″, longitude 76°17′22″; and thence, northerly along the shore to the point of beginning.

(2) Norfolk Naval Shipyard Area. Beginning at a point on the shore at the northeast corner of the Norfolk Naval Shipyard, at latitude 36°49′43.5″, longitude 76°17′41.5″; thence due east approximately 100 feet to the western boundary of Norfolk Harbor 40-foot channel; thence in a southerly direction along the western boundary of the channel to latitude 36°48′58″, longitude 76°17′34.5″; thence southwesterly to latitude 36°48′46″, longitude 76°17′43.5″; thence southeasterly to the western boundary of Norfolk Harbor 40-foot channel at the point where it passes through the draw of the Norfolk and Portsmouth Belt Line Railroad bridge; thence in a southwesterly direction along the northerly side of the bridge to the western shore of Southern Branch of Elizabeth River; and thence along the shore in a northerly direction to the point of beginning.

(3) Southgate Terminal Area. Beginning at a point at the northeast corner of Southgate Terminal Annex of Norfolk Naval Shipyard, at latitude 36°48′23″, longitude 76°17′39″; thence east to latitude 36°48′23″, longitude 76°17′29″; thence southerly along the western boundary of Norfolk Harbor 35-foot channel to latitude

36°48′04″, longitude 76°17′33″; thence west to latitude 36°48′04″, longitude 76°17′41″; and thence along the shore in a northerly direction to the point of beginning.

(b) The regulations. (1) No loitering within the areas will be permitted.

(2) This section shall be enforced by the Commander, Norfolk Naval Shipyard, Portsmouth, Virginia.

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

§ 207.158 Chesapeake Bay entrance; naval restricted area. (a) The area. Beginning at a point on the south shore of Chesapeake Bay at longitude 76°03′06″; thence to latitude 37°01′18″, longitude 76°02′06″; thence to latitude 37°00′18″, longitude 75°55′54″; thence to latitude 36°58′00″, longitude 75°48′24″; thence to latitude 36°51′48″, longitude 75°51′00″; thence to the shore at longitude 75°58′48″, and thence northwesterly and southwesterly along the shore at Cape Henry to the point of beginning.

(b) The regulations. (1) Anchoring, trawling, crabbing, fishing, and dragging in the area are prohibited, and no object attached to a vessel or otherwise shall be placed on or near the bottom.

(2) This section shall be enforced by the Commandant, Fifth Naval District, Norfolk, Va.

§ 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, Fla.

(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, Va.
U.S. District Engineer, Wilmington, N.C.
U.S. District Engineer, Charleston, S.C.
U.S. District Engineer, Savannah, Ga.
U.S. District Engineer, Jacksonville, Fla.

(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 con-

structed 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 vessels or rafts shall approach within 300 feet of any lock entrance unless signaled 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 allowed more in special cases. If tows or rafts are waiting above and below a lock for lockage, sections will be locked both ways alternately whenever practicable. When there are two or more tows or rafts awaiting lockage in the same direction, no part

of one shall pass the lock until the whole of the one preceding it shall have passed.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(4) Assembly and handling of tows.

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

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

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

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

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

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

is received. On receiving the answering signal, they shall then proceed to pass at a speed sufficiently slow to insure safe navigation.

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

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

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

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

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

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

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

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

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

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

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

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

§ 207.162 Pasquotank River, N.C.; seaplane restricted area. (a) The restricted area. That part of the Pasquotank River bounded on the east by a line from Pasquotank River Obstruction Light B (approximately latitude 36°16′18″, longitude 76°07′16″) to Pasquotank River Light 5 (approximately latitude 36°15′14.5″, longitude 76°07′44.5″); on the west by a line bearing due north from Pasquotank River Light 7 (approximately latitude 36°17′19″, longitude 76°11′20.5″); and on the north and south by the lines of seven-foot depth.

(b) The regulations. (1) Vessels without proper lights shall not operate within the area.

(2) Vessels shall not anchor or moor within the area.

(3) Fishing, oystering, clamming, crabbing, and similar activities are prohibited within the area.

(4) All vessels traversing the area shall navigate as near the northeast shore of the river as practicable, and shall remain in the area a minimum length of time.

(5) The regulations in this section shall be enforced by the Commanding Officer, Coast Guard Air Station, Elizabeth City, North Carolina, and such agencies as he may designate.

§ 207.164 Neuse River and tributaries at Marine Corps Air Station, Cherry Point, N.C.; restricted area. (a) The area. That portion of Neuse River within 500 feet of the shore along the reservation of the Marine Corps Air Station, Cherry Point, North Carolina, extending from the mouth of Hancock Creek to a point approximately 6,800 feet west of the mouth of Slocum Creek, and all waters of Hancock and Slocum Creeks and their tributaries within the boundaries of the reservation.

(b) The regulations. (1) Except in cases of extreme emergency, all vessels other than those operated by the United States Navy or Coast Guard are prohibited from entering this area without prior permission of the enforcing agency.

(2) The regulations in this section shall be enforced by the Commanding General, United States Marine Corps Air Station, Cherry Point, North Carolina, and such agencies as he may designate.

§ 207.164a Cape Fear River and tributaries at Sunny Point Army Terminal, Brunswick County, N.C.; restricted area. (a) The area. That portion of Cape Fear River due west of the main ship channel extending from U.S. Coast Guard buoy No. 31A at the north approach channel to Sunny Point Army Terminal to U.S. Coast Guard buoy No. 23A at the south approach channel to Sunny Point Army Terminal and all waters of its tributaries therein.

(b) Except in cases of extreme emergency, vessels of any size or rafts other than those authorized by the Commander, Sunny Point Army Terminal, are prohibited from entering this area without prior permission of the enforcing agency.

(c) The regulations in this section shall be enforced by the Commander, Sunny Point Army Terminal, Southport, North Carolina, and such agencies as he may designate.

§ 207.164b Cooper River and tributaries at Naval Ammunition Depot, Charleston, S.C.; restricted area. (a) The area. That portion of Cooper River extending from the mouth of Goose Creek to Red Bank Landing, a distance of approximately 4.8 miles, and the tributaries to Cooper River within 1½ mile radii of the ammunition piers.

(b) The regulations. (1) Vessels other than those authorized by the Commanding Officer, Naval Ammunition Depot, entering the restricted area shall proceed at normal speed and under no circumstances anchor, fish or loiter in any way until clear of the restricted area. The area will be marked with suitable warning signs.

(2) The regulations in this section shall be enforced by the Commanding Officer, Naval Ammunition Depot, Charleston, S.C., and such agencies as he may designate.

§ 207.165 St. Johns River, Fla., Ribault Bay; prohibited area. (a) The area. All waters constituting the Turning Basin within the Naval Air Base Reservation, Mayport, Florida, and inclosed by a line bearing approximately 180° true from Ribault Channel Light 4 to the shore at a point connecting with the Naval Base boundary line fence.

(b) The regulations. (1) All vessels and craft except those operated by the United States Navy or Coast Guard are prohibited from entering this area except in cases of extreme emergency.

(2) This section shall be enforced by the Commander, United States Naval Air Station, Jacksonville, Fla., and such agencies as he may designate.

§ 207.165a St. Johns River, U.S. Naval Air Station, Jacksonville, Fla.; seaplane restricted area. (a) The area. That portion of St. Johns River between east-west lines at approximate latitude 30°14′47″ and latitude 30°11′41.5″.

(b) The regulations. (1) Watercraft may navigate, anchor, or moor within the operating area. Fishing will be permitted.

(2) Watercraft utilizing the 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. No unlighted watercraft, regardless of size, shall operate in the seaplane area during hours of darkness (sunset to sunrise).

(3) 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. It is, therefore, 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 within the area.

(4) Seaplane landings and takeoffs will be covered by the presence of a station crash boat whenever possible. Under unusual and infrequent circumstances seaplanes may be limited to a particular heading or portion of the operating area, and watercraft in that vicinity may be requested by the crash boat 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 crash boat for the mutual safety of boats and aircraft.

(5) The regulations in this section shall be enforced by the Commanding Officer, U.S. Naval Air Station, Jacksonville, Fla., and such agencies as he may designate.

§ 207.166 St. Johns River, Fla.; naval restricted area, United States Naval Station, Green Cove Springs, Fla.

(a) The area. The waters of the St. Johns River within the following described area: Beginning on the shore at latitude 29°59′20″, longitude 81°40′00″; thence to latitude 29°59′40″, longitude 81°39′49.5″; thence to latitude 29°59′42″, longitude 81°39′39″; thence to latitude 29°59′-11″, longitude 81°38′39″; thence to latitude 29°58′56″, longitude 81°38′41″; thence along a line 50 feet south of and parallel to pier "A" to the shore; thence with the shore and bulkhead line to the point of beginning.

(b) The regulations. (1) No vessel or other craft except vessels operated by the Navy shall enter the restricted area or within 300 feet of piers Nos. 1 through 12 and ships moored in the area, or within 50 feet of pier "A", unless specific permission to enter has been granted the vessel or craft by the enforcing agency.

(2) Fishing is prohibited in the area.

(3) This section shall be enforced by the Commanding Officer, U.S. Naval Station, Green Cove Springs, Fla., and such agencies as he may designate.

§ 207.170 Federal Dam, Oklawaha River, Moss Bluff, Fla.; pool level. (a) The level of the pool shall normally be maintained at elevation 56.5 feet above sea level: Provided, That the level of the pool may be raised to not exceeding 58.5 feet above sea level at such times as may be authorized in writing by the District Engineer, Jacksonville, Fla., and subject to such conditions as he may specify.

(b) When, in the opinion of the District Engineer, an emergency exists requiring the lowering of the pool level to an elevation less than 56.5 feet above sea level either to safeguard the dikes or to increase the discharge from Lake Griffin in times of high water, the discharge past the dam shall be regulated in such manner as he may direct until he shall declare the emergency passed.

§ 207.170a Eugene J. Burrell Navigation Lock in Haines Creek near Lisbon, Florida; 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 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 this lock indicating the nature of the regulations of this section.

§ 207.170b Apopka-Beauclair Navigation Lock in Apopka-Beauclair Canal in Lake County, 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 7:00 a.m. to 12:00 noon, and from 1:00 p.m. to 7:00 p.m., during the period of February 15 through Ooctober 15 each year; and from 8:00 a.m. to 12 noon, and from 1:00 p.m. to 6:00 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 the lock shall place signs, of such size and descriptions as may be designated by the District Engineer, U.S. Army Engineer District, Jacksonville, Fla., at each side of this lock indicating the nature of the regulations.

§ 207.170c Kissimmee River, navigation locks between Lake Tohopekaliga and Lake Okeechobee, Fla.; use, administration and navigation. (a) The owner of or agency controlling the locks shall be required to open the navigation locks upon demand for passage of vessels during the following hours and periods:

Locks S–61, S–65, and S–65E: Monday through Friday, all year: 7:00 a.m. to 6:00 p.m. Saturdays, Sundays, 1 March–31 October: 5:30 a.m. to 7:30 p.m.; 1 November–28 February, 5:30 a.m. to 6:30 p.m.

Lock S–65D: Monday through Friday, all year: 8:00 a.m. to 5:00 p.m. Saturdays, Sundays, 1 March–31 October: 5:30 a.m. to 7:30 p.m.; 1 November–28 February: 5:30 a.m. to 6:30 p.m.

(b) The owner of or agency controlling the locks 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 locks indicating the nature of the regulations of this section.

§ 207.171 Canaveral Harbor adjacent to the Navy pier at Port Canaveral, Fla.; restricted area. (a) *The area.* The waters of Canaveral Harbor within a line circumscribing the water approaches to the Navy pier along the northeasterly edge of the Canaveral Harbor turning basin at a distance of 200 feet from all portions of the pier including the dolphins 200 feet off the northwest end and 75 feet off the southeast end of the pier.

(b) *The regulations.* (1) all unauthorized vessels and personnel are prohibited from the area during specified periods.

(2) The area will be closed when a red ball is shown by day or red flashing lights are displayed by night from the southwest side of the Port Canaveral water tower. The red lights will be shielded to seaward.

(3) Lighted signs indicating the restricted area will be placed on the pier and adjacent thereto.

(4) The regulations in this section shall be enforced by the Commanding Officer, U.S. Naval Ordnance Test Unit, AFMTC, Patrick Air Force Base, Fla.

§ 207.171a Banana River at Cape Canaveral Missile Test Annex, Fla.; prohibited area. (a) *The area.* The waters within a semicircle with a radius of 10,000 feet centered on the easterly shore of Banana River at Cape Kennedy at latitude 28°27′23″, longitude 80°35′48″.

(b) *The regulations.* (1) All unauthorized craft shall stay clear of the area at all times.

(2) The regulations in this section shall be enforced

by the Commander, Air Force Missile Test Center, Patrick Air Force Base, Fla., and such agencies as he may designate.

§ 207.171c Banana River at Patrick Air Force Base, Fla.; seaplane restricted area. (a) The area. Beginning at a point approximately 4 miles south of Casino at Cocoa Beach, Fla., latitude 28°15′38″, longitude 80°36′40″; thence northwesterly a distance of 2,050 yards to a point latitude 28°16′12″, longitude 80°37′38″; thence northeasterly a distance of 990 yards to a point latitude 28°16′41″, longitude 80°37′33″; thence westerly a distance of 1,900 yards to a point latitude 28°16′41″, longitude 80°38′38″; thence south a distance of 3,975 yards to a point latitude 28°14′43″, longitude 80°38′38″; thence easterly a distance of 1,450 yards to a point latitude 28°14′43″, longitude 80°37′49″; thence northeasterly a distance of 2,400 yards to a point latitude 28°15′53″, longitude 80°37′40″; thence southeasterly a distance of 1,900 yards to a point latitude 28°15′21″, longitude 80°36′49″; thence northeasterly a distance of 600 yards along the westerly edge of a prohibited area to the point of beginning.

(b) The regulations. (1) Watercraft may navigate, anchor, or moor within the operating area when area is not in use by seaplanes.

(2) The area may be utilized by seaplanes at any hour between 8:00 a.m. and 4:00 p.m. during Monday through Friday. Training will be limited to two hours during one training period.

(3) The enforcing agency will send a patrol boat to warn watercraft in or near the area of impending operations. The patrol boat will utilize a power amplifier to orally request all watercraft to vacate the area.

(4) Watercraft shall promptly clear the area when seaplanes are observed approaching the area, or when requested to do so, and shall remain clear of the area while seaplanes are operating therein.

(5) The regulations shall be enforced by the Commander, Air Force Missile Test Center, Patrick Air Force Base, Florida, and such agencies as he may designate.

§ 207.171d Atlantic Ocean near Port Everglades, Fla.; Naval restricted area. (a) The area. An area bounded on the east by longitude 80°03′30″, on the south by latitude 26°03′00″, on the west by the beach south of Port Everglades Entrance Channel and a line extended northeasterly on the alinement of the beach to a point on the southerly limit of the entrance channel, and on the north by the southerly limit of said entrance channel and its easterly prolongation to longitude 80°03′30″.

(b) The regulations. (1) Anchoring of oceangoing vessels or any vessel with draft in excess of 12 feet shall be prohibited in the area.

(2) The regulations of this section shall be enforced by the Officer-in-Charge, U.S. Naval Ordnance Laboratory Testing Facility, Ft. Lauderdale, Fla., and such agencies as he may designate.

§ 207.172 Biscayne Bay, Fla.; seaplane restricted and operating areas, Coast Guard Air Station, Miami, Fla. (a) The seaplane restricted area—(1) The area. The waters of Biscayne Bay in the vicinity of Dinner Key Channel within an irregular area described as follows: Beginning at the intersection of the easterly extension of the line of the north wall of the Coast Guard hangar and the sheet steel bulkhead; thence 13°33′, along the bulkhead, 160 feet; thence 51°00′, 128 feet; thence 141°00′, 390 feet; thence 74°02′, 257 feet; thence 136°53′, 186 feet; thence 74°02′, 945 feet; thence 151°49′, 1,041 feet; thence 214°07′, 250 feet; thence 124°08′, 2,680 feet; thence 214°07′, 600 feet; thence 304°08′, 2,680 feet; thence 214° 07′, 290 feet; thence 304°08′, 1,615 feet, to the sheet steel bulkhead; thence 341°48′, along the bulkhead, 701 feet; and thence 13°33′, along the bulkhead, 166 feet, to the point of beginning.

Note: All bearings are referred to true meridian.

(2) The regulations. (i) Watercraft shall not anchor or moor within the restricted area. Fishing in the area is prohibited.

(ii) Watercraft shall use the area to the minimum extent practicable, and only for the purpose of passing through as expeditiously as possible. No watercraft shall use the channel from one-half hour after sundown to one-half hour before sunrise except in the case of an emergency involving danger to life or property.

(iii) Watercraft in the area shall give seaplanes the right-of-way at all times. All watercraft shall promptly clear the area when seaplanes are observed approaching the area or when warned by the siren of a crash boat, and shall remain clear of the area while seaplanes are operating in the area.

(iv) The enforcing agency will send out a crash boat or boats to warn watercraft in or near the area of impending operations within the area. Each crash boat will sound a siren to attract the attention of watercraft and the crew will display a sign reading "Plane Approaching: Clear Channel at Once".

(v) The enforcing agency will post at each end of the area a large sign reading "Danger! Coast Guard Planes Have Right-of-Way in This Channel. Use Channels to South If Practicable. Clear Channel Promptly When Planes Are Observed Approaching Or When Warned By Siren of Crash Boat."

(b) The seaplane operating area—(1) The area. Beginning at Dinner Key Seaplane Channel Lighted Buoy 2A marking the entrance to the seaplane restricted area, thence 105° for approximately 4,350 feet to Dinner Key Seaplane Channel Approach Light 2; thence 54° for approximately 9,900 feet to Miami South Channel Entrance Range Front Light; thence 178° for approximately 4,350 feet to Miami South Channel Entrance Range Rear Light; thence 182° for approximately 12,750 feet to Southwest Point Daybeacon 26; thence 270° for approximately 13,500 feet to a position in Biscayne Bay at latitude 25°41′24″, longitude 80°13′30″; thence 30° for approximately 9,900 feet to Dinner Key Channel Daybeacon 2; thence 313°

for approximately 4,920 feet to Dinner Key Seaplane Channel Lighted Buoy 1 marking the southernmost portion of the entrance to the seaplane restricted area; thence 34° for approximately 600 feet to the point of beginning.

Note: All bearings are referred to true meridian.

(2) The regulations. (i) Watercraft may navigate, anchor, or moor within the operating area. Fishing will be permitted.

(ii) Watercraft utilizing the 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.

(iii) 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 within the area.

(iv) Seaplane landings and takeoffs will be covered by the presence of a station crash boat whenever possible. Under unusual and infrequent circumstances seaplanes may be limited to a particular heading or portion of the operating area, and watercraft in that vicinity may be requested by the crash boat 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 crash boat for the mutual safety of boats and aircraft.

(c) Notices. Notices covering the regulations in this section will be posted at the nearby marina and wharves and at boat basins in Miami and adjoining towns.

(d) Enforcement. The regulations in this section shall be enforced by the Commanding Officer, United States Coast Guard Air Station, Miami, Florida, and such agencies as he may designate.

§ 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, Fla., 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 (see § 207.174).

(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), (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.

§ 207.174 Gulf of Mexico, seaplane restricted area, Naval Air Station, Key West, Fla. (a) The area. An irregular area north of Key West Island, east of Fleming Key, and north and west of Dredgers Key, bounded as follows: Beginning at latitude 24°34′02″, longitude 81°-47′36″; thence due north to latitude 24°35′30″; thence to latitude 24°35′55″, longitude 81°47′50″; thence to latitude 24°35′59″, longitude 81°47′41″; thence due east to longitude 81°47′24″; thence to latitude 24°35′55″, longitude 81°46′30″; thence to latitude 24°35′42″, longitude 81°46′18″; thence to latitude 24°35′26″, longitude 81°-46′33″; thence due south to latitude 24°35′16″; thence due east to longitude 81°46′00″; thence due south to latitude 24°35′09″; thence due west to longitude 81°46′-29″; thence to latitude 24°34′27″, longitude 81°47′14″; thence to latitude 24°34′02″, longitude 81°47′20″, and thence to the point of beginning.

(b) The regulations. (1) Entering or crossing the seaplane restricted areas 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 seaplane landing area except at such times as seaplane operations are scheduled when navy patrol boats will order all other boats to clear the landing area.

(2) Vessels using the perimeter channel along the east side of Fleming Key and along the north side of the Naval Air Station shall travel at a slow speed.

(3) Vessels using the perimeter channel shall lie to as close to the boundary markers as possible during landings or takeoffs of aircraft in the restricted area.

(4) Vessels using the perimeter channel past the seaplane ramp shall give wide berth to seaplane equipment located adjacent to the ramp, and shall lie to if in the vicinity of the ramp when beaching or launching operations are in progress.

(5) No object that might endanger seaplane operations shall be cut adrift or thrown overboard.

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

§ 207.900 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, N.Y.

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

(3) Wilmington Reserve Fleet, Brunswick River near Wilmington, N.C.

(4) Mobile Reserve Fleet, Tensaw River near Bay Minette, Ala.

(5) Beaumont Reserve Fleet, Neches River near Beaumont, Tex.

(6) Suisun Bay Reserve Fleet near Benicia, Calif.

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

(8) Olympia Reserve Fleet, Budd Inlet at Olympia, Wash.

(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.

3. CAPE HENRY TO KEY WEST

The Atlantic Coast of the United States from Cape Henry to Cape Florida is low and sandy, backed by woods. From Cape Florida to Key West the coast is formed by a long chain of small islands known as Florida Keys. The Florida Reefs extend seaward of the keys and are nearly parallel to them.

The coastline of Virginia from Cape Henry southward to the boundary of North Carolina is firm land for 13 miles; then it becomes a barrier beach, covered with sand dunes for 11 miles. The boundary between Virginia and North Carolina is the only marked boundary on this section of the coast. The easternmost boundary monument is a granite shaft 6 feet high about 0.5 mile west of the beach.

The coastline of North Carolina is a long barrier beach. The islands are known as **banks.** The banks are constantly shifting sand dunes varying in height. Three capes, with their offshore shoals, project from the islands, namely: Hatteras, Lookout, and Fear. Behind the barrier beach a chain of sounds, including Currituck, Roanoke, Albemarle, Pamlico, Core, and Bogue, stretch along the entire 300 miles of coastline of the State.

Bordering the sounds on the mainland is a belt from 30 to 80 miles wide, where the land is level and sometimes swampy. On the north a portion of the Great Dismal Swamp spreads across the border of Virginia into North Carolina. Between Albemarle Sound and Pamlico River the swamplands are locally known as **dismals** and **pocosins.** They occur on the divides or watersheds between the rivers and sounds. In the southeast section of North Carolina are the **savannas,** treeless prairie land with a thick growth of grass and wild flowers; they have been formed by a lack of drainage and a close impervious soil.

The coastline of South Carolina from Little River Inlet to Winyah Bay is practically an unbroken beach. Cape Romain, just south of Winyah Bay, and the shoal extending seaward from it, form the southern point of indentations which had its northern point at Cape Fear. From Winyah Bay to Savannah River, the boundary between South Carolina and Georgia, the coastline is a border of sandy barrier islands. The large sounds so characteristic of the North Carolina coast are missing.

The coastline of Georgia between Savannah River on the north and St. Marys River on the south is partly submerged at flood tide, and is broken by tidal rivers and marshes covered with dense grasses. The most important sandy islands off the coast are Tybee, Wassaw, Ossabaw, St. Catherines, Sapelo, St. Simons, Jekyll, and Cumberland.

The coastline of Florida is a long, low, barrier beach, from the border of Georgia south to Cape Florida. Many of the leading tourist towns have been built on this beach, while the business districts are often on the mainland.

Under the sand and the lagoons is a limestone called **coquina,** which is soft while in its native state, but becomes a hard building stone when exposed to the air.

Below Cape Florida 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 keys are generally low and covered with mangrove.

Aids to navigation.—Lights are on or near the dangerous capes, at the entrance to the harbors, and along the Florida Reefs. A lightship is stationed off Diamond Shoals. Radiobeacons are at the lightship and most of the principal light stations. This section of the coast is well covered by Loran. The critical dangers are buoyed.

There are numerous aviation lights along the coast that are useful for navigation purposes, but they should not be confused with the marine lights.

Boundary Lines of Inland Waters.—At all buoyed entrances from seaward to bays, sounds, rivers, or other estuaries for which specific lines are not described, **Inland Pilot Rules** apply shoreward of the outermost buoy or other aid to navigation of any system of aids; **International Pilot Rules** apply outside the aids. Specific lines are described in **Part 82, Chapter 2.**

Control over movement of vessels.—See **Part 124,** Chapter 2, for regulations requiring advance notice of vessel's time of arrival to Captain of the Port.

Harbor entrances.—The entrance to every harbor on this stretch of the coast is more or less obstructed by a shifting sand bar over which the channel depth is changeable. The entrance channels of the larger and more important harbors have been improved by dredging; in some cases jetties have been built from both sides of the entrance.

The buoys on many of the bars are not charted because they are moved from time to time to indicate the changing channel. They are liable to be dragged out of position and cannot always be replaced immediately, so a stranger must use the greatest caution. If possible, a stranger should enter a harbor or inlet on a rising tide.

The tidal currents have considerable velocity in all of the entrances, and their direction is affected by the force and direction of the wind; sailing vessels entering the harbors and sounds require a fair working breeze during the ebb.

Strangers should not attempt to enter the harbors without the assistance of a pilot during easterly gales when the sea breaks on most of the bars.

Depths.—Between Cape Henry and Jupiter Inlet frequent soundings will give the mariner timely warning of his approach to the land from seaward.

Northward of Cape Hatteras the 20-fathom curve is from 13 to 45 miles offshore, but inside of 15 fathoms the depths are irregular and many holes of limited extent lie inside the general limits of corresponding depths; 10 to 14 fathoms are found in places only 1.5 miles offshore. This irregularity of depth is apt to confuse the mariner and lead him into danger in thick weather; the greatest caution should therefore be used inside of a depth of 20 fathoms. By keeping over 6 miles from the beach all dangers will be avoided, but the strong currents which sometimes set along the shore must be considered, especially after a gale.

Southeastward of Cape Hatteras, and off the end of the shoals which extend seaward about 8 miles, the 20-fathom curve is from 12 to 15 miles offshore, and the 30-fathom curve is only a short distance farther. In thick weather, soundings of 20 fathoms or less should warn the mariner to keep offshore.

From Cape Hatteras to Jupiter Inlet, the 20-fathom curve is fairly regular and for a greater part of the distance is from 40 to 55 miles offshore. Northward of St. Johns River, the water shoals uniformly to the 10-fathom curve, which, excepting in the two great bights between Cape Hatteras and Cape Fear, is from 10 to 30 miles offshore. Vessels bound for any of the harbors between Cape Fear and St. Johns River should approach the land with caution when in 10 fathoms of water; inside the 10-fathom curve depths are irregular and spots of 5 fathoms or less will be found from 6 to 12 miles offshore. In thick weather vessels standing along the coast should keep a general depth of 10 fathoms between Cape Fear and St. Johns River.

In a heavy sea, depths of less than 6 fathoms show discolored water; deep-draft vessels should be cautious about passing over such spots.

Southward of St. Johns River, the 20-fathom curve draws inshore gradually and at Jupiter Inlet is only 4 miles from the beach, and the 100-fathom curve a little over 8 miles. Southward of Jupiter Inlet, both curves draw closer inshore, and along the Florida Reefs the 20-fathom curve is close in to the reefs, while the 100-fathom curve is at an average distance of about 7 miles outside the reefs. The 10-fathom curve between St. Johns River and Jupiter Inlet is irregular and of no use in determining distance from shore. Approaching Florida Reefs southward of Jupiter Inlet, soundings are of little use unless taken frequently as the water shoals rapidly from seaward.

When approaching the Bahama Banks along the Straits of Florida, the discolored water is the best indication the mariner has to warn him of shoal water; the 100-fathom curve at some points is only 1 or 2 miles from the shoal water of the banks.

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.

Anchorages.—Vessels may find refuge at a number of places along the coast according to draft. The more important places are Lookout Bight, Beaufort Inlet, Cape Fear River, Winyah Bay, Charleston Harbor, Port Royal Sound, Savannah River, Sapelo Sound, St. Simons Sound, Cumberland Sound, St. Johns River, Fort Pierce Inlet, Lake Worth Inlet, Port Everglades, Miami, and Key West.

Dangers.—A number of wrecks are located along the coast which are obstructions to navigation. Most of the dangerous wrecks are marked with lighted buoys. A careful check should be made of the chart to insure that dangerous wrecks are not along the routes selected.

ROUTES—East coast of the United States to Key West.—Proceed as direct as safe navigation permits to 35°08′ N., 75°15′ W., off Diamond Shoal Lightship, thence on rhumb lines through the following positions:

Outer route to Jupiter Inlet Light
33°00′ N., 75°35′ W.
28°00′ N., 79°00′ W.
26°57′ N., 80°00′ W., off Jupiter Inlet Light

Inner route to Jupiter Inlet Light
33°27′ N., 77°32′ W., off Frying Pan Shoals
32°00′ N., 80°00′ W.
31°00′ N., 80°30′ W.
29°30′ N., 80°30′ W.
28°39′ N., 80°17′ W., off Hetzel Shoal lighted whistle buoy 8
27°24′ N., 80°02′ W., off wreck lighted buoy 12A
26°57′ N., 80°00′ W., off Jupiter Inlet Light

Thence follow the coast of Florida and the Florida Keys as close as safe navigation permits to Key West.

Key West to east coast of the United States via Gulf Stream.—Follow the Gulf Stream in the Straits of Florida about 8 miles off the Florida Reefs, passing Fowey Rocks Light at a distance of 10 to 12 miles and Jupiter Inlet Light 15 miles, thence follow the main axis of the Gulf Stream in the Atlantic Ocean through the following positions:

30°25′ N., 79°40′ W.
31°11′ N., 79°15′ W.
34°00′ N., 75°49′ W.
35°08′ N., 75°15′ W., off Diamond Shoal Lightship

Thence as direct as safe navigation permits to destination.

Southbound vessels from Diamond Shoal Lightship to Jupiter Inlet Light use either the outer route or the inner route to avoid the full northerly set of the Gulf Stream. Most of the regular lines bound for the Straits of Florida use the route outside the Gulf Stream. All vessels bound to any port as far south as the St. Johns River follow the coast inside the Gulf Stream. Currents up to 4.5 knots have been observed at Diamond Shoal Lightship. High current velocities usually occur during heavy or long continued gales. Currents produced by onshore winds are likely to set toward the shore. Details of the wind-driven currents are given in the Tidal Current Tables.

The course from Diamond Shoal Lightship to 33°00′ N., 75°35′ W., along the outer route crosses the Gulf Stream. Under ordinary conditions an average allowance should be made for a 1-knot current setting northeastward for the entire run; with northeasterly winds there may be practically no current, while southerly, and especially southwesterly winds, may increase it considerably. Frequent fixes should be obtained.

There is uncertainty as to the currents that may be expected on the course from 33°00′ N., 75°35′ W., to 28°00′ N., 79°00′ W., along the outer route. Frequent fixes should be obtained to guard against being set off course by the variable currents and also to insure clearing Matanilla Shoal.

When crossing the Gulf Stream for Jupiter Inlet Light, **Matanilla Shoal** should be given a wide berth. The northwestern end of the shoal is marked by a lighted whistle buoy, but it is often difficult to find owing to atmospheric conditions. The bank in the vicinity of the shoal is extremely dangerous, as the bottom is rocky and covered with dark seaweed, the water is not discolored, and the sea does not break. The current for some distance northward of the shoal is very uncertain and near the edge of the bank sets strongly toward it.

In case of doubt as to the position when southward of latitude 28° N., vessels can stand to the westward, checking the depths carefully in order to pick up the edge of the bank on the Florida coast northward of Jupiter Inlet Light.

When on the course northwestward of Matanilla Shoal an allowance should be made for a northerly current, averaging about 2.5 knots for the entire run of about 80 miles. It will, therefore, be necessary to shape the course sufficiently southward of Jupiter Inlet Light to allow for the northerly set. When fixing the position by bearings on the light, keep in mind that while outside the 100-fathom curve the vessel is probably in the full strength of the Gulf Stream, where the northerly current may average a velocity of 4 knots. If the light is on the starboard bow, the vessel will be much closer to it than indicated by the distance run between the successive bearings on it.

The courses southward of Diamond Shoal Lightship on the inner route to Hetzel Shoal lighted whistle buoy 8 have depths of 17 to 20 fathoms. In approaching and passing the shoals off Cape Kennedy, care must be exercised. The current of the Gulf Stream may be expected under ordinary conditions to set against the vessel for the entire run with a velocity of about 0.5 to 1 knot, the direction of the current following the curve of the coast. It must be remembered, however, that the effect of winds is almost immediately felt on the currents, and that with northerly and especially northeasterly winds, a current of possibly 1 knot will set southward along the coast. Southerly, and especially southwesterly winds, increase the velocity of the Gulf Stream.

On the inner route from Hetzel Shoal to Jupiter Inlet Light, the 15-fathom curve is a good guide. The current of the Gulf Stream may be expected under ordinary conditions to have a velocity of about 1 knot off Cape Kennedy, increasing to 1.5 or 2 knots off Jupiter Inlet Light.

Southbound vessels from Jupiter Inlet Light to Fowey Rocks Light usually follow the coast at a distance offshore of 1 to 1.5 miles to Hillsboro Inlet Light, thence 1.5 to 2 miles offshore, passing 1 mile eastward of Miami lighted whistle buoy 2 and Fowey Rocks Light. A northward current can be expected near the coast from northward of Jupiter Inlet to Fowey Rocks. The velocity of the current gradually increases as the axis of the Gulf Stream is approached.

Southbound vessels from Fowey Rocks Light to Key West usually follow a course 1 to 2 miles off the Florida Reefs in the daytime and 2 to 4 miles off at night. The position should be checked on the aids as passed and on the lights and sectors at night. Care must be taken not to get inside of the line of reefs, daybeacons, buoys, or lights, especially when passing parts of the reef that lie well back of the edge and do not break or show near the surface. The color of the water does not always mark the edge of the reefs.

Except in the vicinity of Fowey Rocks, where the 100-fathom curve is only about 2 miles outside the reef, the 50-fathom curve lies from 2 to 4 miles from Florida Reefs, and this is about the least depth that can be depended upon to insure safety in skirting them. The hand lead is practically of no value as an aid and should not be depended on, but vessels equipped with echo-sounding apparatus should find this equipment of great value in navigating this region.

The reefs are fringed in places with broken ground, which, as a measure of safety, should be avoided by deep-draft vessels where the depths are less than 10 or 12 fathoms.

A number of vessels have been lost on the reefs between The Elbow and Molasses Reef, and extra caution should be observed in this locality. The extremely variable current against the vessel should be carefully considered in determining the position off Carysfort Reef Light from which to shape the course to lead well clear of The Elbow.

Vessels bound for Habana generally shape the course for that port when abreast of Alligator Reef Light.

Any crossing of the Gulf Stream should be regarded as difficult, on account of the strong current of variable velocity, for which it may not be possible to make a proper allowance, and the abrupt shoaling inside the 100-fathom curve. The axis of the Gulf Stream is nearest the reefs from about 10 miles northward of Carysfort Reef Light to Molasses Reef Light.

Northbound vessels from Key West to Cape Hatteras follow the Gulf Stream. 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 can be given. Often high velocities will be carried between certain points and will suddenly drop off between others. Frequent fixes should be obtained to determine accurately the speed of advance. The greatest velocity is between Carysfort Reef and Jupiter Inlet, ranging from 2 to 4.5 knots.

The course between Jupiter Inlet Light and 30°25′ N., 79°40′ W., should lead from 6 to 30 miles outside the 100-fathom curve. Northward currents of 1.5 to 3.5 knots may be expected. It is reported that between latitude 30°30′ and 32°30′ N. heavy tide rips will be experienced, indicating a change in the direction of the stream and not an increase in the velocity, and creating in stormy weather a very uncomfortable sea.

When approaching Diamond Shoal great care must be taken to determine accurately the position of the vessel. The currents are subject to wide variations as indicated by the observations on the lightship. At times during both summer and winter the Gulf Stream has great velocity; at other times none will be found, or a southerly set may be experienced with northerly winds. The general direction of the stream is northeast with a velocity of 1 to 2 knots, but on nearing Diamond Shoal Lightship the current is reported to set well to the east-northeast and at other times nearly north. In northerly and northeasterly weather a dangerous heavy cross and confused sea usually is encountered in the stream between Jupiter Inlet and Cape Hatteras.

INSIDE NAVIGATION.—Navigation on the waterways covered by this volume requires a knowledge of the channel conditions and other factors restricting navigation. General items of interest to the vessel operator are indicated in the paragraphs that follow; details are given in the text.

Speed.—Regulations are given in **207.160**, Chapter 2.

Bends or curves.—In the Intracoastal and adjoining waterways there are many sharp bends which are dangerous to vessels meeting or passing. On approaching a bend, a vessel should reduce speed sufficiently to be able to stop within half the distance to a ship coming from the opposite direction. Under no circumstances should a vessel attempt to overtake and pass another at a bend. Even with sufficient view of the channel ahead and after proper exchange and understanding of signals, the overtaken vessel may suddenly sheer from current action. This is even more pronounced with larger vessels and tows.

Cross currents.—Where two streams cross, the current will have a greater velocity in the deeper channel. This is noticeable along the Intracoastal Waterway where it follows a dredged canal cutting across a winding stream. Cross currents will also be noticed where either an inlet from the ocean or a drainage canal enters the waterway.

Bridges.—Some drawbridges are hand-operated and move very slowly. Some open in the direction toward a vessel using the right-hand opening; however, this is no reason for using the left opening. Also many of the swing spans, even when the clearances are the same, do not make a complete turn but close in the opposite direction to that of opening. Vessels equipped with whistles of the same or nearly the same tone as an automobile horn may have difficulty in making themselves heard or understood at highway bridges.

Spoil banks.—Nature quickly covers her scars. This is true of the spoil banks made by dredging. In the northern areas when awash these banks are often covered by grass, while in the southern areas they are covered by bushes and sometimes fairly large trees.

Water hyacinth is a floating fresh-water plant which infests numerous streams tributary to the South Atlantic and Gulf coasts. It has bright green leaves and a purple flower. It propagates from seeds and suckers, spreads quickly in most localities, and may cause entire suspension of navigation if not removed. The hyacinths form in mats or jams and float around driven by the wind or current. In open water these mats often resemble small islands. At times some of the bays and tributaries may be changed in appearance due to hyacinth jams. Where the water is apt to be brackish, an attempt can be made to force a boat through the mat. In doing so, however, care should be taken that any logs that might be floating in the weeds are not struck with force enough to damage the hull. Snakes may also be found on the hyacinth mats. The work of removing this growth is undertaken by the various Corps of Engineers districts by the processes of spraying, cutting, and the use of booms.

Mangrove.—Three distinct types of mangrove are found in the southern section of this area. Yellow mangrove grows to a height of about 4 feet and is found principally on the sand flats in front of the fast land. Red mangrove grows to a height of 10 to 15 feet and is rooted in water most of the time. Black mangrove grows on sand ridges and higher ground which cover only at very high water or storm tides. The black mangrove sometimes grows to a height of 50 to 60 feet.

Stumps and sunken logs.—Reports are frequently

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made that vessels have struck shoals or rocks in rivers which have later proved to be stumps or sunken logs. Mariners are warned against navigating too close to the banks of streams where submerged stumps are known or may be expected to exist.

The term **marina** in its original conception was to be a sheltered harbor for recreational craft of all sizes, wherein the owner of a boat might buy his fuel, provisions, accessories, and the like, as well as spend the night or a longer period. The type of ownership may be municipal, club, or private. In this publication the term is used to indicate a sheltered harbor for the docking or mooring of recreational craft. The facilities and services available are generally listed in the description of the place.

Hurricane moorings.—On receiving advisory notice of a tropical disturbance small boats should seek shelter in a small winding stream whose banks are lined with trees, preferably cedar or mangrove. Moor with bow and stern lines fastened to the lower branches; if possible snug up with good chafing gear. The knees of the trees will act as fenders and the branches, having more give than the trunks, will ease the shocks of the heavy gusts. If the banks are lined only with small trees or large shrubs, use clumps of them within each hawser loop. Keep clear of any tall pines as they generally have shallow roots and are more apt to be blown down.

Currents.—It appears that, except during northerly and northeasterly winds, a current of about 0.5 knot average velocity, setting northeastward with the trend of the coast, may be expected outside the 10-fathom curve between Cape Kennedy and Cape Hatteras. Farther offshore the velocity of the northeastward flow increases as the axis of the Gulf Stream is approached. Current observations taken at lightships off Cape Hatteras and Cape Fear show that at those locations the northeastward current is much stronger in summer than in winter.

Strong currents are produced by the wind along the coast during northeasterly and southerly gales reversing or greatly increasing the normal current. Their velocity and direction depend upon the direction, strength, and duration of the wind. Details of the velocities and directions of currents caused by winds for a number of locations along the Atlantic coast are given 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 ripples as well as by the difference in color. Northward, in the cooler regions, the evaporation from its surface, when the temperature of the air is lower than that of the water, is apparent to the eye. In addition, in the lower latitudes, the stream may carry with it some **gulf weed,** which is olive brown, branched seaweed with berrylike air vessels. Surface debris such as logs and other material tend to drift toward the eastern edge of the stream but not toward the western edge.

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 here the stream sets eastward and northward through the Straits of Florida and, after passing Little Bahama Bank, it continues northward and then northeastward, in 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 gives 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-spread 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-sectional 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 one 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 sea 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 currents 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 Kennedy 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.

Wind currents are very complicated. Their velocities and directions depend upon a number of factors such as the velocity, direction, and duration of the wind, the proximity of the coast and the direction of the coastline. Generally in the Northern Hemisphere the wind-driven current sets somewhat to the right of the wind but in coastal waters there are many exceptions to this general rule, the current often setting to the left of the wind, due to the tendency of the current to follow the direction of the coastline or to other local conditions.

The velocity of the wind current relative to that of the wind also varies with the locality. Wind-current information is given in the Tidal Current Tables.

WEATHER.—The Appendix includes climatological tables for eleven Atlantic coast localities and a table of fog-signal operation. Also listed are Weather Bureau offices, storm warning display stations, and radio stations which transmit weather information.

General.—The coastal area from Cape Henry to Key West is low and flat. The entire shoreline is marked by inumerable indentations and irregularities, many of which cause important local climatic variations. In the area north of the Florida Peninsula there is an abrupt rise from the coastal plain which continues in an irregular terraced pattern westward, and culminates in the Blue Ridge Mountains, the Great Smokies, and other ranges of the Appalachian chain. The mountainous area, though at a considerable distance from the ocean, forms a partial barrier to the cold waves that move southeastward from the interior.

The climate of the region varies from temperate and semimarine in southern Virginia to humid and subtropical in southern Florida.

Pressure.—Over the ocean east of the southeastern seaboard there is a region of high pressure. This Azores or Atlantic HIGH is the center of the surface circulation system in this area. During the year it migrates a limited distance to the north or south and to the east

or west, but is persistent throughout the year. The circulation over the eastern seaboard is controlled largely by the proximity of the Azores HIGH.

During the winter the mean position of the Azores HIGH is far out to sea. Major frontal systems developing over the continent and the Gulf of Mexico sweep over the Middle Atlantic States until the mountain ranges to the westward partly obstruct their progress and cause considerable modification. Usually only the strongest polar outbreaks penetrate to the southernmost points in the area. The rapidly changing air masses in the northern part of the area may be observed in variable temperatures from day to day and in the alternation between brief stormy periods followed by crisp, clear days. The contact between polar air masses of continental and maritime origin and tropical maritime air is greatest at this time. Consequently, winter storms are generally severe and are accompanied by strong, gusty winds. Northers, when they do occur, cause rough seas in the Straits of Florida.

During the spring the Azores HIGH begins to move westward and northward. It affects the southern Atlantic coast where the frequency of passing cyclonic storms decreases and the weather becomes more uniformly warm and humid. The northern part of the area, still at the outer edge of the HIGH, is subject to frontal activity and changing air masses. Warm spring rains usually alternate with mild weather. It is not uncommon, however, for the Azores HIGH to dominate the entire area in this season, bringing summer heat and enervating humidities.

In summer the center of the Azores HIGH has moved to its northern limit and extends over the entire eastern seaboard. The intensity is moderate but persistent, blocking the eastward movement of the continental pressure systems. For weeks at a time the weather on the coast may not change significantly. This season is characterized by frequent instability, showers and thunderstorms, high temperatures and humidities, and relatively low wind velocities. The summer months also mark the beginning of the hurricane season, which reaches its peak in late summer and early fall. All of the coastal states have felt the effect of tropical disturbances.

During the fall the Azores HIGH retreats southward and eastward, leaving the Atlantic coast under the influence of a weak continental high-pressure zone. The weakening of the pressure system indicates the gradual transition to the winter pattern accompanied by increased frontal activity, particularly in the northern part. The weather is usually cool and fine, interrupted by brief rainy periods associated with the passage of fronts.

The pressure pattern changes considerably over the area from winter to summer. At individual stations, however, the seasonal variation in mean pressure is only 0.12 inch to 0.17 inch throughout the year. Extremes vary considerably more than this. During the summer the mean pressure remains low and steady, but begins to rise again in September and continues to rise through the remainder of the year.

The extreme lowest pressure from a hurricane was 26.35 inches at Long Key during the "Labor Day hurricane" of 1935. The lowest pressure from an extratropical cyclone (28.32 inches) occurred at Cape Henry in March. The seasonal range from extreme highest to extreme lowest is greater during winter and smaller during summer, an indication of the numerous LOWS and HIGHS that traverse the area during the winter.

Winds.—In winter over the northern part of the sea area (north of latitude 30°) predominant winds are from the north through west. Southwest winds are also frequent. Along the coast north of latitude 35° wind directions are variable, though predominantly from the westerly quadrant. Along the middle coast, directions are mostly northerly to westerly. Off and along the Florida coast, south of latitude 30°, easterly winds are prominent throughout the year.

Winter storms over the entire area are modified by the Appalachian Mountain ranges. However, even the extreme southern portion occasionally experiences northwesterly winds when the severest of the winter storms penetrate this far south.

In spring, over the northern part of the sea area (north of latitude 30°), winds from the southwest, south, and northeast are about equal in frequency. Along the coast (north of latitude 35°) southwest winds predominate. North and south winds are also frequent. Along the middle coast south and southwest winds predominate.

In summer the persistence and dominance of the Azores HIGH is shown in the increasing frequency of southwesterly winds over the northern part of the sea area. Along the coast (north of latitude 35°) southerly winds predominate. Along the middle coast southwest winds predominate.

In autumn the recession of the Azores HIGH, accompanied by changing pressure systems along the coast, results in a sharp increase in the frequency of northerly winds, which are recorded about 50 percent of the time over the northern part of the sea area. Along the coast (north of latitude 35°) and the middle coast (between 30° and 35° latitude) northern winds prevail.

Along the coast a daily shift in wind direction is observed. During the warmest part of the day winds blow from the ocean toward shore (known as **onshore winds**), and during the coolest, from the land toward the sea (**offshore winds**). Offshore winds, unless they are exceptionally strong, are generally considered most favorable for coastal navigation. Onshore winds have a more pronounced effect upon the sea surface, particularly when they have been blowing from the same direction for a long period of time. Strong onshore winds cause heavy or choppy seas and swell, and frequently make navigation difficult for small vessels.

Wind velocities along the southeastern coast are generally moderately light, averaging 8 to 12 knots over the year. Monthly averages vary in summer from 6 to 10 knots, and 8 to 15 knots in winter. Wide departures from these averages should be expected in all seasons. In the immediate coastal area the windward side of the promontories may be lashed by gales and heavy seas, while the

lee side is relatively protected. Averages do not show these variations. The area from Cape Hatteras to Cape Henry, exposed as it is to the ocean, is subject to severe northeasterly storms as well as moving continental pressure systems. Cape Hatteras is particularly exposed to the winds, with open sea from north through east to southwest. South of Cape Hatteras gale winds are much less frequent, occurring generally on less than 15 days a year. The frequency of calms is less than 1 percent in the north and from 15 to 20 percent during the year at most places in the middle and south.

Extreme wind velocities are a hazard in any month. Though winds greater than 34 knots are comparatively infrequent, they have been recorded at all stations in this stretch of coast and at almost any time of the year. Gale winds usually accompany sharply defined frontal systems, severe cyclonic storms, hurricanes, or occasionally severe local thunderstorms.

The seasonal variation in wind velocity is slightly grater in the north than in the south. An idea of the magnitude of the difference is given by the monthly averages as indicated in the tables in the Appendix. Highest mean velocities occur during the month of March in the north and in October and November in the extreme south; lowest velocities occur during July and August over the entire area. Over the ocean, winds are slightly stronger than at most land stations during the winter months and about the same during the summer.

Temperature.—The temperature regime of the southern Atlantic coast varies from temperate in the northern part of the area to subtropical in the southern part. The gradation from north to south is regular, decreasing with increasing latitude. Another interesting variation is the general modification process of the ocean and coastal temperatures by each other. Along the coast the sheltered land stations have warmer summers and cooler winters than do exposed points.

Temperatures along the southeastern seaboard region are conducive to a long period of small-craft operation. The southern Atlantic coast annual mean air temperatures range from 59.7° F. at Norfolk, Va., to 76.8° F. at Key West, Fla. January is the coldest month at most stations; July the warmest. The range in mean monthly air temperature over the area is from 41.2° F. at Norfolk in January to 83.6° F. at Key West in August.

Over the water area the coldest month is February and the warmest is August. Exposed coastal stations experience mean air temperatures more like those over the water than those over land, and have annual extremes in February and August.

The daily range in temperature averages from 10° to 17° F. at coastal stations throughout the year, and is likely to be less over the water. The greatest daily variation occurs at most stations during the winter and early spring months and the lowest during late summer and fall.

Very little data on extreme temperatures for the ocean areas are available. At coastal stations temperatures above 100° F., while not common, have been recorded. The highest during the period of record considered was 103° F. at Norfolk, Va., Savannah, Ga., and Jacksonville, Fla. The lowest recorded temperature was 11° F. at Norfolk, Va., in February.

Humidity.—Mean relative humidity is highest from July through September and lowest in April and May. Data are not summarized for water areas, but the relative humidities are known to be uniformly high. The presence of minute particles of salt in the air over the ocean together with the high moisture content in the air results in a very corrosive effect upon equipment and supplies, both on the water and at nearby shore points.

Cloudiness.—Mean cloudiness over the area is moderate to moderately high throughout the year, averaging from 35 to 65 percent sky cover. In general, however, the cloudiest month is January in the northern sections and over most of the water areas, and may be any month from June through September in the southern section. At most of the individual stations in the northern part of the area the least average cloudiness occurs in October, and in the extreme southern part least cloudiness occurs in February or March.

Since the air is usually moist, only a small decrease in temperature may cause condensation and cloud formation. At the edge of the warm northward-moving Gulf Stream and the cool southward moving countercurrent which skirts the shore from Cape Hatteras, N.C., to Jacksonville, Fla., sharp contrasts in temperature result in the formation of heavy stratus clouds which may appear very much as a cold front. These clouds may persist for days at a time if the wind is light and may be carried inland by northeasterly winds. Such cloudiness is common during the spring when the gradient between shore water and Gulf Stream temperatures is steepest.

The fact that maximum cloudiness for the year occurs during the winter at northern coastal stations may be explained by the maximum frequency of cyclonic storms passing northward or northeastward from the central or south-central section during that season. These rarely affect the extreme southern part of the area.

Much of the cloudiness over the entire area is of the cumulus type, resulting from either the unstable conditions that accompany cyclonic activity in all seasons, or the general air mass instability during the summer months. Such clouds frequently form over land during the day and drift seaward at night.

Sunshine.—The area as a whole experiences monthly averages of from 52 to 80 percent of possible hours of sunshine during the year. In the north the largest percentage of possible sunshine occurs in spring and fall and the smallest percentage in winter. In the overall picture, the extreme south and a narrow belt in the north-central part of the area show a greater percentage of possible sunshine than the northern and south-central sections.

Precipitation.—Over the southeastern seaboard region precipitation is moderately heavy, averaging about 45 to 60 inches a year. Monthly departures may be large in

any individual year, but over a long period of record, 50 to 75 years, a fairly uniform pattern prevails. Since the area lies within both temperate and subtropical regions, the precipitation pattern shows differences in both type and amount from north to south. Irregularities from station to station in the idealized pattern are due to differences of exposure at the observing stations. Year-to-year variation is caused by overall departures from the average general circulation.

In the northern part of the area the heaviest precipitation occurs normally during July and August, and the least in November. In the southern section, however, heaviest precipitation falls in September or October, and the least in February. Average monthly totals at most stations range from 2 to 6 inches throughout the year. During the months of greatest hurricane frequency, excessive rains of 9 to 15 inches in a 24-hour period have been recorded. These may occur at any point along the coast but are most common in the southern part of the area.

The monthly mean number of days with 0.01 or more of precipitation in the northern part of the area ranges from about 6 to 9 days a month in the fall to 10 to 12 days a month in the summer and winter. In the central part of the area the most rainy days are in summer, 11 to 16 days a month, and the least in spring and fall, 6 to 9 days a month. The most rainy days along the Florida coast, 14 to 18 days a month, generally occur in late summer and early fall, and the minimum number, 5 to 8 days a month, from February through April.

Much of the precipitation, like cloudiness, is associated with cyclonic activity throughout the year. During the winter, precipitation is usually general but may come with occasional thunderstorms along fronts. Frontal systems originating or developing in the Gulf region result from the interaction of a moist tropical air mass with colder continental masses. These move eastward or northeastward and bring extensive precipitation to the seaboard region. During the summer, when the area is dominated by the Azores HIGH and cumulus clouds predominate, precipitation is localized and is showery in nature.

The intensity of ordinary cyclonic storms and showers is usually greater over land than over water. Heaviest precipitation occurs over land and near coastal waters in the afternoon; over open water during the night.

Thunderstorms along the coast occur on an average of from 40 days a year in the north to 80 days a year in the south. Maximum occurrence is from June through August, and an average of 7 to 18 thunderstorms a month occur during this season. In summer, cumulus clouds frequently develop into thunderstorms over the land and drift seaward late in the afternoon.

Snow falls from December through March in the northern part of the area on 1 or 2 days a month. So far as coastal operations are concerned, snow conditions are not significant since most of the area is entirely free from snow the year round.

Visibility.—Visibility is generally good throughout the year over the entire area. Fog is the principal restriction to visibility. Fog reducing visibility to 0.25 mile or less is very irregular, ranging from practically no days a year at some stations to 37 days a year at Savannah, Ga. Differences in exposure account for the considerable variation between locations. In general, however, fog decreases from north to south, and the worst fog conditions occur during the winter months when air masses change frequently. Visibility is usually poorest during the night and early morning hours.

Along the coast radiation fog is frequent, forming shortly after sunset. These fogs generally do not extend any great distance seaward, but may seriously restrict harbor activities. Sea fogs sometimes drift onshore on hot summer days, persisting for many hours in a shallow layer along the coast. Over the land, dispersal usually begins at the surface giving the effect of lifting. Over the water, fog generally persists at the surface and restricts visibility until the last vestige of the formation disappears.

In addition to fog, precipitation occasionally reduces visibility over both land and water, and haze and smoke sometimes restrict visibility over land.

HURRICANES.—Severe tropical cyclones of the North Atlantic Ocean are ordinarily referred to as West Indian Hurricanes, though actually many of these storms form, move, and die far out from the mainland and hundreds of miles from the West Indies. As a general rule these storms move with the prevailing winds of the area. In small hurricanes the diameter of the area of destructive winds may not exceed 25 miles while in some of the greatest storms the diameter may be as much as 400 to 500 miles.

At the center is a comparative calm known as the "eye of the storm". The diameter of this "eye" varies with individual storms and may be as little as 7 miles but is rarely more than 30 miles. The average is 15 to 20 miles. This center is the region of low atmospheric pressure around which winds blow in a more or less circular course, spiraling inward in a counterclockwise direction. Winds at the outer edge of the storm area are light to moderate and gusty, and often increase toward the center to speeds too high for instrument recording. Although the air movement near the center of the hurricane is usually light and fitful, the seas in this area are in most cases very heavy and confused, rendered so by the violent shifting winds which surround it. Furthermore, after the center has passed a vessel, she may expect a sharp renewal of the gales, with winds from a more or less opposite direction. The fully developed tropical cyclone may affect an area covering tens of thousands of square miles.

Tropical cyclones occur over all the tropical oceans except the South Atlantic. They usually form in the tropical regions of the easterly trade winds. In the North Atlantic, hurricanes form over a wide range of ocean be-

tween the Cape Verde Islands and the Windward Islands, over the western part of the Caribbean Sea, and the Gulf of Mexico. While some may initially move northward, 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 for varying distances from the Atlantic Coast of the United States. Others pass over or to the south of the larger islands and enter the Gulf of Mexico, then curve northward or northeastward and strike some part of the east Gulf Coast. Others may continue westward and strike the west Gulf Coast.

The most common path is curved, the storms moving generally in a westward direction at first, turning later to the northwestward and finally to the northeastward. A considerable number, however, remain in low latitudes and do not turn appreciably to the northward. Freak movements are not uncommon, and there have been storms that described loops, hairpin-curved paths, and other irregular patterns. Movement toward the southeast is rare, and in any case of short duration. The entire Caribbean area, the Gulf of Mexico, the coastal regions bordering these bodies of water, and the Atlantic Coast are subject to these storms during the hurricane season.

Tropical cyclones can be expected from May through November. However the months of greatest frequency are August, September, and October, when hurricanes are most likely to be severe. During all of the season the chance of an intense storm developing is great enough to warrant careful watch of the weather elements in this area. 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° N. 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. They generally move on a west-northwesterly course in low latitudes, some 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 in the tropics is about 10 to 15 knots. This speed, however, varies considerably according to the location of the storm, its development, and attendant meteorological conditions. The highest rates of progression usually occur when the storm is moving northward or northeastward in the middle or higher latitudes.

Signs of approach.—One of the earliest signs of a hurricane is the appearance of high cirrus clouds which converge 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, or 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 is lacking, 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. When facing the wind, the observer will find that the wind, in general, will back to the left during this time if the center is moving toward his left, or veer to the right if moving toward his right. 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 at a considerable distance. 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.—If an observer faces the wind, the storm center will likely be located 8 to 12 points to the right in the northern hemisphere. When the storm is distant it may be 10 to 12 points, and when the barometer has fallen 5 or 6 tenths of an inch it may be nearer 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.

Pilotage is compulsory for all foreign vessels and United States vessels under register in the foreign trade at the ports where State pilots are available. Pilotage is usually optional for coastwise vessels who have on board a pilot licensed by the Federal Government. Detailed information on pilotage requirements is given in the text for the ports concerned. Pilots will usually come out to vessels making a signal by the International Code, but to insure that they are available at the time of arrival, arrangements should be made in advance.

Local boatmen or fishermen competent to act as pilots for parts of the Intracoastal Waterway and interior waters can usually be found at the larger cities and towns along the route or near the entrances to the various tributaries.

Towage.—Tugs are available at the major ports; they can usually be obtained for the smaller ports on advance notice if none are available locally. Arrangements for tugs should be made in advance through the ship's agents or the pilots. See the text for the ports concerned as to the availablity of tugs.

Harbormasters are appointed for the principal ports. They have charge of the anchorage and berthing of vessels.

Repairs.—Charleston, Savannah, and Jacksonville are the principal places where extensive repairs to the hulls and machinery of large vessels can be made. Limited repairs can be made at a number of other ports as shown in the text.

Supplies.—Bunker C and diesel oil are available at Morehead City, Wilmington, Georgetown, Charleston, Savannah, Brunswick, Jacksonville, Fort Pierce, Palm Beach, Port Everglades, Miami, and Key West. At Port Royal and Fernandina Beach, it can be barged in from the larger ports. Coal is obtainable at Wilmington, Charleston, Savannah, Brunswick, Jacksonville, and Miami, and in limited quantities at Morehead City, Georgetown, and Palm Beach. Gasoline and diesel fuel for small craft can be obtained at all of the ports and at numerous facilities along the Intracoastal Waterway or on the tributaries branching from it. Fresh water, provisions, supplies of all kinds, and marine hardware can be obtained at all the larger ports and in limited quantities at most of the smaller ports and facilities. Detailed information is given in the text for the port or place concerned.

Standard time.—The coastal areas covered by this volume use eastern standard time, which is 5 hours slow of Greenwich mean time. Example: When it is 10 a.m. at Greenwich it is 5 a.m. along this coast.

4. CAPE HENRY TO CAPE LOOKOUT

Charts 1109, 1110.—Between Cape Henry and Cape Lookout, a distance of 190 miles, the seacoast of Virginia and North Carolina is a line of long, low, and narrow islands, backed by a series of sounds and tributary rivers, through which the Intracoastal Waterway passes from Chesapeake Bay southward.

Chart 1227.—The summer resort of **Virginia Beach** is 5 miles southward of Cape Henry Light. The buildings are conspicuous, the most prominent being the Cavalier Hotel, which is distinguished by its size and cupola. The towers of two other hotels, marked by lights, two water tanks, and the radio tower of Station WBOF, are also prominent. A Coast Guard station is on the beach about 1 mile south of the Cavalier Hotel, and a checkered water tank, 158 feet above the water, is near the beach about 10 miles south of Cape Henry.

A **Naval restricted area** extends northward, eastward, and southeastward from Cape Henry; see **207.158,** Chapter 2, for limits and regulations.

A **danger zone** of a firing range is just southward of Cape Henry extending 15 miles offshore; limits and regulations are given in **204.52,** Chapter 2. A **Naval prohibited area** is off Camp Pendleton, 7.4 miles southward of Cape Henry Light; limits and regulations are given in **204.53,** Chapter 2. A Coast Guard station is at Little Island, 14.5 miles southward of Cape Henry Light.

About 22 miles southward of Cape Henry are **Wash Hill** and **Sheep House Hill,** sand dunes about 60 and 40 feet high, respectively. This locality is known as **False Cape** because of its resemblance to Cape Henry when approaching from southward. Several spots with depths of 10 to 17 feet are 0.8 to 1.5 miles offshore from False Cape.

Chart 1229.—Currituck Beach Light (36°22.6′ N., 75°49.8′ W.), 158 feet above the water, is shown from a red conical tower on the beach near the settlement of **Corolla.** Caffey Inlet Coast Guard station is 9.8 miles southward of the light. **Caffey Inlet** is closed.

Danger zones between Currituck Beach Light and Oregon Inlet are described in **204.54,** Chapter 2.

A conspicuous steel tower is just eastward of Kitty Hawk, 20 miles southward of Currituck Beach Light. **Wright Monument,** a high stone memorial on the highest of the **Kill Devil Hills,** 3.5 miles southward of Kitty Hawk, is very prominent and is a good landmark on this low sandy coast where there are very few conspicuous objects. A Coast Guard station is southeast of the monument.

Defensive sea area.—A rectangular area comprising approximately two-thirds of a square mile, 2.5 miles offshore at Kill Devil Hills, is reserved as a defensive sea area for purposes of national defense. The area is bounded by the following lines: beginning at a point in 36°03′00″ N., 75°37′24″ W.; a line drawn to a point in 36°03′18″ N., 75°36′42″ W., thence to a point in 36°02′17″ N., 75°36′09″ W.; thence to a point in 36°02′00″ N., 75°36′48″ W., and thence to point of beginning.

At no time shall vessels or other craft be navigated within the area above defined, except such as are authorized by the Secretary of the Navy.

Any violation of the provisions of this order shall be subject to the penalties provided by law.

Bodie Island Light (35°49.2′ N., 75°33.8′ W.), 156 feet above the water, is shown from a conical tower, with alternate white and black horizontal bands above a granite base, 36 miles southward of Currituck Beach Light.

Oregon Inlet, 2 miles southward of Bodie Island Light, is entered over a shifting bar. A lighted whistle buoy marks the approach. The inlet, which deepens with northwest winds and fills in with northeast winds, is used by local fishing boats but is not recommended to strangers. In July 1962, the controlling depth over the bar was 14 feet. Tidal currents in the inlet are reported to to be as much as 5 knots.

A highway bridge crosses the inlet; the fixed channel span has a clearance of 65 feet over the main channel. A Coast Guard station is on the south side of the inlet. **Oregon Inlet Light (35°46.1′ N., 75°31.4′ W.),** 54 feet above the water, is shown from the Coast Guard station lookout tower. A marker radiobeacon is near the light.

Three marked dredged channels with a Federal project depth of 12 feet lead from Oregon Inlet into Pamlico Sound. **Oregon Inlet Channel** leads westward from the inlet to a junction with **Old House Channel,** which then leads southwestward into Pamlico Sound. From the junction, the inlet channel continues northward to a junction with **Roanoke Sound Channel,** which continues northward to a turning basin at Manteo. A side channel of the same project depth leads westward to a turning basin at Wanchese at the south end of Roanoke Island. A connecting channel with a project depth of 6 feet continues northward into Albemarle Sound from the north end of the Roanoke Sound Channel. In 1963, the controlling depth from the inlet to Wanchese and Manteo was 11 feet with 6 feet in the connecting channel northward into Albemarle Sound. In

Old House Channel from the inlet channel southwestward into Pamlico Sound the centerline depth was 12 feet.

On the southern end of Bodie Island, just west of the bridge, there is a small-boat basin operated by the National Park Service, with depths of 4 to 12 feet. Gasoline, diesel fuel, water, and ice are available. The service station and store are prominent. Charter boats depart from here for deep-sea fishing.

Wanchese is a small town near the south end of **Roanoke Island** west of the entrance to Mill Creek. Gasoline, diesel fuel, water, groceries, and small charter boats can be obtained at the fishhouses and small docks. The largest of three marine railways in **Mill Creek** can haul out craft up to 60 feet in length for hull and engine repairs; there is a machine shop at the larger railway.

Just south of Mill Creek there are two marine railways, the larger of which can haul out boats 50 feet in length for hull repairs; there is a small-boat launching ramp.

Baum Creek, on the west side of Roanoke Island, has two marine railways which can haul boats 60 feet in length for hull and engine repairs. Gasoline and wet and dry storage are available; there is also a small-boat launching ramp. In 1963, the controlling depth in the creek was 4 feet.

The causeway over Roanoke Sound connects Roanoke Island with Bodie Island and the U.S. Route 158 highway to Norfolk. It has a swing span with a clearance of 11 feet. An overhead power cable at the bridge has a clearance of 60 feet.

Manteo, the principal town on Roanoke Island and the seat of Dare County, is at the head of **Shallowbag Bay.** A large elevated tank in the town is conspicuous. Gasoline, diesel fuel, water, some supplies, and berthing facilities are available. See Appendix for **storm warning display.**

Historic **Fort Raleigh,** site of the **Lost Colony,** is at the northern end of Roanoke Island.

Nags Head is a summer resort on the east side of Roanoke Sound, 3.5 miles northeastward of Manteo. Other inland waters are described in another section.

Platt Shoals, consisting of several spots covered 27 to 34 feet, are east-southeastward of Oregon Inlet and 2.5 to 4 miles offshore. Between the shoals and the shoal water off the shore the depths are 39 to 85 feet. In easterly gales the shoaler spots are marked by breakers.

Wimble Shoals, 15 miles southward of Oregon Inlet, are a number of ridges extending offshore about 4 miles, with depths ranging from 21 to 36 feet. In easterly gales the shoaler parts are marked by breakers. A lighted whistle buoy is outside the shoals.

Chart 1232.—Cape Hatteras, where the coast makes a sharp turn westward, is low and sandy. **Cape Hatteras Light (35°15.3′ N., 75°31.2′ W.),** 191 feet above the water, is shown from a black and white spirally banded tower on a red brick base. About 0.8 mile north of the light are a radio tower and a tank, and about 1.2 miles west-northwest of the light is a white radar sphere on top of the cut-down tower of the former light. A Coast Guard station is 0.8 mile southwest of the light. See Appendix for **Cape Hatteras climatological table.**

Diamond Shoals extend off Cape Hatteras in a southeasterly direction for about 9 miles. Depths of 3 feet have been found on the shoaler parts. Diamond Shoals include **Hatteras Shoals, Inner Diamond Shoal,** and **Outer Diamond Shoal.** Hatteras Shoals, with little water over them, are usually marked by breakers. Outer Diamond Shoal consists of irregular patches, with depths of 3 to 18 feet, which are usually marked by breakers. Between Outer Diamond Shoal and Inner Diamond Shoal is **Diamond Slough,** with least depths of about 22 feet. This passage should not be attempted by strangers; during strong winds the currents set across the shoals with great velocity.

The difficulty of making proper allowance for the Gulf Stream, and the strong currents near the shoals, may cause considerable error in the reckoning. When approaching in thick weather, and uncertain of the position, care should be taken to stay in at least 20 fathoms, or preferably 30 fathoms. Diamond Shoal Lightship is the guide for clearing the shoals.

Diamond Shoal Lightship (35°05.3′ N., 75°19.7′ W.), with red hull and the name DIAMOND in large white letters on the sides, is 13.8 miles southeast of Cape Hatteras Light; the light is 66 feet above the water. The lightship has a fog signal and a radiobeacon. The code flag signal and radio call is NNBJ. **Storm warning displays** are made during the daytime.

From Cape Hatteras to Cape Lookout the coast trends generally southwestward for 64 miles and is broken by several inlets. For 6 miles from Cape Hatteras it is thickly wooded near the beach, and between the woods and the beach is a range of sand dunes 10 to 40 feet high. For the remainder of the distance the coast is a narrow barrier beach with numerous sand dunes. The coast is fairly bold, and depths of 4 to 7 fathoms will be found within 0.5 mile of shore, except off Hatteras Inlet, where shoals extend out 1.2 miles, and off Ocracoke Inlet, where they make out 1.6 miles.

Hatteras Inlet, 11 miles westward of Cape Hatteras Light, is entered over a shifting bar on which, in May 1963, the controlling depth was 9 feet; the approach is marked by a lighted bell buoy. An 80-foot lookout tower on the east side of the inlet is a conspicuous mark. Strangers should not enter as the aids may not mark the best water.

Hatteras, a town 3 miles northeast of Hatteras Inlet, has several stores, a year-round hotel, several motels, and restaurants. A Coast Guard station is on **Austin Creek,** 0.8 mile southwest of the town. See Appendix for **storm warning display.** There are several small wharves in the basin at Hatteras where gasoline, diesel fuel, and fresh water are available.

Long Slue, the crooked and winding channel from the inlet to Austin Creek, is marked by lights and buoys. The least depth found in the channel, in May 1963, was

3½ feet at its junction with the dredged channel leading into the creek, and 5½ feet in that channel to the Coast Guard pier and the ferry landing. The creek channel is marked by two lights.

A small ferry carries vehicles and passengers across Hatteras Inlet from Austin Creek to Ocracoke Island.

The marked channel from Hatteras Inlet to Pamlico Sound, used chiefly by local fishermen, is subject to change both in position and depth, and is not safe to navigate without local knowledge.

Tides.—The mean range of tide is 2 feet on the bar. In the channels the height of the water depends upon the direction and force of the wind.

Currents.—The tidal currents in the channel through the inlet are influenced by winds, and attain velocities of 2 to 5 knots. For predicted times and velocities see the Tidal Current Tables.

Other channels in Pamlico Sound are described in another part of this chapter.

Chart 419.—Ocracoke Inlet, 27 miles west-southwestward of Cape Hatteras Light, is entered over a shifting bar, on which, in May 1963, depths of 16 to 21 feet were obtained. Strangers should not enter without a pilot as the buoys may not always mark the best water. A lighted bell buoy marks the approach.

Ocracoke Light (35°06.5′ N., 75°59.2′ W.), 75 feet above the water, is shown from a white tower near a clump of woods on the western part of Ocracoke Island and about 3 miles northeastward of Ocracoke Inlet. A Coast Guard station is 0.4 mile north of the light. See Appendix for **storm warning display.**

Several channels or sloughs lead from Ocracoke Inlet through the shoals to deep water in Pamlico Sound. **Teaches Hole Channel** follows the western side of Ocracoke Island and connects with Silver Lake through a Federal project 10-foot dredged channel. It also joins **Big Foot Slough Channel** northwest of Ocracoke which leads to Pamlico Sound. The controlling depth from the inlet to Silver Lake, in May 1963, was 10 feet. The controlling depth through Big Foot Slough Channel, in May 1963, was limited to 3 feet by the bar at the northwest end. Strong currents have been experienced in these channels; the buoys and lights must be followed closely.

A swash channel marked by buoys connects Big Foot Slough Channel with **Nine Foot Shoal Channel,** which leads off in a northwesterly direction. The controlling depth, in May 1963, was 6 feet through the swash channel to Pamlico Sound. Some local vessels use this channel because of the limited depth over the bar at the northwest end of Big Foot Slough Channel.

Wallace Channel leads northwestward from Ocracoke Inlet to a dredged channel which leads to Pamlico Sound. In March 1962, the controlling depth was 5½ feet. The channel is marked, but strangers entering without local knowledge should exercise extreme caution.

The town of **Ocracoke,** 3.5 miles inside the inlet, is frequented by numerous fishing vessels. Supplies in limited quantities are available. Gasoline, diesel fuel, water, electricity, and ice may be obtained at the piers. A toll ferry transports passengers and autos to Atlantic on the mainland daily and a mail boat runs to Portsmouth 3 days a week. There are several hotels, motels, and restaurants in the village, two of which remain open all year. There are numerous points of interest on the island and the National Park Service has a museum at the village and also maintains camp sites for tourists. Facilities for repairing boats are limited.

Silver Lake, a circular basin at Ocracoke, affords good anchorage in depths of 12 feet, and has several wharves extending from the shore to depths of 10 or more feet. A small marine railway on the west shore of Silver Lake can haul boats up to 50 feet in length for hull repairs only.

Portsmouth is a small town on the west shore of Ocracoke Inlet. A spire here is a prominent landmark. The inactive Coast Guard station, the largest building, is near the inlet.

Tides.—The mean range of tide is 1.9 feet over the bar at Ocracoke Inlet and 1 foot in Silver Lake. In the channels, the height of the water depends upon the direction and force of the wind.

Currents.—The currents in the inlet and connecting channels are influenced by the winds. The ebb current usually has a greater velocity than the flood. Velocities up to 4 knots have been observed. Current predictions for several locations in the channels may be obtained from the Tidal Current Tables.

Drum Inlet is an opening through the barrier beach 17 miles southwestward of Ocracoke Inlet. The channel is constantly shifting and should be used only with local knowledge. The controlling depth on the bar, in 1961, was 3 feet and in April 1963, from the inner edge of the bar to deep water in Core Sound, the controlling depth was 2 feet.

Chart 1233.—Cape Lookout is the extremity of a long and very narrow sand beach projecting into the sea where the coast angles sharply westward. **Cape Lookout Light (34°37.3′ N., 76°31.5′ W.),** 156 feet above the water, is shown from a black-and-white diagonally checkered tower on the north point of the cape. A radiobeacon is about 1.5 miles south-southwestward of the light, and a Coast Guard station is 0.2 mile north of the radiobeacon. See Appendix for **storm warning display.**

Cape Lookout Shoals extend about 9 miles south-southeastward from the cape where they are marked by a lighted buoy. Their greatest width is about 2 miles, and depths over the shoals range from 2 to 18 feet. **Lookout Breakers** is the local name for the ridge, covered 2 feet, about 5 miles out on the shoals from the cape. Between Lookout Breakers and the cape are several other spots which break heavily.

Outside the shoals proper are two irregular shoals with depths of 28 feet over them. These can be avoided by passing south of the lighted whistle buoy about 18 miles

south-southeastward of the cape. In thick weather a vessel should stay in 14 fathoms or more if uncertain of its position. A number of wrecks with varying depths over them are in the vicinity of the shoals; some are marked.

Chart 420.—Lookout Bight, on the west side of Cape Lookout, affords good anchorage for large vessels, except with winds from south through west to northwest. This harbor of refuge is protected by a rubblestone breakwater awash at low water and hardly visible when a heavy sea is running; its outer end is marked by a lighted bell buoy. Mariners should give it a wide berth in bad weather.

Good anchorage, with ample swinging room, may be had northeast of the breakwater in 30 to 35 feet, soft mud bottom. This anchorage is not free from swell, however, and small vessels at anchor may be uneasy if the seas are high. Large oceangoing vessels usually anchor north or northwest of the breakwater in 39 to 45 feet, soft sand and mud bottom.

Good anchorage for small vessels can be had in the inner bight south of **Wreck Point** in 14 feet, good holding ground of soft mud. Prevailing swell from the southwest is effectively excluded, but the surrounding terrain is too low to greatly restrain the force of wind. A severe blow from the northerly direction may cause a vessel to drag, but most boats drop an extra anchor if the wind reaches gale force from any direction.

There is a marina on the southeast shore of the bight where gasoline, water, ice, and some provisions may be obtained. There are restrooms and a snack bar at the head of the pier which has 2 feet of water alongside.

A Federal project provides for a channel 7 feet deep from deep water in Lookout Bight through **Barden Inlet** and **Lighthouse Bay** to deep water in Back Sound. In December 1963, the controlling depth was 6 feet. The channel is well marked.

The channels in Back Sound and Core Sound are described in another section.

INLAND WATERS

Charts 1227, 1229.—Currituck Sound is a narrow and shoal body of water which extends for 25 miles in a north-south direction behind the barrier beach near Currituck Beach Light. The southern part of the sound is navigable for craft drawing 4 or 5 feet to the junction with Albemarle Sound, but navigation among the extensive shoals depends on local knowledge of the channels and on the level of the water. The northern part of the sound is practically unnavigable due to dense grass. There are no periodic tides in Currituck Sound, the water level depending upon the force and direction of the winds.

Chart 1227.—Back Bay and its connection with Currituck Sound extends a little over 10 miles northward from the northeastern end of the sound. This shoal bay is navigable only for small boats. Northward of **Back Bay** are shallow **Shipps Bay** and **North Bay.**

North Landing River extends in a north-northwesterly direction from the north end of Currituck Sound. The river is a part of the Intracoastal Waterway and is described in Chapter 12.

Naval aircraft bombardment **target areas** are in North Landing River off Troublesome Point, in Currituck Sound east of Bell Point, and north of Currituck Beach Light; limits and regulations are given in **204.54,** Chapter 2.

Chart 1229.—Several small landings are on the east shore of **Whale Head Bay,** just southward of Currituck Beach Light.

The landing at **Poplar Branch,** on the western shore of Currituck Bay, is frequented by local fishermen and duck hunters; gasoline is available. In May 1963, the controlling depth to and alongside the pier was 3 feet, and craft drawing 2 feet can pass through the channel into **Gaffy Landing,** about 2 miles south of Poplar Branch.

Piper Hill, on the outer beach, about 4 miles east of Poplar Branch, is approached through **Lone Oak Channel** and **Beasley Bay.** Lights mark the channel. In May 1963, a draft of 2 feet could be carried through the channel but local knowledge is required to make the crossing of Poyner Bar. Dense grass covers the whole area.

Wright Memorial (U.S. Route 158) Highway Bridge, over the south end of Currituck Sound between **Sampson Point** and the outer beach, has a swing span with a channel width of 40 feet and a clearance of 4 feet.

Charts 1228, 1229.—Albemarle Sound is about 45 miles long in an east-west direction, and in width ranges from 11 miles near its eastern end to 3 miles about 10 miles from the western end. The sound has good navigable depths for any vessel able to pass through the canals and, with its numerous tributaries, forms the approach to many towns and landings.

There are depths of 10 to 18 feet along the routes from North River and Pasquotank River to Croatan Sound and Alligator River, and less water farther eastward. Fish stakes and nets, extending long distances from shore are often found on the shoals, especially at the northern entrance to Croatan Sound. The shores of Albemarle Sound are low and generally wooded; there are no prominent natural features.

Naval aircraft bombardment **target areas** are on both sides of Albemarle Sound between Alligator River and the first bridge to the westward; see **204.54,** Chapter 2, for limits and regulations.

The eastern end of Albemarle Sound, which is separated from the Atlantic Ocean by the barrier beach about 15 miles north of Bodie Island Light, is connected northward with Currituck Sound and southward with Croatan and Roanoke Sounds, and by the latter sounds with Pamlico Sound.

Westward of Laurel Point, about 33 miles from the east end of Albemarle Sound, the water is usually fresh or

slightly brackish. The rise and fall of the water level depends on the direction of the winds.

Chart 1229.—Kitty Hawk Bay is at the east end of Albemarle Sound and, in May 1963, had depths of 3 to 8 feet. **Kitty Hawk** is a small town just north of the bay. There are several private landings, but in May 1963, not more than 2 feet could be taken to them.

North River, on the north side of Albemarle Sound near the eastern end, is a part of the Intracoastal Waterway and is described in Chapter 12.

Chart 1228.—Pasquotank River, 4 miles westward of North River, is marked at its entrance by a light on **Wade Point.** The river and Elizabeth City are described in connection with the Dismal Swamp route of the Intracoastal Waterway, Chapter 12. **Flatty Creek,** 3 miles westward of Wade Point, is shoal and little used; depths over the bar, in May 1963, were 3 feet and 3 to 5 feet inside for a distance of 3.5 miles.

Little River is on the north side of Albemarle Sound and 4 miles westward of Flatty Creek. The channel at the entrance is about 0.3 mile wide between shoals, and is marked by daybeacons. The river has a general northwesterly trend to the village of **Nixonton,** which is on the east bank 7 miles above the entrance. The only dock at the village is in ruins. In May 1963, 7 feet was the deepest draft that could be taken to the village. Spits, with little water over them and generally steep-to, make out some distance in places from the shores, especially off the points. The channel in the upper reaches of the river is well marked by the outer ends of the fishweir stakes which make out from shore.

Perquimans River, on the north side of Albemarle Sound, has its entrance 3 miles northwestward of **Reed Point Light.** For a distance of 10 miles to the town of Hertford, the river is from 1.5 to 0.8 miles in width and has navigable depths of 13 to 10 feet to U.S. Route 17 highway bridge, thence 7 feet to the Norfolk Southern railroad bridge. The highway bridge which crosses the narrow part of the river at Hertford, has a swing span with a clearance of 7 feet.

Hertford, on the southwest bank of Perquimans River, has rail connections and a paved highway leads to Edenton and Elizabeth City. Gasoline, fresh water, and some supplies are available. The wharves at Hertford are above the highway bridge, and except for oil-receiving piers, are in ruins. The river water is fresh at Hertford.

Above Hertford the river is narrow and crooked, but has fairly good depths for about 8 miles to a point near **Goodwin Creek.** Navigation is restricted to very small boats, about a mile above the highway bridge, by the railroad bridge, which has a 22-foot fixed span with a clearance of 3 feet.

Yeopim River, 6 miles west of Perquimans River, is shoal and unimportant. In May 1963, the depth was 7 feet over the bar between **Batts Island** and **Drummond Point** and for 4 miles above the entrance.

Six miles southwestward from Drummond Point, State Route 32 highway bridge crosses Albemarle Sound from **Sandy Point** to the south shore. The swing span, near the middle of the bridge, has a clearance of 14 feet. The 23-foot fixed spans have a clearance of 14 feet. Four miles westward of the highway bridge, the Norfolk and Southern railroad trestle crosses the sound. About 1.5 miles from the northern end of the bridge is a bascule span with a clearance of 6 feet. Five 35-foot fixed girder spans, at intervals of about 0.5 mile, have clearances of about 8 feet. A bell is struck by hand at the drawspan when the weather is thick or foggy.

Edenton Bay is on the north side of Albemarle Sound just westward of the railroad trestle which crosses the sound. **Edenton,** a town at the head of the small bay, has rail and highway communications with Norfolk and the south. Lumber is shipped by rail, truck, and by barge. The main industries are: peanuts, lumber, cottonseed oil, veneer, and plywood. The river water is fresh. A U.S. Public Health Service outpatient office is in the town. See Appendix for **storm warning display.**

A large water tank in the town is the most prominent object from the sound; also conspicuous are a brick chimney and a water tank on the east side of the bay.

A dredged channel with a Federal project depth of 12 feet leads from deep water in the sound to the town. In May 1963, the controlling depth was 12 feet in the entrance channel and 5 feet in the northwesterly reach. The channel is well marked by lights and daybeacons; a fog signal is at the light in the entrance.

The inner anchorage, close eastward of the channel entrance, has a depth of 9 feet but is small. The larger anchorage is on the west side of the entrance.

The city wharf, on which a light is located, is at the head of the entrance channel. In May 1963, there was 9 feet alongside the west bulkhead. The fish wharf and the oil wharf had 10 feet alongside. A marine railway can haul out craft up to 50 feet in length. Gasoline, diesel fuel, water, ice, and supplies are available.

Pembroke Creek is a small nontidal stream flowing easterly into the head of Edenton Bay. A row of piles which are submerged at high water bisects the lower part of the creek for some 2,000 feet. U.S. Route 17 highway bridge, 0.6 mile above mouth of creek, has a 20-foot fixed span with a clearance of 5 feet. With local knowledge, a draft of 5 feet can be carried to the bridge. At a marina on the northeast bank of the creek, just below the bridge, berthage, gasoline, water, and some supplies are available. There is a depth of 4 feet alongside the piers. Engine repairs are made at the marina and there is a small boat launching ramp. About 0.5 mile above the bridge there is a U.S. Fish Hatchery.

Chowan River empties into the western end of Albemarle Sound from northward, and with its tributaries forms one of the largest rivers in North Carolina. In May 1963, a controlling depth of 15 feet was available to Winton about 32 miles above the mouth. About 11 feet is available to the confluence of Blackwater and Nottoway

Rivers, 45 miles above the mouth. For about 17 miles above its mouth, Chowan River has an average width of 1.5 miles. Snags, many of which are underwater, are generally found on the shoals in this part of the river; the worst place, known as **Stumpy Reach,** is between Colerain Landing and **Bennetts Creek,** a distance of about 6 miles.

Salmon Creek is a small stream which flows easterly into Chowan River just above the mouth. The entrance to the creek is a good harbor for boats of drafts up to 6 feet. **Avoca** is a village on the south bank about a mile above the entrance. In May 1963, the controlling depth was 7 feet to Avoca, thence 5 feet for another 0.5 mile.

The highway bridge about 2 miles above the mouth of Chowan River has a swing span with a clearance of 4 feet.

Colerain Landing, on the west bank of the Chowan River, 12 miles above the entrance, is the site of a large herring factory. Just above it is an oil dock. The village of **Colerain** is on a hill 0.5 mile inland.

Tunis, a landing on the south bank of Chowan River and east of the Atlantic Coast Line Railroad bridge, is 30 miles above the river mouth. The railroad bridge has a hand-operated swing span with a clearance of 5 feet. A bridge tender is on duty from 6 a.m. to 10 p.m.

Tuscarora Beach is about a mile above the railroad bridge at Tunis. A yacht basin has a service pier with depths of 11 to 13 feet alongside and covered berthage for boats with drafts up to 6 feet; gasoline, water, electricity, and groceries are available.

Winton is a small town on the west bank of the river 32 miles above its mouth. Gasoline and some supplies can be obtained in the town, and also at a small outboard marina on the north bank of the river just east of the highway bridge. A small-boat launching ramp is available at the marina. U.S. Route 13 highway bridge at Winton has a swing span with a clearance of 5 feet. A small wharf is above the bridge, and another is below the bridge on the south bank and eastward of a ramp used by barges for loading plywood.

Meherrin River joins the Chowan River from westward 2.5 miles above Winton. About 0.4 mile above the mouth of the river is a cable ferry. **Murfreesboro** is a small town 10.5 miles above the mouth. U.S. Route 258 highway bridge there has a fixed span with a clearance of 24 feet. In May 1963, the controlling depth to Murfreesboro was 7 feet, and the turning basin there had a controlling depth of 12 feet.

About 13 miles above Winton, Chowan River is formed by the confluence of **Blackwater River** and **Nottoway River** near the Virginia State line. In April 1958, the controlling depth in Blackwater River was reported to be 7 feet to **Franklin,** Va., where there is a wharf. Small craft are able to reach **Burdette,** Va., 10.5 miles above Franklin. A highway bridge across Blackwater River 8 miles above its mouth has a swing span with a clearance of 17 feet. Five other bridges cross the river between Franklin and Burdette; the fixed bridges have a minimum channel width of 22 feet and a minimum clearance of 12 feet. Navigation of Nottoway River is restricted by seven fixed bridges; the minimum channel width of the bridges is 13 feet and the clearance 7 feet.

Roanoke River rises in the Blue Ridge Mountains, west of Roanoke, Va., and flows southeasterly into **Batchelor Bay,** a shoal bight at the southwestern end of Albemarle Sound; about halfway it is joined by the **Dan River,** its principal tributary. There are a number of flood control and power dams on the rivers. The largest of these, about 17 miles below Clarksville, Va., forms the John H. Kerr Reservoir. The reservoir extends upstream about 48 miles on the Roanoke and about 30 miles on the Dan River. Another dam is at **Roanoke Rapids** about 120 miles from the mouth of the river.

A Federal project provides for a channel 12 feet deep to a mile above Plymouth, thence 10 feet deep to **Hamilton,** 52 miles above the mouth, and thence 8 feet deep to **Palmyra Landing,** 67 miles above the mouth with a cutoff channel 8 feet deep about 1.7 miles above Hamilton. Controlling depths in July 1963, were: 12 feet to Plymouth, 8 feet to Hamilton, and thence, in 1952, 2½ feet to Palmyra Landing.

Plymouth is an important town 6 miles above the mouth of Roanoke River. The town has good highway and rail connections. Fresh water, gasoline, diesel fuel, and provisions are available. There are several small wharves at Plymouth, with 14 to 18 feet of water alongside. A veneer factory is on the river front below the town, and 1 mile above the town is the large wharf of a pulp mill, which has 15 to 18 feet of water alongside.

Williamston is 26 miles above the mouth of the river. U.S. Routes 13 and 17 highway bridge at Williamston has a swing span with a clearance of 17 feet at low water and 4 feet at high water. Just below the bridge are a fertilizer plant and an oil dock. Several oil piers are above the bridge. Logs and oil comprise most of the shipping.

Cashie River flows southeasterly about 50 miles to its intersection with the **Thorofare,** connecting Cashie and Roanoke Rivers; thence it flows northeasterly about 6 miles and empties into Batchelor Bay. The controlling depth, in May 1963, was 8 feet to Windsor. A cable ferry crosses the river about 6 miles above the mouth.

The Thorofare has several sharp bends, and at its junction with the Cashie River there are two small islands. Pass eastward of the islands. The head of navigation in Cashie River is the fixed highway bridge at Windsor. Gasoline and some supplies are available.

Kendrick Creek is on the south side of Albemarle Sound just westward of the railroad trestle which crosses the sound. Several fishhouses and a small cannery are here. Gasoline, fresh water, and groceries are available. The controlling depth, in May 1963, was 7 feet from the entrance channel and for a distance of 4 miles up the creek, which is the head of navigation; the creek is obstructed by trees and logs above this point.

The channel into Kendrick Creek is marked on either side by rows of piles. There are stumps in places on the shoals at the mouth of the creek. The Norfolk Southern Railway bridge just above the mouth has a swing span with a channel width of 32 feet and a clearance of 3 feet; drawspan regulations are given in **203.245,** Chapter 2.

Mackeys is a small town 0.5 mile above the entrance. The highway bridge about 0.5 mile above Mackeys has a 34-foot fixed span with a clearance of 8 feet.

Bull Bay is on the south side of Albemarle Sound, 7 miles eastward of the highway bridge which crosses the sound. **Bull Creek** and **Deep Creek** empty into the western side of the bay. A channel with a depth of 7 feet, in May 1963, leads through the flats to the entrances of Bull and Deep Creeks. Daybeacons mark the entrance.

Scuppernong River empties into the eastern end of Bull Bay from southeastward. Lights and daybeacons mark the channel from the bay to Columbia. The controlling depth, in June 1963, was 10 feet from the mouth to Columbia, and thence, in May 1963, about 8 feet to Spruills Bridge, and thence 4 feet to a turning basin at **Cherry,** about 16 miles above the mouth.

Columbia, a small town 4 miles above the mouth of the river, has two oil docks and several landings. The landings have depths of 14 to 16 feet alongside, but are in poor condition and not able to accommodate more than one boat at a time. Gasoline, diesel fuel, and some supplies are obtainable and there is a small-boat launching ramp.

The first of two highway bridges at Columbia has a swing span with a channel width of 42 feet and a clearance of 2 feet. The second highway bridge has a 35-foot fixed span with a clearance of 12 feet; the navigation span of this bridge is removable. See Appendix for **storm warning display.** An overhead power cable above the second bridge at Columbia has a clearance of 76 feet.

Cross Landing Bridge, 12 miles above the mouth of Scuppernong River, has a swing span with a channel width of 42 feet and a clearance of 1 foot. **Spruills Bridge,** 15 miles above the mouth near **Creswell,** has a 32-foot removable span with a clearance of 6 feet. Drawspan regulations for bridges over Scuppernong River are given in **203.245,** Chapter 2.

Alligator River is on the south side of Albermarle Sound directly opposite Pasquotank River. For about 18 miles above the mouth (see also Chart 1231), Alligator River has a southerly direction, is 2 to 3 miles wide, and has general depths of 8 to 11 feet. Above this, the river has a further length of about 24 miles, is narrow and crooked, but in May 1963, had depths of 8 feet or more to **Cherry Ridge Landing;** the upper part, however, is too narrow to turn in. Logs are towed from the river in barges and rafts.

The entrance to Alligator River is full of shoals, but the channel of the Intracoastal Waterway, described in Chapter 12, has been dredged through the shoals and along the entire length of the wider part of the river.

On the eastern side of Alligator River and just above the mouth is the entrance to **East Lake** and **South Lake** (see also Chart 1229), which in May 1963 had general depths of 6 to 8 feet. The village of **East Lake** is on the east side of Alligator River, 4 miles above the mouth. Highway bridge crossing the river at East Lake has a swing span with a clearance of 13 feet.

Little Alligator River empties into Alligator River from westward just inside the entrance. The narrow, crooked channel of Little Alligator River, in May 1963, had a controlling depth of 5 feet for about 6 miles to a landing at the head of the river where gasoline, diesel fuel, water, and provisions are obtainable.

Chart 1229.—Croatan Sound, between Roanoke Island and the mainland, connects Albermarle and Pamlico Sounds. The controlling depth through the dredged channel was 8 feet in May 1963. The channel is well marked, but strangers should not attempt passage at night. Fish stakes are numerous in season.

Height of water in Croatan Sound depends entirely on the wind, which under exceptional conditions may lower or raise the level as much as 1.5 feet from normal; easterly winds lower the water and westerly winds raise it. Strong northerly or southerly winds produce currents which are especially marked when the wind shifts suddenly to the opposite direction.

There is a good harbor in **Peter Mashoes Creek,** westward of Croatan Light, but entrance is possible only for small craft. The fixed highway bridge (U.S. Routes 64 and 264) between **Redstone Point** on the mainland and **Weir Point** on Roanoke Island has a clearance of 45 feet.

Roanoke Sound and the towns on the east side of Roanoke Island are described in another section.

Charts 1229, 1231, 1232.—Pamlico Sound, the largest body of water in North Carolina, is separated from the Atlantic Ocean by a narrow beach extending from Bodie Island Light to Cape Hatteras, a distance of about 35 miles. From Croatan Sound to the mouth of Neuse River, the distance through the middle of Pamlico Sound is about 65 miles; maximum width is about 25 miles. Oregon, Hatteras, and Ocracoke Inlets pierce the narrow beach, giving access to the ocean, but all are blocked by inside bars with little water over them; they are described in another section.

The northern and western shores of Pamlico Sound are broken by numerous small bays and two large rivers, Pamlico River and Neuse River. General depths in the middle of the sound are 14 to 24 feet, but shoals extend miles from shore in many places. **Bluff Shoal,** northward of Ocracoke Inlet, has 7 to 12 feet over it and extends completely across the sound. It is marked by a light.

In the exposed parts of the sound, strong winds from any direction raise a short, choppy sea uncomfortable to small craft and even dangerous to open boats; but protected anchorage for small craft can be found in the many bays along the northern shore, and along the southern shore in several sloughs which lead to sheltered berths in the lee of shoals. Middletown Anchorage and the anchorage in the bight formed by the hook of Royal Shoal can be made either day or night, with caution.

Tides at the inlets have a mean range of from 2.2 to 2.4 feet. In other parts of the sound the periodic tide is less than 0.5 foot. Easterly and westerly winds produce the greatest change in water level. Currents are negligible except in the vicinity of the inlets.

Chart 1229.—Stumpy Point Bay, on the west side of Pamlico Sound 10 miles from the south end of Roanoke Island, affords good anchorage in depths of 3 to 4 feet. A Federal project provides for a channel 7 feet deep from Pamlico Sound through Stumpy Point Bay to a basin of the same depth at Lake Worth, the small town at the head of the bay. The controlling centerline depth, in May 1963, was 7 feet to and including the turning basin. A fishhouse and landing at the upper end of the basin have gasoline and diesel fuel.

Stumpy Point, a small town on the east side of Stumpy Point Bay, has a fishhouse where gasoline, diesel fuel, and water are available; a marine railway can haul out vessels up to 50 feet in length for hull and engine repairs.

Long Shoal River, which flows southerly into Pamlico Sound about 8 miles southwestward of Stumpy Point Bay, is 1.5 miles wide at the mouth, and is a good anchorage for vessels with drafts of 8 feet or less. Shoals with 1 to 2 feet over them on both sides of the entrance break up the sea from southward. The channel, in May 1963, had a depth of 9 feet to an anchorage off **Pains Bay,** thence 9 feet for another mile, thence 5 feet for 2 miles. **Long Shoal,** to the east of the entrance, and **Pingleton Shoal,** on the west, are marked by lights, and daybeacons mark the points of shoals in the entrance. In a smooth sea vessels of less than 7-foot draft can cross Long Shoal just northwest of the light. With the aid of the chart, strangers should have little difficulty entering Long Shoal River in daytime.

The town of **Rodanthe** is on the narrow barrier beach 12 miles southward of Oregon Inlet on the east side of Pamlico Sound. Two landings are in the basin at the village in addition to the bulkheaded area. The controlling depth in **Chicamacomico Channel** from the sound to the basin at Rodanthe was 2½ feet in May 1962. The channel is marked by lights.

Chart 1232.—The town of **Avon** is on the barrier beach, 6 miles north of Cape Hatteras on the southeast side of Pamlico Sound. Gasoline and diesel fuel can be obtained at the fishhouse landing. Hotel accommodations are available. Shoal water extends about 3 miles from shore. **Cape Channel,** a natural opening in the shoal southwest of the village, has a controlling depth of about 6 feet.

A Federal project provides for a channel 6 feet deep from the sound to a basin at Avon, at the shore end. The controlling depth, in 1961, was 6 feet. The channel is well marked.

Buxton is a small town about a mile north-northwest of Cape Hatteras Light. The town of **Frisco** is about 4 miles westward, on the southeast side of Pamlico Sound. There are no wharves at either place, and anything but a light-draft boat must anchor well offshore. Local fishermen usually approach Buxton through Cape Channel.

Rollinson Channel extends from deep water in Pamlico Sound to the basin at Hatteras, and is well marked. A Federal project provides for a channel 6 feet deep from the sound to the basin. The controlling centerline depth, in May 1963, was 6 feet in the channel and basin. Hatteras Inlet and the facilities at Hatteras were described previously in another section.

Far Creek, on the northwest side of Pamlico Sound between Pingleton Shoal and **Gibbs Shoal,** leads to the town of **Engelhard,** which is connected with the interior by a paved highway. An oil dock and several piers with depths of 7 to 12 feet alongside are just below U.S. Route 264 fixed highway bridge. Barges go to the grain elevator landing and to the oil dock. Seafood is shipped from the town by truck. Gasoline, diesel fuel, ice, and some supplies are available in the town.

A Federal project provides for a channel 12 feet deep from Pamlico Sound to a turning basin at the same depth about 200 feet below the highway bridge at Engelhard. In May 1963, the controlling depth was 12 feet. The channel is marked by lights and daybeacons.

Middletown Anchorage, a broad open bight in the northwestern shore of Pamlico Sound, has depths of 9 to 13 feet and is sheltered from eastward by Gibbs Shoal, which has 1 to 4 feet over it. There is no shelter from southeasterly or southerly winds. The anchorage is large and easy of access, and is used by tows and other vessels. **Middletown** is a short distance inland from the anchorage, and is reached by light-draft boats by way of **Middletown Creek.** In May 1963, the controlling depth over the bar and to the fixed bridge over the creek at Middletown was 3 feet. Vessels must pass south of the light on the southeast end of Gibbs Shoal in entering. Gasoline is obtainable in the town.

Caution should be used in approaching Middletown Anchorage at night, as the low marshy shore extends long distances from the woods in places and does not show well. In rough weather vessels with drafts less than 4 feet prefer to pass inside Gull Shoal Light when bound southwestward from Middletown Anchorage. They enter Wysocking Bay, pass westward of Gull Rocks, and thence eastward of the light 0.4 mile eastward of **Hog Island.**

Wysocking Bay indents the north shore of Pamlico Sound northwestward of Gull Shoal Light. It is a convenient anchorage for small craft drawing less than 6 feet when following the north shore of the sound. In May 1963, the bay had depths of 7 to 5 feet from the entrance to its head. The entrance is obstructed by shoals. Daybeacons and lights mark the channel which leads northward of **Gull Shoal** and into the bay. **Gull Rocks,** on the south side of the entrance to the bay, are covered at ordinary water levels.

Nebraska Canal, with a depth of about 1½ feet in May 1963, leads from the head of Wysocking Bay to **Nebraska,** a small town 2 miles inland where gasoline and supplies can be obtained. The lower part of the canal has filled in so that boats going to Nebraska must enter the old cut at the entrance light; local knowledge is required. A fixed bridge crosses the canal at Nebraska.

Chart 1231.—Bluff Point, low and marshy, separates **East Bluff Bay** and **West Bluff Bay,** two unimportant bights southwestward of Wysocking Bay. A light marks

the end of the shoal making eastward from Bluff Point. A daybeacon marks the 4-foot shoal 2 miles south-southeastward of Bluff Point. Extending southward from Bluff Point is a large area of shoal water, a tongue of which, called **Bluff Shoal,** extends completely across Pamlico Sound. Depths on Bluff Shoal are 7 to 12 feet. A light is near the middle of the shoal. A 12-foot slough through the shoal is about 1 mile northward of the light.

Juniper Bay, on the north side of Pamlico Sound 4 miles westward of Bluff Point, is about 1.5 miles wide at the entrance, but narrows gradually toward its head, to a narrow, crooked stream 3 miles above the entrance. Shoals extend from both shores. A light marks the shoal extending from the east point at the entrance. The middle of the bay had depths of 7 to 10 feet, in May 1963. The bay has considerable traffic in small craft with drafts less than 5 feet; these make the passage to and from Belhaven by way of Swanquarter Narrows, Swanquarter Bay, and the canal to Deep Bay.

Great Island, on the west side of the approach to Juniper Bay, is low and grassy. A light marks the shoal extending southeast from the island. **Swanquarter Narrows,** between Great Island and the mainland to the north, is navigable for vessels of 6-foot draft. In May 1963, the controlling depth in the narrows was 7 feet. A light marks the western entrance to the narrows.

Swanquarter Bay, northwestward of Great Island, is about 2 miles wide at the mouth, but narrows gradually toward its head 4 miles above. Depths in the bay, in May 1963, were 6 to 12 feet to abreast the town of Swanquarter. The natural channel is marked by 331° lighted range, lights, and daybeacons. Oyster beds are numerous in the bay.

Swanquarter, the seat of Hyde County, is the center of trade for much of this area. The town connects with the interior by a hard-surfaced highway via Belhaven and Washington. Gasoline, diesel fuel, and water are obtainable at the town.

Swanquarter Canal, a Federal 8-foot project, connects Swanquarter Bay with Deep Bay. In December 1963, the controlling depth was 8 feet in the canal, thence 8 feet in January 1964 to and in the basin at Swanquarter.

Rose Bay, westward of Swanquarter Bay on the north side of the entrance to Pamlico River, is 1.8 miles wide at the entrance, but shoals extending from both sides restrict the entrance channel to a width of 0.6 mile. The channel, in May 1963, had depths of 7 feet or more for 4 miles from the entrance. A light is at the entrance and daybeacons mark the best water in the bay. The bay is used mostly by local fishing boats.

Deep Bay, leading eastward from just inside the entrance of **Rose Bay,** is the approach to the land cut to Swanquarter Bay. In May 1963, the controlling depth was 7 feet. Local vessels generally use this route. A narrow channel, locally known as **The Blowout,** has been cut through the narrow neck of **Judith Island** from Deep Bay to **Deep Cove** on the Pamlico Sound side. The channel is used considerably by local fishermen, but strangers should not attempt it. The controlling depth in The Blowout, in May 1963, was 3 feet.

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Pamlico River and **Tar River** are the two names applied to the same river; it is known as the Pamlico below Washington, N.C., and as the Tar above that point. The river rises in Person County, flows in a general southeasterly direction and empties into the northwestern part of Pamlico Sound. Pamlico River, in May 1963, had depths of 12 feet or more for a distance of 20 miles above the mouth; above that point the river has been improved by dredging.

A Federal project provides for a channel dredged to 12 feet from the vicinity of Core Point to Washington. In May 1963, the controlling depth was 12 feet. The channel is marked by lights. The improved channel in Tar River, above Washington, in May 1963, had a controlling depth of 9 feet for 15 miles to Hardee Creek, thence 3 feet for 4 miles to Greenville.

Pamlico River is nontidal; variations in the water level at Washington, due to prevailing winds, seldom exceed 2 feet. The extreme range of the flood or freshet stage for Tar River is 34 feet at Tarboro, 75 miles above the mouth. For the lower section, the extreme range due to winds is 8.5 feet.

Pungo River, which empties into Pamlico River from northward about 5 miles above the mouth, has a channel well marked by daybeacons and lights, and can be readily followed by a stranger for 15 miles. The river then narrows. The least channel depth, in May 1963, was 8 feet to **Leechville,** a town 18 miles above the mouth. The U.S. Route 264 highway bridge at Leechville has a 30-foot fixed span with a clearance of 7 feet. Tributaries to the Pungo River include several navigable creeks. The most important are Slade, Scranton, Wilkerson, Pungo, and Pantego Creeks. The route of the Intracoastal Waterway, described in Chapter 12, follows Pungo River from Wilkerson Creek to and across Pamlico River.

Slade Creek, which empties into Pungo River from eastward about 4 miles above the mouth, in May 1963, had depths of 8 feet or more for 2 miles from the mouth, and 7 feet for 2 miles farther.

Pungo Creek empties into Pungo River from westward about 8 miles above the mouth of the river and 1.5 miles southwestward of Belhaven. A highway bridge, 2.5 miles above the mouth of the creek, has a 32-foot fixed span with a clearance of 8 feet. The overhead power cable just north of the bridge has a clearance of 35 feet. In May 1963, the creek had depths of 9 feet or more to the bridge and thence 7 feet for about 2 miles. A light and a daybeacon mark the entrance to the creek.

Pantego Creek empties into Pungo River northward about 9 miles above the mouth of the river. Timber breakwaters extend from both shores of the entrance. The outer end of the north breakwater is marked by a light.

The breakwaters are in fair condition. In May 1963, the controlling depth was 9½ feet in the dredged channel to the basin just below the bridge at Belhaven, thence 7 feet for 1.0 mile above the bridge, thence 4 feet to the highway bridge at the town of **Pantego;** daybeacons mark the dredged channel. The highway bridge over Pantego Creek at Belhaven has a 32-foot removable span with a

clearance of 8 feet. An overhead power cable just west of the bridge has a clearance of 35 feet.

Belhaven, on the northeastern side of the entrance to Pantego Creek, has an excellent harbor for small craft. Belhaven is connected with the interior by highway and railroad. Seafood, grain, and lumber are shipped from the town. Gasoline, diesel fuel, water, ice, provisions, ship chandlery, and hotel accommodations are available. A marine railway can haul out vessels up to 55 feet in length for hull and engine repairs.

A marina on the north side of the creek at Belhaven, just inside of the breakwater, in May 1963, had depths of 6½ to 8 feet of water alongside the pier, and a depth of 7½ feet in the channel leading to the pier. Gasoline, diesel fuel, water, electricity, ice, hotel, and restaurant are available at the marina, and there is a small-boat launching ramp.

Goose Creek empties into Pamlico River from southward about 7 miles above the mouth of the river. The dredged channel of the Intracoastal Waterway crosses the shoals which obstruct the mouth of the creek, and passes southward to **Upper Spring Creek** and the land cut which connects with Bay River.

Chart 537.—South Creek empties into Pamlico River from southward about 9 miles above the entrance. The deeper entrance is southward of **Indian Island** and the shoal extending westward from that island to **Hickory Point.** In May 1963, a draft of about 6 feet could be taken through the channel across the shoal west of Indian Island; a light and a daybeacon mark the best water. The creek has depths of 7 feet or more for 4 miles above Hickory Point; above this, the creek has been improved by dredging. In May 1963, a depth of 6 feet could be taken to Aurora, and thence about 4 feet to Idalia. Daybeacons mark the channel.

Bond Creek, on the south side of South Creek opposite Hickory Point, in May 1963 had a depth of 6 feet to the small fish wharf in ruins at the town of **South Creek,** and 6 feet for another 1.7 miles. Daybeacons mark the entrance to Bond Creek.

Aurora, a town with rail connections, is 7 miles above Hickory Point. Gasoline and some supplies are available. There is a depth of 8 feet alongside the oil dock. The State Route 33 highway bridge over South Creek at Aurora has a 37-foot fixed span with a clearance of 5 feet; about 500 yards below this bridge is an overhead power cable with a clearance of 33 feet. Small boats use the creek as far as **Idalia,** 2.3 miles above Aurora.

North Creek empties into Pamlico River directly opposite South Creek. The channel had depths of 5 feet or more for about 1.5 miles in May 1963, and is marked by a light and daybeacons, but its navigation should not be attempted by strangers. In East Fork, the channel had a depth of 7 feet for 1.5 miles above the entrance.

Durham Creek empties into Pamlico River from southward 17.5 miles above the mouth and 2.5 miles westward of **Rumley Marsh Light.** The creek in May 1963 had a depth of 4 feet to **Bonnerton,** 4 miles above the entrance. A fixed highway bridge with a clearance of 2 feet crosses the creek at Bonnerton. A daybeacon marks the entrance.

Bayview is a pleasure resort on the north bank of Pamlico River 2 miles above Rumley Marsh Light. Small tourist cabins are available, and a good secondary road connects with the paved highway about 7 miles northward. The nearest rail connections are at Washington, about 20 miles distant by highway. Gasoline and some supplies are available at Bayview and there is a small boat launching ramp. All docks are in ruins.

Bath Creek flows southward into Pamlico River 3.5 miles above Rumley Marsh Light and in May 1963 had depths of 7 feet or more for 1.8 miles to the bridge at the town of **Bath,** and 4 feet for about 1.7 miles farther. The most difficult part of the channel to Bath is the entrance, where a shoal with grass showing extends halfway across from the west side and drops off abruptly. The outer edge of the shoal is marked by a light.

The State Route 92 highway bridge at Bath has a 37-foot fixed span with a clearance of 13 feet. An overhead cable at the bridge has a clearance of 60 feet. The bulkhead below the bridge has a depth of 6 feet alongside, and a small dock north of the bridge has 4 feet alongside. Gasoline and some supplies are available at Bath, and there is a small-boat launching ramp.

Blounts Creek flows northward into **Blounts Bay,** which is on the south side of Pamlico River, about 25 miles above the mouth. A highway bridge, 0.2 mile above the entrance of the creek, has a 36-foot fixed span with a clearance of 15 feet. The creek, in May 1963, had depths of 5½ feet or more for about 1 mile above the bridge and 3 feet for an additional 2 miles.

Broad Creek, on the north side of Pamlico River opposite Blounts Bay, in May 1963 had a controlling depth of 5 feet from the entrance to the **Washington Yacht and Country Club,** a distance of 1 mile, thence 4 feet for another 1.3 miles. Lights and daybeacons mark the channel. Gasoline, water, and electricity are available on the piers of the private club, which have 4 feet of water alongside. Just south of the yacht club there is a pier with 4 feet alongside where covered storage is available only.

Runyon Creek is on the north side of Pamlico River at Washington. A highway bridge and the Norfolk Southern railroad bridge crossing the creek just above the mouth have 18-foot fixed spans and a clearance of 4 feet. There is a marina where gasoline, diesel fuel, water, electricity, provisions, and some supplies may be obtained. A small marine railway can haul boats up to 30 feet in length for hull and engine repairs, and there is a small boat launching ramp. In May 1963, there was a depth of 4 feet from the improved channel to and alongside the pier at the marina.

Washington, 32 miles above the mouth of Pamlico River, is the seat of Beaufort County and an important business center with communications extending to nearly all points on Pamlico River and Pamlico Sound. The

city has excellent rail and highway connections. Gasoline, oil, and grain are the principal items shipped by water.

Washington has hotel accommodations. Gasoline, diesel fuel, water, ice, and ship chandlery are available. A small marine railway can haul out vessels up to 75 feet in length and minor repairs are made on hulls and engines. The river water above Bath Creek is usually fresh. A U.S. Public Health Service outpatient office is here. There is a customs office at Washington and marine documents are issued. See Appendix for **storm warning display.** The Coast Guard Depot is just eastward of the highway bridge. U.S. Route 17 highway bridge and a railroad bridge (Norfolk Southern railroad) cross the river at Washington. Both bridges have swing spans. The railroad bridge has a clearance of 7 feet and the highway bridge has a clearance of 11 feet. The overhead power cable at the highway (upper) bridge has a clearance of 75 feet. The highway bridge near Grimesland about 7 miles above Washington has a swing span with clearance of 5 feet at extreme high water and 10 feet at low-water stage.

Drawspan regulations for the drawspans of the highway bridges at Washington and near Grimesland are given in **203.245,** Chapter 2.

Chart 1231.—Mouse Harbor, Big Porpoise Bay, and **Middle Bay** are small unmarked shallow bays on the east side of **Goose Creek Island** on the western side of Pamlico Sound between Pamlico River and Jones Bay. **Mouse Harbor Ditch** and **Leary Canal** are two small-boat passages which connect Mouse Harbor with Clark Creek, on Pamlico River, and Big Porpoise Bay with Middle Bay. The controlling depth in both passages was 3 feet in April 1963. The three bays are frequented only by local fishermen.

Jones Bay, on the western side of Pamlico Sound just northward of the entrances of Bay and Neuse Rivers, in April 1963, had depths of 7 feet or more for 4 miles above its mouth. The entrance is somewhat obstructed by shoals through which a marked channel leads into the bay. On the north side, near the head of the bay, is the town of **Hobucken.** Small craft bound for the town can land in the cove 0.8 mile above **Drum Creek. Ditch Creek,** on the opposite side of the bay from Drum Creek, leads to an old canal through which small boats can be taken at high water to Bay River. Hobucken is discussed further in Chapter 12 in connection with the Intracoastal Waterway which crosses the head of Jones Bay and links it with Goose Creek on the north and Bay River on the south.

The approach to Jones Bay from eastward is over or around **Brant Island Shoal,** which extends for 10 miles in a southeasterly direction from the north side of the entrance to the bay. For 6 miles southeastward to Brant Island Slue Light the shoal has depths of 2 to 3 feet; between that light and Brant Island Shoal Light at the outer end are depths of 5 to 8 feet.

The **danger zone** of a bombing and rocket firing area is in Pamlico Sound near Brant Island; limits and regulations are given in **204.55,** Chapter 2.

Charts 1231, 538.—Bay River empties into the western part of Pamlico Sound between Jones Bay and the mouth of Neuse River. The natural channel, from the entrance to off the mouth of Trent Creek about 12 miles above the entrance, is marked by lights and daybeacons and, in April 1963, had depths of 9 feet or more. It can be followed readily. Above this point, a Federal project provides for a channel dredged to 10 feet to Bayboro, which is practically the head of navigation. In April 1963, the controlling depth was 9 feet. The dredged channel is marked by daybeacons to Stonewall. An overhead power cable crossing the river about 0.3 mile below Bayboro has a clearance of 65 feet.

The route of the Intracoastal Waterway is along Bay River for 4 miles, thence northward through Gale Creek.

Vandemere is a town on the north side of Bay River 8 miles above the mouth. Gasoline, diesel fuel, and some supplies are available. There are two marine railways that can haul out vessels up to 60 feet in length for hull repairs and there is a machine shop with engine repair service. In April 1963, the controlling depth was 9 feet to Vandemere, and there was 10 feet of water alongside the piers and 4 feet at end of railways.

Stonewall is a small town on the south side of the river 14 miles above the mouth; most of its docks are in ruins.

Bayboro, 15 miles above the mouth of the river, has docks in fair condition on the east side of the creek leading to Mill Pond. Depths at the oil and fish docks are 8 to 9 feet. Gasoline, ice, and some supplies are obtainable here. Lumber and pulpwood are shipped out by Norfolk Southern Railway. Navigation above Bayboro is restricted by fixed bridges at the town.

Neuse River rises in the northern part of North Carolina and flows for about 250 miles in a general east-southeasterly direction into the western end of Pamlico Sound. Its mouth is about 5 miles wide, but is reduced to a navigable width of about 2 miles by shoals which extend from either side. The river has depths of 13 feet or more for 25 miles above the mouth; above that point it has been improved by dredging. A Federal project provides for a 12-foot channel to New Bern. In April 1963, the controlling depth was 11 feet to New Bern, thence 3 feet for 23 miles above the city. The channel is marked to about 4 miles above the city. Strangers should not attempt to navigate the river above that point.

Tides.—Neuse River has practically no tide, the variation in water level being due principally to winds. Easterly winds cause high water and westerly winds low water, the maximum variations with heavy gales amounting to about 2 feet above or below the normal in the lower part of the river, and about 3 or 4 feet at New Bern. Freshets of 10 to 20 feet occur in the upper reaches of the river above New Bern, but have little effect at or below the town.

Broad Creek empties into the north side of Neuse River about 4 miles above the mouth. In April 1963, the controlling depth was 7 feet for a distance of 2.5 miles, thence 5 feet to Whortonsville. A light marks the west side of the entrance to the creek. **Pamlico** is a village on the south side of the creek, 3 miles above the entrance. **Whortonsville** is on the east side of the entrance to **Brown Creek** about 0.5 mile northeast of Pamlico, and on the opposite side of Broad Creek. Gasoline is available at the pier which has a depth of 5 feet alongside. Minor logging operations are conducted in Broad Creek. Overhead power cables crossing the mouth of Brown Creek and Broad Creek at Pamlico have a clearance of 40 feet.

South River flows into the south side of Neuse River about 8 miles above the mouth. The entrance is marked by daybeacons and a light. The channel had depths of 8 feet for about 6 miles above the entrance, thence 7 feet for another 1.5 miles, in April 1963.

The **danger zones** of several bombing, rocket firing, and strafing areas are in Turnagain Bay and Rattan Bay, in Neuse River, and in Long Bay and West Bay in Pamlico Sound. A number of markers, some of which are lighted, are in the vicinity of the areas; see **204.55,** Chapter 2, for limits and regulations.

Chart 538.—Garbacon Shoal extends halfway across Neuse River from the southern shore 10 miles above the mouth, leaving a clear width of about 0.8 mile between the 12-foot contours. The outer end of the shoal is marked by a light.

Oriental is a small town at the entrance to **Smith Creek** on the north bank of the Neuse River about 11 miles above the mouth. Fishing is the principal industry and seafood is trucked to the interior. The harbor is protected by a rubble mound breakwater marked by a light off the end. A Federal project provides for a 10-foot entrance channel dredged from Neuse River to a basin of the same depth at the town. The controlling depth was 9 feet in June 1963. Lights and daybeacons mark the entrance channel. The harbor provides excellent anchorage for small craft.

A marina with 6 to 8 feet at the pier has a small-boat launching ramp; gasoline, diesel fuel, water, ice, electricity, showers, restaurant, and a motel are available. These services and some supplies are also available elsewhere on the waterfront and in the town. A marine railway can haul out craft up to 60 feet in length for hull and engine repairs.

A highway bridge 0.2 mile above the entrance to Smith Creek has a 36-foot fixed span with a clearance of 17 feet. Overhead power and telephone cables with clearances of 27 feet cross the creek at **Blackwell Point.** An abandoned railroad bridge, in ruins, across **Morris Creek** about 1 mile above the highway bridge has a 11-foot fixed span with a clearance of 6 feet. **Greens Creek** joins Smith Creek at **Dewey Point** just above the bridge.

Adams Creek empties into the south side of Neuse River about 13 miles above the mouth. The creek is part of the Intracoastal Waterway and is described in Chapter 12.

Clubfoot Creek flows into Neuse River from southward about 15 miles above the mouth. The entrance is marked by a light. The channel southward of the light is narrow with shoals rising abruptly on both sides. Depths in the channel, in April 1963, were 5 feet or more for 3 miles above the light.

Hancock Creek is on the south side of Neuse River about 20 miles above the mouth. In April 1963, a draft of 10 feet could be carried through the narrow entrance to the **Cherry Point** wharf just inside by following the 261° lighted range. The depth at the wharf was 12 feet. The lighted range, a light, and daybeacons mark the channel. A **restricted area** at the Cherry Point Marine Corps Air Station is described in **207.164,** Chapter 2.

Slocum Creek, on the south side of Neuse River 22 miles above the mouth, in April 1963, had a controlling depth of 4 feet for 4 miles to the forks, and up the East Prong 0.1 mile to a foot bridge across the creek which obstructs passage for further navigation. A light and daybeacons mark the critical parts of the channel at the entrance to the creek. A highway bridge with a 12-foot fixed span and a clearance of 11 feet crosses 3 miles above the entrance. An overhead cable with a clearance of 39 feet crosses the creek just below the bridge.

Beard Creek is on the north side of Neuse River opposite Slocum Creek. The mouth of the creek is marked by a daybeacon. The controlling depth from the entrance to the highway bridge, 2.3 miles upstream, was 4 feet in April 1963. The bridge has a fixed span and a clearance of about 4 feet. Good anchorage may be found off the eastern side of the entrance.

Goose Creek, on the northeast side of Neuse River 27 miles above the mouth, in April 1963, had depths of 5 feet or more to **Wood Landing,** 3 miles above the entrance. **Upper Broad Creek,** on the northeast side of Neuse River 28 miles above the mouth, had depths of 5 feet or more, in April 1963, to **Lees Landing,** 4 miles above the entrance. The overhead cable at the landing has a clearance of 40 feet. The entrance is marked by a daybeacon.

New Bern, a city on the west bank of Neuse River 34 miles above the mouth, is the seat of Craven County and an important center for this area. The rectangular lighted clock tower atop City Hall is visible for 10 miles down river and is an excellent landmark. Vessels proceeding up the river to New Bern are advised to stay in the channel because of the numerous fish traps scattered indiscriminately throughout the unmarked areas. The river is slightly brackish except during freshets. Some lumber is shipped by truck and cottonseed oil and marl are transported by barge.

Gasoline, diesel fuel, water, ice, marine supplies and provisions are available, and there are numerous restaurants, hotels, and motels. Two shipyards are on Trent River; the larger, just westward of the Southern Railway Bridge, has five marine railways that can haul out vessels up to 205 feet in length. The other just westward of the highway bridge has two marine railways that can haul out vessels up to 150 feet in length. Major hull and engine repairs can be made, and ship chandlery is

available at both yards. On the south side of Trent River just southwestward of the railroad bridge there is a marina with a marine railway that can haul out vessels up to 50 feet in length for general hull and engine repairs. Three piers 100 feet long have depths of 9 feet alongside. Dry storage for 25 boats and wet storage for 50 boats is available, and there are two small-craft launching ramps. Gasoline, water, and electricity are available at the piers and diesel fuel is delivered by truck.

A U.S. Public Health Service outpatient office is here. A Coast Guard patrol boat is based at the marina on Trent River.

U.S. Route 17 highway bridge over Neuse River at New Bern has a swing span with a clearance of 13 feet. The Norfolk Southern railroad bridge 0.9 mile above the highway bridge has a swing span with a clearance of 0 feet at extreme high water and 2 feet at low water. The overhead power cable at the railroad bridge has a clearance of 50 feet over the main channel.

Trent River empties into Neuse River on the south side of New Bern. In 1963, depths available were 10 feet along the New Bern waterfront, thence 7 feet for about 14 miles to Pollocksville, and thence 3½ feet for 19 miles to Trenton.

U.S. Route 70 highway swing bridge over Trent River at the mouth has a clearance of 14 feet. The Atlantic and East Carolina Railway bridge has a swing span with a channel width of 43 feet and a clearance of 3 feet. An overhead power cable about 1.8 miles above the mouth has a clearance of 65 feet, and the cable 4.8 miles above the mouth has a clearance of 48 feet.

At **Pollocksville,** 15 miles above the mouth, the Atlantic Coast Line Railroad bridge has a 40-foot lift span with a clearance of 2 feet down and 27 feet up, and U.S. Route 17 highway bridge with a 48-foot fixed span with a clearance of 5 feet.

Drawspan regulations governing the drawbridges above New Bern are given in **203.245,** Chapter 2.

Brice Creek enters Trent River from the east about 1.7 miles above the mouth. The natural depths in the creek were 8 to 40 feet for 2.6 miles in April 1963. A highway bridge 1 mile above the mouth has a 25-foot fixed channel span with a clearance of 5 feet.

Chart 1231.—West Bay is a large irregularly shaped body of water on the southwest side of Pamlico Sound west of Cedar Island and just southeastward of Neuse River entrance. The shores of the bay and its numerous branches are marshy, and it is of little importance other than for its oyster beds. In April 1963, a depth of 8 feet could be taken into the three principal arms of the bay through narrow and devious channels. Lights and daybeacons mark the entrance to West Bay and the channel in **Cedar Bay,** the middle arm.

Hook-shaped **Royal Shoal** extends northwestward from the vicinity of Ocracoke Inlet. The shoal is marked by three lights and a daybeacon. Tows and other vessels sometimes anchor inside the hook when the seas are too rough to make headway in the sound. The shoal, which bares in one place and elsewhere is covered 1 to 4 feet, breaks the seas so as to leave comparatively smooth water in the anchorage. Depths in the anchorage are 9 to 14 feet over good holding ground.

Charts 419, 420.—Core Sound extends southwesterly along and just inside the barrier beach from the south side of Pamlico Sound to Cape Lookout, a distance of about 27 miles; the width varies between 2 and 3 miles. The sound is mostly shoal but an improved channel, well marked by lights, extends along its entire length. Behind Cape Lookout, Core Sound is joined by Back Sound and The Straits, both of which connect with Beaufort Harbor.

Tidal currents of 1 to 2 knots may be found in the southern part of Core Sound. A mean range of about 1 foot of tide is now experienced in the sound due to the forming of Drum Inlet.

A Federal project provides for a channel 7 feet deep from Pamlico Sound to Beaufort Harbor by way of Wainwright Slue, Core Sound, The Straits, and Taylor Creek. Project depths obtained in 1962.

Chart 419.—Wainwright Slue is a small anchorage in the northeastern entrance to Core Sound. Shelter from the sea is provided by surrounding shoals, which have depths of 1 to 3 feet over them. Depths in the anchorage, in April 1963, were 8 to 10 feet. The channel into Core Sound is through Wainwright Slue and east of **Wainwright Island.**

Thorofare Bay is on the northwest side of Core Sound and 8 miles from the northeastern entrance. In April 1963, the controlling depth was 6 feet.

The **Thorofare,** a convenient passage from Core Sound through Thorofare Bay, Cedar Bay, and West Bay to the mouth of Neuse River, is used by local fishermen. In April 1963, the controlling depth from Cedar Bay through the Thorofare and Thorofare Bay to Core Sound was 6 feet. The critical part of the channel is marked by lights and daybeacons. A highway bridge near its eastern end has a swing span with a channel width of 30 feet and a clearance of 8 feet.

Atlantic is a town on the northwest side of Core Sound about 2 miles southwestward of the eastern entrance to Thorofare Bay. Two aluminum-colored tanks on the beach are prominent from seaward. A highway connects Atlantic with Beaufort and Morehead City. A marine railway can haul out boats up to 45 feet in length for hull repairs only. There is 8 feet of water alongside the pier. Fresh water, gasoline, diesel fuel, ice, provisions, and marine supplies are available. There is a restaurant and motel in the town. A passenger and vehicle ferry operates daily to Ocracoke on the outer beach.

A Federal project provides for a channel 7 feet deep from the main channel in Core Sound to a basin at the town of Atlantic; project depths obtained in 1963.

Chart 420.—Sealevel is a small fishing community about 3 miles southwest of Atlantic and on the west shore of Core Sound. Gasoline, diesel fuel, water, ice, and some

supplies are available. There is a restaurant and motel in the village. There is a pier which has 8 feet of water alongside. A Federal project provides for a channel 7 feet deep from the main channel in Core Sound to a basin of the same depth at Sealevel; project depth obtained in January 1963.

Davis, another small community, 5 miles southwestward of Sealevel, ships seafood to the interior by truck. Gasoline, diesel fuel, water, ice, provisions, and some marine supplies are available. There are machine shops at Davis and **Oyster Creek** where engine repairs may be obtained. A restaurant and cabins are available at Davis. The piers at Davis and Oyster Creek have 4 feet of water alongside. A Federal project provides for a channel 5 feet deep from the main channel in Core Sound to the piers at Davis. Project depth obtained in 1962.

Marshallberg is on the west shore of Core Sound and on the north side of the eastern entrance to The Straits. A Federal project provides for a channel 7 feet deep from the main channel in Core Sound to a basin of the same depth at Marshallberg. The controlling depth was 7 feet, in January 1963. A light and daybeacons marks the channel. Gasoline, diesel fuel, water, ice, telephone, provisions, and marine supplies are available. There is a marine railway at a boatbuilding yard that can haul out boats up to 100 feet in length. Complete hull and engine repairs may be obtained. There is 6 feet of water alongside the pier.

Back Sound leads westward from Core Sound for 6 miles to Beaufort Inlet, and varies in width from over 2 miles to 0.5 mile. A Federal project provides for a depth of 7 feet by way of the marked channels north and south of Harkers Island. In November 1963, the controlling depth was 7 feet in the channel through The Straits, north of the island and, in December 1963, was 4½ feet in the channel through Core Sound to Back Sound.

The improved channel from Back Sound to Lookout Bight has been discussed previously.

The Straits parallel Back Sound on the opposite side of Harkers Island and afford a through passage from Core Sound to Beaufort. The average width is about 0.5 mile, but in places the channel is only 100 yards wide. The channel is well marked by lights. A highway bridge over the western end of The Straits has a swing span with a channel width of 35 feet and a clearance of 8 feet; the nearby overhead power cable has a clearance of 71 feet.

Westmouth Bay is a cove on The Straits side of Harkers Island. A marine railway at a boatbuilding yard at the head of the bay can haul out vessels up to 45 feet in length, for hull repairs. The town of **Harkers Island** in the central part of the island, has piers both on Back Sound and at the head of Westmouth Bay; depths to the piers were 3 feet in April 1963. Gasoline, diesel fuel, water, ice, and some provisions may be obtained at the piers and there is also a small machine shop.

On the eastern end of Harkers Island there are three small marinas. Gasoline, diesel fuel, water, ice, electricity, showers, motels, restaurants, cottages, and provisions are available. There are two small-boat launching ramps at each marina; dry and wet storage can be obtained and there is ample berthing space at the piers which have 3 feet of water alongside. Seafood is shipped by truck and boat from the island.

A marina on the southwest point of the island has gasoline, water, ice, and some provisions available. A restaurant and motel are at the head of the pier which has 3 feet of water alongside.

From The Straits, the improved channel to Beaufort leads southwestward and along the north side of **Middle Marshes,** thence westward to abeam of **Lenoxville Point** where it turns sharply northward and then westward into **Taylor Creek.** The route is then westward through Taylor Creek to the wharves at Beaufort. The east entrance to Taylor Creek had a controlling depth, in July 1962, of about 7 feet, thence in November 1963, 9½ feet in the channel from Lenoxville Point westward to the turning basin. The channels are marked.

5. CAPE LOOKOUT TO CAPE FEAR

Chart 1110.—From Cape Lookout the coast extends 8 miles in a northwesterly direction, and then curves gradually westward and southward to Cape Fear. This section, nearly 100 miles long, is similar to that between Capes Hatteras and Lookout, but the strips of land which form it are separated from the mainland by much narrower bodies of water. As a consequence, the thick woods of the mainland can be seen from much farther seaward.

Depths along this stretch of coast are regular, and 4 to 6 fathoms can be taken to within 1.5 miles of the beach. The 10-fathom curve, about 10 miles offshore, is nearly parallel to the shore until eastward of Cape Fear where it bends southeastward around Frying Pan Shoals. The 20-fathom curve is from 20 to 45 miles offshore. An unmarked wreck, covered 5 fathoms, is 8.2 miles east-northeast of Cape Fear.

Between Beaufort Inlet and Cape Fear River, there are several inlets through which 2 to 6 feet can be carried to sheltered anchorage, but all are obstructed by shifting bars on which the sea breaks when at all rough. An onshore wind, even if light, will cause a heavy break on the bars, while an offshore wind may be heavy without making the bars dangerous. Strangers bound southward in small craft should not leave a sheltered anchorage with the wind anywhere between southeast and southwest, and should find anchorage as soon as possible after the wind begins to blow from those directions. The best guide for entering or leaving the inlets is the appearance of the water, as breakers always form on the shoal areas; strangers should not attempt to enter an inlet when breakers form entirely across it.

Charts 420, 423.—Beaufort Inlet is about 220 miles southwestward of the Chesapeake Bay entrance and the same distance northeastward of Charleston. It is the approach to **Morehead City Harbor,** the most important coastal harbor between Cape Henry and the Cape Fear River.

Morehead City, 2 miles inside the entrance on the western side of the harbor, is a shipping point for oysters and seafood products. It is 249 miles south of Norfolk, Va., and 154 miles north of Wilmington, N.C., by coastwise routes. Exports are general cargo and principally tobacco, wheat, dried milk, animal products, and lumber. Imports are petroleum and steel products and general cargo, including canned goods, plywood, and hardware.

Prominent features.—The buildings at **Atlantic Beach,** the most conspicuous being a hotel with twin cupolas, 3 miles west of Fort Macon, a standpipe at the eastern end of Morehead City, three water tanks at the State terminal, a water tank in Beaufort, and the cupola of the Coast Guard station on the west side of the entrance are prominent from seaward. **Fort Macon,** a State Park, is just east of the Coast Guard station.

Channels.—A Federal project provides for a 35-foot channel through the bar and Beaufort Inlet to a turning basin of the same depth off the North Carolina State Ports Authority Terminal at Morehead City; thence a 12-foot channel and turning basin westward along the Morehead City waterfront as far as Tenth Street; thence a 6-foot channel to the Intracoastal Waterway in Bogue Sound. In January 1964, the controlling depth was 26 feet in Beaufort Inlet Channel; controlling depths are published in the Notice to Mariners. Markers include range lights, lighted and unlighted buoys, and daybeacons.

Anchorage.—Good anchorage for large ships, but exposed from the southwest quadrant, may be obtained from the sea buoy eastward to Cape Lookout. There is good sand-shell holding bottom.

Dangers.—Cape Lookout Shoals, previously described in Chapter 4, are the principal danger in the approach to Beaufort Inlet. Spoil areas are on both sides of the approach to the entrance channel. A number of wrecks, some of which are marked, are in the approaches.

Tides and currents.—The mean range of tide at Morehead City is 2.8 feet. Tidal currents along Beaufort Inlet Channel attain velocities of 2 to 3 knots. They usually set along the channels, but at the entrance to Morehead City Channel, they usually set across the channel near the end of the flood period and beginning of the next ebb. For predictions see the Tidal Current Tables.

See Appendix for **storm warning displays.**

Pilotage is compulsory from the sea to the terminal for all foreign vessels and United States vessels under register in the foreign trade. Pilotage is optional for United States coastwise vessels which have on board a pilot licensed by the Federal Government. Pilots board vessels at the sea buoy, usually during the day. Vessels arriving at night anchor off the sea buoy and await daylight for pilots to board. The pilot boat is equipped with radiotelephone and guards frequencies 2182 kc. and 2738 kc. Pilots are usually contacted prior to arrival through the ship's agent.

Towage.—Docking and other towing services are available in the port by tugs up to 650 horsepower.

Quarantine.—Vessels subject to quarantine inspection are boarded upon arrival at berth. A U.S. Public Health Service outpatient office is in Morehead City, and a marine ward is maintained in the Morehead City General Hospital.

Customs.—Beaufort-Morehead City is a customs port of entry and marine documents are issued.

Immigration officials will come from Wilmington when requested.

Wharves.—The North Carolina State Port Authority Terminal, on the west side of the turning basin, provides 2,550 feet of berthing space, sufficient for four large ocean-going vessels and one tanker. Three transit sheds on the wharf provide 132,000 square feet of storage space and five storage warehouses provide 363,000 square feet. The 34-foot marginal apron on the wharf is double tracked and there is a single depressed track at the rear of all transit sheds and warehouses. Pipelines for fresh water and petroleum products, and facilities for general cargo handling and grain loading, are on the wharf. Cargo fumigation facilities are available at the terminal. A depth of 35 feet is maintained alongside the berths. The short 350-foot northerly section of the wharf is usually reserved for tankers. Three LST loading ramps are at the westerly end of this berth. The terminal is served by the Southern Railway and by numerous highway motor carriers.

A Navy fuel depot is on the west side of Radio Island. About 640 feet of berthing space with a depth of 32 feet is available alongside the T-head fuel pier and mooring cribs. Fresh water is piped to the pier. Four LST loading ramps are at the southern end of the island. Three rows of mooring dolphins, extending off the ramps, separate the berths, and a breakwater to the eastward, marked by a light, protects them from east and northeasterly weather.

Supplies.—Gasoline, diesel fuel, fuel oil, water, ice, provisions, and ship chandlery are available.

Repairs.—There are marine ways and plants equipped to handle hull and topside repairs to vessels up to 85 feet in length.

Communications.—Morehead City is served by highways and the Southern Railway System.

Beaufort, on the eastern side of Morehead City Harbor, is reached from Beaufort Inlet through **Bulkhead** Channel, and from the Intracoastal Waterway through Gallant Channel. The Taylor Creek Channel is described in Chapter 4. The U.S. Public Health Service maintains an outpatient office in the town.

A Federal project provides for a channel 12 feet deep in **Bulkhead** and **Gallant Channels** and a basin of the same depth in front of the town of Beaufort; for a channel 12 feet deep and about 2.6 miles long from a point opposite the foot of Marsh Street in Beaufort through Taylor Creek to Lenoxville Point. The distance from the inlet to the upper end of Gallant Channel is about 5 miles. In November 1963, the controlling depths were: 7 feet in Gallant Channel, and 10 feet in Bulkhead Channel and in the turning basin. The channels are marked.

Beaufort is connected by rail and highway bridges across Gallant Channel to **Radio Island,** and thence to Morehead City by bridges over the main route of the Intracoastal Waterway. Minimum clearance is 4 feet for the bridges with bascule spans over Gallant Channel. An overhead power cable about 30 yards south of the railroad bridge has a clearance of 85 feet. The bridges over the Intracoastal Waterway are described in Chapter 12.

Gasoline, diesel fuel, water, ice, provisions, and some ship chandlery may be obtained at Beaufort. A small boatyard on Gallant Channel between the railroad and highway bridges has a marine railway that can haul out vessels up to 45 feet in length; hull repairs can be made There are two machine shops nearby where engine repairs can be made.

Chart 1234.—Bogue Sound extends 22 miles westward along the coast from Beaufort Inlet to Bogue Inlet. It is shallow, and separated from the ocean by **Bogue Banks,** a wooded beach 0.1 to 0.7 mile wide. The sound is about 2 miles wide midway of its length but narrow at each end; at the western end there are numerous marshy islets. The Intracoastal Waterway route is through the north side of the sound. The mean range of tide in Bogue Sound is about 2.5 feet near the inlets, and about a foot where the tides meet near the middle. Strong south and southwest winds may raise the tide a foot or more, and north to northwest winds lower it the same amount.

Bogue Inlet, 22 miles west of Beaufort Inlet, is the seaward approach to the town of Swansboro, which can be seen from outside. The entrance is used almost exclusively by local fishermen. The inlet is between a high wooded ridge on the west and a long low spit on the east. On the inside of the spit, about a mile eastward of the inlet, is a Coast Guard station. The entrance is obstructed by a shifting bar extending about 0.5 mile seaward. The controlling depth over the bar, in April 1963, was 6 feet, thence 5 feet through the channel to the Intracoastal Waterway. The mean range of tide is 2.5 feet on the bar; high water occurs 2 hours earlier than at the head of the marshes inside.

The channel into Bogue Inlet is continually changing and the buoys are shifted frequently. Strangers should wait for a rising tide and never attempt to enter when the bar is breaking. If fishermen happen to be coming in, it is advisable to follow them. The channels inside the inlet are also subject to considerable change, particularly during southeast and southwest storms.

Swansboro, a small town on the west bank of White Oak River 3 miles north of Bogue Inlet, is reached by the shifting channel from the inlet, and from Bogue Sound and Cape Fear River through the Intracoastal Waterway. Numerous fishermen base at Swansboro. State Route 24 highway bridge over White Oak River at the town has a 30-foot fixed span with a clearance of 12 feet. The highway bridge over the easterly channel, about 0.3 mile southeastward, has a 30-foot fixed span with a clearance of 6 feet. Swansboro is described in more detail in connection with the Intracoastal Waterway, Chapter 12.

For 4 miles above Swansboro, **White Oak River** has a width of 1 mile or more through which there is a narrow tortuous channel between the flats and oyster rocks. Farther up, the river is narrow and deep, and leads between marshes. The head of navigation is at the fixed bridge at **Stella,** and 8 miles above Swanboro.

Bear Inlet, 3 miles westward of Bogue Inlet, is used only by local boats. The entrance is about 0.3 mile wide between high sand dunes and is unmarked. The depth over the bar to the Intracoastal Waterway is only 2 feet. Strangers should not attempt to enter the inlet. **Browns** Inlet, 3 miles southwestward of Bear Inlet, is rarely used and strangers are advised not to attempt passage.

The danger zones of firing ranges are in the ocean between Bear Inlet and New River Inlet and in New River; limits and regulations are given in **204.56,** Chapter 2.

Chart 777.—New River Inlet, 35 miles westward of Beaufort Inlet, is considered dangerous by local pilots, and entrance should not be attempted except under the most favorable conditions. There is a strong ebb current from the inlet which causes a break on the bar when there is a sea outside. The break is especially bad when the ebb sets against a south or southeast wind. Current predictions may be obtained from the Tidal Current Tables. The mean range of tide at the inlet is 3 feet. At the head of the marshes, 2 miles above the entrance, the range is about 1 foot.

A Federal project provides for an entrance channel 6 feet deep at New River Inlet, with a connecting channel of the same depth to the Intracoastal Waterway. In April 1963, the controlling depth over the bar was 4 feet, thence 6 feet in the channel to the Intracoastal Waterway. Lights and buoys mark the channel.

New River has a width of 1 to 2 miles from the head of the marshes above the inlet to within 2 miles of Jacksonville, above which it is a narrow stream. There is practically no periodic tide in the river.

A Federal project provides for a channel 10 feet deep in New River from the Intracoastal Waterway at the head of the marshes to the Atlantic Coast Line Railroad bridge at Jacksonville. The channel is well marked by lights and daybeacons; controlling depth was 10 feet in August 1963.

State Route 172 highway bridge over New River, 3 miles above the Intracoastal Waterway, has a swing span with a clearance of 8 feet. At **Fulcher Landing,** 1.5 miles southeast of the bridge, there are numerous piers at seafood packing houses where gasoline, diesel fuel, water, electricity, and supplies may be obtained. A motel and restaurant are nearby. Two marine railways can haul out boats up to 50 feet in length for engine and hull repairs.

Jacksonville is on the east bank of New River, about 17 miles above the Intracoastal Waterway. Gasoline, diesel fuel, groceries, and ice are obtainable at the town. Hotel accommodations, motels, and restaurants are available and there is a county hospital. Fish are moved by rail and truck to the interior, and pulpwood is shipped by rail and also by barge down the Intracoastal Waterway.

About a mile south of Jacksonville, an overhead power cable with a clearance of 60 feet crosses the river near **Jacks Point.** The Atlantic Coast Line Railroad bridge over New River at Jacksonville has a swing span with a channel width of 48 feet and clearance of 3 feet. Drawspan regulations are given in **203.245,** Chapter 2. An overhead cable at the bridge has a clearance of 50 feet. The highway bridge, 0.5 mile above the railroad bridge, has a 28-foot fixed span with a clearance of 13 feet. Overhead power cables just above this bridge have a clearance of 14 feet. About 200 yards above this bridge is another bridge which has a 33-foot fixed span with a clearance of 10 feet.

Chart 1235.—New Topsail Inlet, 19 miles southwestward of New River Inlet, has an unmarked channel which is obstructed by a shifting bar. In April 1963, the depth over the bar was 2 feet. The inlet is rarely used, and should not be entered by strangers. The mean range of tide is 3 feet.

In **Topsail Sound,** 2 miles northeast of New Topsail Inlet, there is a marina where gasoline, diesel fuel, water, electricity, and some marine supplies are available. There is a 2-ton marine hoist, a small-boat launching ramp, and apartments available for rent. The depth of water alongside the pier is 3 feet.

Old Topsail Inlet, 1.5 miles southwestward of New Topsail Inlet, is constantly changing. The depth over the bar was 4 feet in April 1963. Small boats can enter the inlet at low water, and at high water they can pass through inside channels to the Intracoastal Waterway and the mainland. Strangers should not use this inlet. The shore on both sides is a low sand beach without distinguishing marks.

Rich Inlet, 5 miles southwestward of New Topsail Inlet, had a depth of 3 feet over the bar in April 1963, but is constantly changing. Local fishermen sometimes use it. Four buoys mark the bar channel, but strangers should not enter without local knowledge.

Mason Inlet, 8.5 miles southwestward of New Topsail Inlet, in April 1963, had a depth of 4 feet over the bar and to a junction with the Intracoastal Waterway. The inlet is constantly changing and strangers should not attempt it.

Moore Inlet, 10 miles southwest of New Topsail Inlet, is completely closed.

Wrightsville Beach is a summer resort between Moore Inlet and Masonboro Inlet. A tank and buildings are prominent from seaward. The facilities on the inside of the barrier beach are reached through Masonboro Inlet.

Masonboro Inlet is 2.5 miles southward of Moore Inlet and 22.3 miles northward of Cape Fear. The entrance is buoyed, but the buoys are frequently shifted to conform to the changing depths. Entrance should not be attempted except with thorough knowledge and under the most favorable conditions. In northeasterly weather the bar is rough. Strong tide rips form on the ebb current. The mean range of tide on the bar is 3.8 feet. See Appendix for **storm warning display.**

A Federal project provides for a channel 14 feet deep across the ocean bar to a 15-foot deep turning basin at Wrightsville Beach inside and northward of the inlet, thence a channel 12 feet deep northward through Wrightsville Channel to a junction with the Intracoastal Water-

way at Wrightsville. The ocean bar channel has never been dredged. In April 1963, the controlling depth over the bar was 4 feet, thence 10 feet, in November 1963, to the Intracoastal Waterway.

The municipal dock at Wrightsville Beach, just southward of the highway bridge, is 120 feet long with a depth of 4 feet alongside; water and electricity are available. Charter fishing boats use the wharf. There is bus service between Wrightsville Beach, Wrightsville, and Wilmington.

A marina on the north side of the channel between Wrightsville Beach and **Wrightsville** has gasoline, diesel fuel, water, electricity, showers, restrooms, restaurant, and telephone services available. Open and covered storage, some marine supplies, and hull and engine repairs may be obtained. There is a marine railway that can haul out boats up to 42 feet in length. There is a depth of 7 feet alongside the pier and in the slips.

About 7 miles south of Masonboro Inlet is **Carolina Beach Inlet** which cuts through the beach and provides a channel to the Intracoastal Waterway. In 1953, a depth of 3 feet was reported over the bar and 2½ feet in the channel. Only those with local knowledge should use this channel.

Carolina Beach is a resort 12 miles northward of Cape Fear Light. A yacht basin at the town connects with Myrtle Sound and the Intracoastal Waterway by a small channel 1.5 miles long. In the basin the bulkhead is 175 feet long with depths of 6 to 2½ feet alongside. Minor hull and engine repairs can be made. Diesel fuel, gasoline, fresh water, provisions, and limited wet storage are available. The controlling depth in the channel leading from the Intracoastal Waterway to Carolina Beach, in April 1963, was 4½ feet. See Appendix for **storm warning display.**

A military tower, 2.1 miles north-northwest of the Carolina Beach Pier, is 641 feet high.

Corncake Inlet, 4.5 miles north of Cape Fear, is completely closed.

Chart 1236.—Cape Fear is a low, sharp, sandy point 85 miles southwestward of Cape Lookout at the southern extremity of **Smith Island.** This island, on the eastern side of the entrance of Cape Fear River, is mostly low and marshy, but on the western side has a thick growth of trees and a 99-foot high octagonal tower of an abandoned light.

Frying Pan Shoals, extending south-southeastward from Cape Fear, are bare in spots near the shore and have general depths of 2 to 12 feet in an unbroken line to a point 10 miles from the cape; for 6 miles farther the shoals are broken with depths ranging from 10 to 20 feet. Broken ground with depths of 5 to 7 fathoms extends from the shoals proper almost to the lightship. Lighted buoys are at critical points along the shoals.

Frying Pan Shoals Lightship (33°28.0′ N., 77°33.8′ W.), with red hull and the name FRYINGPAN in large white letters on the sides, is 30 miles southeast of Cape Fear; the light is 63 feet above the water. The lightship has a fog signal and a radiobeacon. The code flag signal and radio call is NNBM. **Storm warning displays** are made during the daytime.

In 1964, a light station tower was under construction about 1.3 miles northwestward of the lightship. When the light station is completed, the lightship will be discontinued.

A wreck, covered about 6 feet, lies on Frying Pan Shoals about midway between Cape Fear and the light ship. A reported obstruction, covered 19 feet, lies in 75 feet of water 5.3 miles west-northwestward of the lightship.

Chart 426.—Cape Fear River, about 370 miles long and the approach to the city of Wilmington, empties into the sea immediately westward of Cape Fear. Barge traffic is active as far as **Fayetteville,** about 125 miles above the mouth.

Wilmington, 24 miles above the mouth, on the east bank of Cape Fear River, is the leading port of North Carolina. It is 362 miles south of Norfolk, Va., and 586 miles north of Jacksonville, Fla., by coastwise routes. Exports are iron and steel products, pulp and paper products, wood pulp, machinery, cotton, auto parts, ore, bark, tobacco, fertilizer, scrap metal, boiler components, and numerous manufactured articles. Imported are sulphur, tobacco, tools and hardware, molasses, sugar, burlap and jute, fertilizer, coal tar, lumber, and petroleum products. The city has a growing industrial potential, and there are many points of historical interest in the city and vicinity.

Prominent features.—Oak Island Light (33°53.6′ N., 78°02.1′ W.), 169 feet above the water, is shown from a 155-foot cylindrical tower, upper part black, middle white, and lower part gray, on Oak Island on the western side of Cape Fear River entrance. It is the most conspicuous object in the approach. The abandoned lighthouse, known as "Old Baldy" on the west side of Smith Island, the buildings of the Oak Island Light Station, and the lookout tower and building of the lifeboat station, westward of Fort Caswell, are also conspicuous.

Channels.—A Federal project provides for a channel 35 feet deep over the ocean bar, thence 34 feet deep for 24 miles to Wilmington, and 34 feet deep in the anchorage basin off the southerly part of the city; thence 30 feet deep to and including a turning basin 0.4 mile above the mouth of Northeast Cape Fear River, thence 30 feet deep to Hilton Bridge about 1.2 miles above the mouth of Northeast Cape Fear River, and thence 25 feet deep to and including a turning basin about a mile above the bridge. The channels are maintained at or near project depths. The controlling depths are published in the Notice to Mariners. The channel is well marked by lighted ranges, lights, daybeacons, and lighted and unlighted buoys. In January 1964, depths of 21 to 27 feet were reported in the anchorage basin.

Western Bar Channel, close to **Fort Caswell** on the western side of the entrance to Cape Fear River, is used considerably by small craft bound westward along the coast. The channel is good for about 6 feet but is not

buoyed. The best water lies from 100 to 200 yards offshore south of Fort Caswell, and from there the channel through the shoals trends about 256°. Abreast of the Coast Guard station the shore should not be approached closer than 0.3 mile. A dredged channel from Cape Fear River to the Coast Guard wharf had a controlling depth of 5 feet in April 1963. The channel is marked by daybeacons, lights, and a 257½° lighted range.

Anchorages.—An anchorage basin is available at Wilmington. Good anchorage is available in the Cape Fear River abreast the town of Southport. The holding ground is good, but because of strong tidal currents vessels should anchor with a good scope of chain. This anchorage is sometimes used as a harbor of refuge in the winter by coasting vessels.

Vessels awaiting entrance to the river may find good holding ground in about 7 fathoms within a mile southward of the sea buoy. The area to the westward of the sea buoy is reported to be rocky and foul and some vessels have lost anchors or broken flukes in the area.

Dangers.—Frying Pan Shoals are the principal danger in the approaches to Cape Fear River. Isolated wrecks, some marked, and obstructions with varying depths over them are in the approaches. **Bald Head Shoal** and **Middle Ground** are dangerous shoals on either side of the bar channel.

A **restricted area** of the Sunny Point Army Terminal is 9 miles above the mouth of Cape Fear River; limits and regulations are given in **207.164a**, Chapter 2. A **restricted area** for a reserve fleet of the Maritime Administration is in Brunswick River, 21 miles above the mouth; regulations are given in **207.900**, Chapter 2.

Routes.—On the approach to Cape Fear River from northward, the safer course, and the one generally used by deep-draft vessels, is outside of Frying Pan Shoals Lightship.

From southward, deep-draft vessels should set a course to pass outside the broken ground extending offshore between Cape Romain and Winyah Bay. When clear of this broken ground, the course can be shaped for Cape Fear River entrance lighted whistle buoy 2CF. When approaching from southward an overrun of as much as 0.5 knot may be expected except during northeasterly winds.

Tides and currents.—The mean range of tide at the entrance is 4.5 feet; at Southport, 4.1 feet, and at Wilmington, 3.6 feet. Daily predictions for Wilmington are given in the Tide Tables; predictions for a number of places on the river and in the vicinity are also in the tables.

The tidal currents on the bar run with considerable velocity, and as a rule set nearly in the direction of the channels, but on the last of the flood and first of the ebb they set to the eastward across the channel and on the beginning of the flood they set to the westward. In the river their set is generally in the direction of the channel. The relative velocities of flood and ebb depend upon the stage of the river. During freshets the flood at times is completely overcome by the river current and the ebb is greatly increased. At low-river stages, a strong flood is felt for a considerable distance above Wilmington, where it runs 5¼ hours to nearly 7 hours of ebb; downriver from Wilmington, the periods of flood and ebb become more nearly equal. Current predictions for a number of locations in Cape Fear River may be obtained from the Tidal Current Tables.

Weather.—The climate is usually mild and even in winter, after low temperatures at night, the days warm up. Sea fog is experienced from November to April, usually with the advent of southeast or southerly winds when it may hang on for several days. Westerly winds clear it off. After a very warm day with a large drop in temperature at night, fog may settle on the river but it usually burns off in the forenoon. It may be thick on the bar and outside, and clear on the river from 2 or 3 miles above the entrance. The office of the Weather Bureau is at the New Hanover County Airport about 5 miles outside the city. Barometers may be compared there. See Appendix for **Wilmington climatological table and storm warning displays.**

Freshets occur any time from November through April, but no appreciable rise in the water level has been reported at Wilmington. They do have a marked effect on the tidal currents and sometimes overcome the flood current entirely in the river almost to the entrance. The velocity of the ebb current is greatly increased during freshets.

Pilotage is compulsory from the bar to Southport for all foreign vessels and United States vessels under register in the foreign trade. Pilotage is optional for United States coastwise vessels which have on board a pilot licensed by the Federal Government. Pilotage is not compulsory between Southport and Wilmington but if a vessel does take a pilot he must be a State pilot. Most vessels and even tugs take a pilot in entering the river. The pilot boats are painted white, fly the code flag **P**, and are equipped with radiotelephone (2182 kc., 2638 kc., and 2738 kc.); the pilots communicate with the pilot office at Southport. Pilots board day or night in the vicinity of the sea buoy. Pilots may be obtained by wire, by radiotelephone through the Charleston Marine Operator, phone: Wilmington 763-4931, or Southport 7-5831, or by prior arrangements through the ship's agents. Vessels can call the pilot boats directly to discuss time of arrival or existing local weather conditions.

Towage.—Vessels seldom find it necessary to employ tugs between the sea buoy and the anchorage basin at Wilmington, but tugs are generally used to assist in docking and movement within the port or to upriver facilities. Inbound vessels are usually met by the tugs just below the terminal they are bound for, or off the State Ports Authority Terminal wharf.

Quarantine.—Vessels subject to quarantine are boarded by quarantine officers for inspection upon arrival at the dock day or night. U.S. Public Health Service outpatient offices are maintained at Southport and Wilmington. Deratization inspection, and issuance or renewal of certificates are not possible at Wilmington or Southport.

Customs.—Wilmington is a port of entry and marine documents are issued. Vessels are boarded at the dock.

Immigration officials are stationed at Wilmington.

Harbor regulations.—A Board of Commissioners of Navigation and Pilotage adopts regulations which are enforced by a harbormaster. There is a speed limit of 5 miles per hour between Point Peter and the foot of Queen Street.

Wharves.—The North Carolina State Ports Authority wharf, on the east bank of the river at Dram Tree Point, is the only general cargo terminal in the port. The marginal wharf is 2,500 feet long with a 46-foot double-tracked concrete apron. A depth of 34 feet is generally maintained alongside. Three steel and concrete sprinkler-equipped fireproof transit sheds with a total of 270,000 square feet of storage space are on the wharf. Two fireproof sprinkler-equipped steel and concrete warehouses with storage space of 186,000 square feet are at the terminal. The wharf has depressed tracks at the rear of the transit sheds to facilitate the rapid loading and unloading of freight cars. There are two 45-ton gantry cranes on the wharf, which in tandem have lifted 65 tons, and are equipped for magnet work and two-cubic-yard bucket operation; 35-ton and 25-ton locomotive cranes are also available in the port.

There are seven oil terminals at Wilmington, the wharves are all on the channel along the east bank of the river. Depths vary from 31 to 32 feet alongside. There are bulk cement handling, molasses, liquid chemical, sulphur, and fertilizer wharves and a beltline railroad connects the various terminals.

Supplies.—All manner of marine supplies and provisions are obtainable at Wilmington. Potable water is piped to the wharves. Vessels are usually bunkered at the oil terminal wharves. There is no provision for bunkering in the stream, but small quantities of diesel fuel are sometimes trucked in to vessels berthed at the State pier.

Repairs.—There are three shipyards at Wilmington. All are on the west bank of Northeast Cape Fear River, two below the highway bridge and one above the railroad bridge. The one above the railroad bridge has a 1,000-ton floating drydock which can lift craft up to 200 feet in length. The two yards below the highway bridge each have two marine railways, the largest of which can haul out craft up to 200 feet in length. Hull and engine repairs can be made. There are machine shops and floating cranes up to a capacity of 50 tons in the port.

Communications.—Railroad connections to the interior and coastal cities are offered by the Atlantic Coast Line Railroad and the Seaboard Air Line Railroad. One commercial airline connects the port with other cities in the United States.

Southport, on the west bank of Cape Fear River, is 3 miles above the mouth. There are fish wharves, service wharves, and a yacht basin. A boatyard, just inside the entrance to the Intracoastal Waterway, has a marine railway that can haul out craft up to 45 feet in length, for hull and engine repairs.

Gasoline, diesel fuel, fresh water, ice, and berthing with electricity can be obtained at two service piers which have from 4½ to 7 feet alongside. Berthing is available in the yacht basin, and motels and restaurants are on the waterfront. Provisions and marine supplies can be obtained in the town. The Wilmington-Cape Fear River Pilots Association maintains an office and a 90-foot lookout tower adjacent to the town pier, which had 7 feet alongside in March 1963; the yacht basin had a controlling depth of 8½ feet in November 1963.

The Intracoastal Waterway northward leaves the main ship channel about 11.5 miles above the mouth of Cape Fear River. The distance from the intersection of the two channels to the western end of the land cut of the waterway is 2 miles. A Federal project provides for a channel 12 feet deep from near the end of the land cut to a connection with the main ship channel about 14 miles above the mouth of the river. In December 1963, the centerline controlling depth was 2 feet.

The Federal project for Cape Fear River above Wilmington provides for a channel 25 feet deep for 3.5 miles to and including a turning basin at **Navassa,** thence 8 feet deep to **Fayetteville,** the head of navigation, 100 miles above Wilmington, and the construction of three locks and dams in the latter section. In October 1960, controlling depths were 24 feet to Navassa and thence, in June 1963, 8 feet to Fayetteville. The locks between Navassa and Fayetteville have a usable length of 200 feet, a width of 40 feet, and a depth over miter sills of 9 feet.

U.S. Route 17 highway bridge over Cape Fear River opposite Wilmington has a bascule span with a clearance of 26 feet. Just above the highway bridge is an overhead power cable with a clearance of 125 feet. The Atlantic Coast Line Railroad bridge at Navassa has a bascule span with a clearance of 6 feet.

Black River flows into Cape Fear River about 12 miles above Wilmington. It has been reported that drafts of not more than 3 feet can be taken to **Still Bluff,** about 10.4 miles above the mouth.

Northeast Cape Fear River empties into Cape Fear River from northward at Wilmington. Above the turning basin 1 mile above the Hilton Bridge, it is reported that natural depths of 6 feet can be taken for 42 miles, and thence 3 feet for 7 miles to **Crooms Bridge.**

U.S. Route 17 highway bridge over Northeast Cape Fear River a mile above its mouth has a bascule span with a clearance of 26 feet. The Hilton (Atlantic Coast Line) railroad bridge, 1.3 miles above the mouth, has a bascule span with a clearance of 5 feet. State Route 117 highway bridge at **Castle Hayne,** about 23.4 miles above the mouth, has a fixed span with a clearance of 23 feet at **low water stage.** The Atlantic Coast Line Railroad bridge just above it has a swing span with a clearance of 7 feet **at low water stage;** see **203.245,** Chapter 2, for drawspan regulations.

Smith Creek empties into Northeast Cape Fear River from eastward 2 miles above the river mouth. The controlling depth over the bar was 8½ feet in April 1963 and then 4½ feet to the walkway crossing the creek at

the airport. The creek was foul with stumps, logs, and submerged piling from the entrance to its head. State Route 117 highway bridge 1.3 miles above the mouth has a swing span with a channel width of 45 feet and a clearance of 3 feet; see **203.245,** Chapter 2, for drawspan regulations. The Atlantic Coast Line Railroad bridge about 2 miles above the mouth has a fixed span with a clearance of 12 feet.

Freshets.—Low-water stages prevail in the rivers above Wilmington from 2 to 4 months during the summer, and freshets usually occur as often as once a month during the remainder of the year, but with no regularity.

6. CAPE FEAR TO CHARLESTON HARBOR

Chart 1110.—From Cape Fear the coast curves gradually westward and southward for 80 miles to Winyah Bay Entrance. It is a sand beach, with numerous sand dunes, separated from the heavily wooded mainland by small streams and marshes. From offshore, the woods appear to extend to the outer beach. The coast is clear, and a depth of 3 fathoms can be taken to within a mile of the beach, except at Murrells Inlet where, about 2 miles offshore, there is a 16-foot spot. The 10-fathom curve is from 18 to 21 miles offshore, and inside it the water shoals gradually as the shore is approached.

Chart 1236.—Lockwoods Folly Inlet is 11 miles westward of Cape Fear River. There are aids for entering, but strangers should not attempt it as the inlet is enclosed by breakers at virtually all stages of tide and wind. In March 1963, the controlling depth over the bar and to the Intracoastal Waterway was 4 feet. Two wrecks, one showing at low water, are at the mouth. A high sand dune is east of the inlet.

Lockwoods Folly River is navigable from the ocean to the Intracoastal Waterway, at the head of the marshes inside the inlet, and thence to a fixed highway bridge at **Supply,** which is at the practical head of navigation 16 miles above the waterway. The channel is narrow and bordered on both sides by oyster bars which are covered at high water. The mean range of tide is 4.2 feet at the inlet and about 2 feet at Supply. In March 1963, the controlling depth from the waterway to Supply was 3 feet. The channel is marked by daybeacons northward of the Intracoastal Waterway.

There is a pier 1.6 miles up the river from the Intracoastal Waterway where gasoline, water, and groceries can be obtained.

Shallotte Inlet, 19 miles westward of Cape Fear River, has a shifting bar and a winding entrance; it is used only by local fishermen. **Shallotte River** is navigable from the sea to the town of **Shallotte,** about 8 miles above the inlet. In March 1963, the controlling depth over the bar and to the Intracoastal Waterway was 4 feet and thence 2 feet to Shallotte. The mean range of tide is 4.6 feet near the inlet and about 3 feet at Shallotte. The facilities at Bowen Point are described with the Intracoastal Waterway in Chapter 12.

Tubbs Inlet, 6 miles westward of Shallotte Inlet, is seldom used.

Chart 1237.—Little River Inlet, 28 miles westward of Cape Fear River, is entered between **Waiter Island** on the west and **Bird Island** on the east, at high water. The bar channel is subject to change and the buoys marking it are shifted frequently. Daybeacons mark the channel from the inlet for about 2 miles to the junction with the Intracoastal Waterway. In March 1963, breakers extended across the entire entrance and no channel was found through the bar. From the inner edge of the bar to the east point of Waiter Island, the controlling depth was 3 feet, thence 7 feet to the Intracoastal Waterway. The mean range of tide at the inlet is about 5 feet.

Between Little River Inlet and Murrells Inlet, there are many piers, most of which are marked by lights and extend out some 400 to 1,000 feet into the ocean. See Appendix for **storm warning displays.**

Myrtle Beach, a summer resort, is on the outer beach nearly 20 miles southwestward of Little River Inlet and 32 miles north-northeastward from Georgetown Light. At **Ocean Forest,** 3.5 miles northeast of Myrtle Beach there is a large red brick hotel whose tall central tower is the most prominent landmark between Beaufort and Winyah Bay. An aviation light is on the hotel tower at an elevation of 176 feet. Numerous tanks in the area are conspicuous. Hotels and motels along the beach, and a microwave tower, 230 feet high, at Myrtle Beach, are also prominent. The rotating aerobeacon, on a tank, at Myrtle Beach Air Force Base can be seen to seaward.

Murrells Inlet, 12 miles southwest of Myrtle Beach, connects with **Main Creek** and **Oak Creek,** which drain a considerable area of marsh between the mainland and the outer beach. The entrance bar is shifting and the channel is subject to change. In March 1963, the controlling depth over the bar was 3 feet. Inside the inlet, where the channel turns sharply to northward into Main Creek, the tide rips are strong at full ebb or flood current. In March 1963, the controlling depth was 4 feet up this channel for about 1.8 miles to a launch landing. Buoys and daybeacons mark the channel. Local fishermen use this inlet, but strangers should not enter without local knowledge.

There are two marinas inside Murrells Inlet, one of which has a marine railway that can haul out boats up to 48 feet in length. There is a small-boat launching ramp at each, and the piers have 5 feet of water alongside. Gasoline, diesel fuel, ice, water, electricity, restrooms, restaurants, and motels are available. Hull and engine repairs and dry storage can be obtained. See Appendix for **storm warning display.**

North Inlet, 6 miles northward of Georgetown Light, connects with Winyah Bay by way of both **Town Creek** and **Jones Creek.** Jones Creek, the southerly of the two, is easier to follow. In March 1963, the creek was found

to bare in places at mean low water. There is little water on the Winyah Bay side, and navigation is restricted to shallow-draft craft. Some fishermen use North Inlet, but strangers should not. In March 1963, the controlling depth over the bar was about 5 feet.

Chart 787.—Winyah Bay is the first harbor southward of Cape Fear River, a distance of 70 miles, that is navigable for vessels drawing up to 25 feet. It is entered between **North Island** and **South Island.** The entrance is protected by jetties. The entrance is not safe for small craft except in favorable weather. Heavy tide rips prevail near the ends of the jetties, and heavy seas run in moderate weather. The south jetty is visible only at low water. Craft drawing 5 feet or less can enter close to the outer end of the north jetty in good weather.

Georgetown, 14 miles above the entrance to Winyah Bay, is on the north bank about 1.5 miles above the entrance to Sampit River. It is 390 miles south of Norfolk and 247 miles north of Jacksonville by coastwise routes. It is a city of growing commercial importance and has a large pulp mill, a chemical plant, a steel fabrication plant, and several seafood processing plants. The principal exports are wood pulp, kraft paper, and soya beans. Veneer logs, tapioca meal, and petroleum products are imported. It is the terminus of a branch of the Seaboard Airline Railway and considerable ocean shipping calls at the port. It has schools, banks, hotels, motels, markets, a hospital, and many landmarks of historical interest.

Prominent features.—Georgetown Light (33°13.4′ N., 79°11.1′ W.), 85 feet above the water, is shown from a white cylindrical tower and dwelling near south end of North Island. A radiobeacon is at the light. The light is difficult to pick up in daytime especially in hazy weather due to the sand dunes in the vicinity. There are no other prominent objects in the vicinity, and the land is low on both sides of the entrance.

Channels.—Federal project depth is 27 feet from the sea to the turning basin off the two deepwater terminals on Sampit River. The channel is well marked by lighted ranges, lights, buoys, and other aids. The channel is maintained at or near project depth, but during freshets from February to April it is reported that silting occurs in the turning basin and on Sampit River Range; annual dredging is necessary to maintain this portion at project depths. Controlling depths are published in the Notice to Mariners.

The bypassed portion of the river in front of the city wharves has shoaled considerably and is not maintained. In March 1963, the controlling midchannel depth was 5½ feet to the top of the bend of the horseshoe and was reported to dry at low water in places from there to the southwestern end.

Anchorages.—There are no anchorages in Winyah Bay or Sampit River for deep-draft vessels. Good holding ground in about 6 fathoms can be found within a mile of the sea buoy.

Dangers.—East Bank, covered 10 feet and marked by a buoy, is about 2 miles south of the end of the south jetty. **Hector Wreck,** with 11 feet over it and marked by a lighted bell buoy, is about 12 miles south of the sea buoy. These are the two principal dangers in the approach to Winyah Bay. Vessels approaching the entrance at night should remain in the vicinity of the sea buoy until the pilot boards. Some vessels, mistaking Range B Lights for Entrance Channel Range A Lights, have approached the entrance too closely at night and only with difficulty have cleared the outer end of the south jetty.

Tides and currents.—The mean range of tide on the bar off the end of the south jetty is 4.6 feet; in the channel off Georgetown Light is 4 feet, and at Georgetown 3.3 feet. The force and direction of the wind has marked influence on the range of the tide. Continuing easterly winds bringing abnormal high tides and westerly winds much lower tides.

The tidal currents are affected by variations in the flow of the tributary rivers. The velocity is greatest between the jetties where the average is between 2 and 3 knots. The set is diagonally across the south jetty. During freshets in the rivers, also with westerly winds, the velocity of the ebb current between the jetties is reported to be very strong at times and the channel buoys between the jetties are nearly towed under. In the channel in Winyah Bay, from the entrance to Georgetown, the tidal current averages about 2 knots, but during freshets the ebb current is considerably stronger and the flood weaker. Near the mouth of Sampit River, the tidal current averages about 1 knot with somewhat stronger ebb current velocities during freshets. Outside the jetties, with fresh to strong northeast winds, a strong southerly current is reported to set across the entrance channel and with southerly and southwesterly winds a northerly set is experienced. Current predictions for a number of places in Winyah Bay and vicinity are given in the Tidal Current Tables.

Weather.—The climate is usually mild and, except in severe winters, little ice is seen and then only along the banks. The channels are never obstructed. Fog is prevalent during the fall and spring and usually sets in during southwesterly weather, when it may persist for several days. Fog due to a large drop in temperature usually burns off in the forenoon. Fog sometimes hangs offshore or in the entrance when it is clear inside. See Appendix for **storm warning display.**

Routes.—Vessels from the northward usually make for the sea buoy from Frying Pan Shoals Lightship. When coming from the southward they should stay outside Cape Romain lighted whistle buoy 2CR, shaping for the entrance. Some vessels in closing the entrance have mistaken the ranges and come too close to the south jetty; they should remain in the vicinity of the sea buoy until the pilot boards.

Pilotage is compulsory for all foreign vessels and for United States vessels under register in the foreign trade. Pilotage is optional for United States vessels in the coastwise trade which have on board a pilot licensed by the Federal Government. Pilots will board day or night in the vicinity of the sea buoy. The pilot boat is painted

white with a white **P** on a black funnel, and flies the code flag **H**. It is equipped with radiotelephone (2182 kc., 2638 kc and 2738 kc.). Pilots may be obtained by wire, by radiotelephone through the Charleston Marine Operator, phone: at Georgetown, 546-5977, or by prior arrangement through the ship's agents.

Towage.—Two tugs are usually available at Georgetown. They are of 1,000 hp. Arrangements should be made in advance through the ship's agents.

Quarantine.—Vessels subject to quarantine are usually boarded at the dock by a contract physician of the U.S. Public Health Service. The nearest Marine hospital is at Savannah. There is a hospital in Georgetown.

Customs.—Georgetown is a port of entry and marine documents are issued. A deputy collector of customs usually boards at the dock. The office is in the Post Office Building.

Immigration officials board vessels at the dock. The customs officer usually acts for the Immigration Service. Arrangements should be made prior to arrival through the ship's agents.

Harbor regulations.—The South Carolina State Port Authority exercises jurisdiction over the port. There are no formal harbor regulations.

Wharves.—The State Port Authority Terminal Pier and the International Paper Company wharf are the only deep water berths at Georgetown. They are on the north side of the turning basin in Sampit River at the head of the Federal project. The State pier is of concrete pile construction, is 500 feet long, and has a steel fireproof transit shed. There was 24 to 30 feet alongside in March 1963. The paper company wharf is of timber pile construction, is 400 feet long, and has a transit shed. There were 15 to 19 feet alongside in March 1963. Both piers have railroad sidings. Other small seafood handling and service wharves are along the city waterfrant.

Supplies.—Provisions, supplies, and marine hardware can be obtained at Georgetown. Bunker C can be obtained at the State pier. Diesel fuel must be trucked in to the two deep-water piers or brought by barge from Charleston. Fresh water is piped to the piers.

Repairs.—There are no drydocks at Georgetown. There are machine shops and minor above-water hull and engine repairs can be made.

Small-craft facilities.—There are several wharves along the city waterfront where gasoline, diesel fuel, fresh water, ice, berthing with electricity, telephone, provisions, and marine supplies may be obtained. A boatyard has two marine railways that can haul craft up to 60 feet in length. Hull and engine repairs can be made. Open, covered, wet, and dry storage are available. Machine shops are in the town. In March 1963, the depths alongside the wharves were 6 to 13 feet.

Above Georgetown the principal landing on Sampit River is at **Sampit**, about 10 miles above the river mouth. U.S. Routes 17 and 701 highway bridge crossing the river at Georgetown has a fixed span with a clearance of 34 feet. The overhead power cable about 0.9 mile above the bridge has a clearance of 61 feet. A boatyard on **Penn Royal Creek**, off the river about 5 miles above Georgetown, has a marine railway that can haul craft up to 60 feet. Wet and dry storage are available, and hull and engine repairs can be made. In March 1963, the controlling midchannel depth from the bridge to **Sampit Landing** was 7½ feet. Controlling depth in Penn Royal Creek was 9 feet to the boatyard.

Waccamaw River rises at Lake Waccamaw, N.C., and flows southwestward into Winyah Bay just above Georgetown. The river is little used, except for that section which is a part of the route of the Intracoastal Waterway described in Chapter 12.

The controlling depth from the Intracoastal Waterway to **Conway**, 36 miles above the mouth, was 7½ feet in March 1963. Above this point the river is obstructed by logs, snags, and sandbars. The mean range of tide at the river entrance is 3.5 feet and 1.2 feet at Conway. The head of the tidal reach is at Bellamys Landing, 80 miles above the mouth. For predictions see the Tidal Current Tables. The **freshet** range at Conway is about 13.5 feet. About a mile below Conway U.S. Route 501 fixed highway bridge over Waccamaw River has a clearance of 35 feet. At Conway the river is crossed by three bridges. The first a highway bridge, has a fixed span with a clearance of 48 feet. The second is a railroad swing bridge with a clearance of 9 feet. The third, also a railroad swing bridge, has a clearance of 5 feet; an overhead cable near this bridge has a clearance of 50 feet.

Pee Dee River rises in the North Carolina mountains and flows generally southeastward into Winyah Bay just westward of Waccamaw River. U.S. Route 17 highway bridge over Pee Dee River just above the mouth has a swing span with a clearance of 12 feet; drawspan regulations are given in **203.245**, Chapter 2. In 1963, a new highway bridge was under construction about 300 yards southward. It will have a fixed span with a design clearance of 20 feet. The velocity of the current at the bridge is about 1 knot. For predictions see the Tidal Current Tables. At **Yauhannah**, 28 miles above the mouth, the river is crossed by U.S. Route 701 fixed highway bridge with a clearance of 39 feet.

The Seaboard Airline Railway bridge near **Poston**, about 62 miles above the mouth, is the head of commercial navigation.

Black River empties into Pee Dee River from northward about 3 miles above the mouth of the latter, and is navigable for a distance of 44 miles. The bridges over this river have minimum channel widths of 16 feet and minimum clearances of 7 feet; drawspan regulations are given in **203.245**, Chapter 2. The mean range of tide in Pee Dee River is 3.3 feet at the mouth and 0.2 feet at the mouth of Little Pee Dee River, 33 miles above. **Mingo Creek** flows into Black River about 22 miles above the mouth of the latter. When last ascertained, the controlling depth in this creek was 8 feet. The mean range of tide is 2 feet, and the **freshet** range is 4.5 feet.

Chart 1238.—Between Winyah Bay and Charleston Harbor there are several rivers and inlets which are changeable in character, and local knowledge is essential to enter even under favorable conditions. Some dry at low

water and in the others the depths range between 1 and 6 feet. Suitable anchorages for small craft can be found inside these inlets or in their tributary waters. At most entrances, the channels trend in northerly directions, and shoals and breakers generally mark the channel edges inside the bars. Entrances to North Santee River and Bull Bay are less difficult of navigation than the other entrances in this locality, but these should be entered only at high water under favorable weather conditions.

Between Winyah Bay entrance and Cape Romain, broken ground, with depths of less than 5 fathoms, extends 11 miles offshore. In addition to East Bank and Hector Wreck, a 14-foot spot is about 6 miles offshore.

Santee River, formed by the confluence of **Congaree River** and **Wateree River,** flows generally southeast and enters the ocean between Winyah Bay and Cape Romain. Its two mouths, known as **North Santee River** and **South Santee River,** are both obstructed by shifting bars with little depth. In the tidal reach are several privately owned landings which are used infrequently. The river is closed to navigation at Wilson Landing, 75 miles above the mouth, by the Santee Dam.

Vessels bound for Santee River are advised to enter by way of Winyah Bay and the Intracoastal Waterway. Navigation between the coast and points on Santee River above the dam is possible by way of Cooper River and the Santee-Cooper project. The U.S. Route 17 fixed highway bridges over North and South Santee Rivers, about 12 miles above the mouths, have clearances of 30 feet over North Santee River and 15 feet over South Santee River.

Cape Romain Shoal, with depths of 6 to 15 feet over it, extends 4 miles southeastward from Cape Romain. A depth of 7 feet at the outer end of the shoal is marked by a buoy. The twin towers of an abandoned lighthouse, the taller 165 feet high, stand on the east end of **Lighthouse Island.** A 335-foot microwave tower and a 108-foot lookout tower at McClellanville, about 6 miles inland, are also conspicuous from seaward.

Cape Romain Harbor, an unimportant cove with depths of 1 to 2 feet, is used only by small local fishing craft. In March 1963, the controlling depth in **Casino Creek** was 3 feet to the Intracoastal Waterway. A narrow, crooked, unmarked channel leads from the sea around the north end of **Cape Island** into **Horsehead Creek.** In March 1963, the controlling depth was 4 feet. The mean range of tide in this area is about 4.7 feet. The inlet leading to Cape Romain Harbor from the south is practically closed at low water.

Five Fathom Creek, off **Sandy Point** at the western end of **Raccoon Key,** in March 1963 had a controlling depth of 3½ feet from Sandy Point to the Intracoastal Waterway Narrow and crooked at its upper end, the creek has deeper water throughout from its entrance to within a mile of the waterway. A bell buoy marks the approach and buoys mark the channel through Bull Bay. The outer bar is subject to change, and strangers should not attempt it.

Bull Bay, southwest of Raccoon Key, is broad and shallow, and has numerous shoals, many of which are bare at low water. A 56-foot steel skeleton fire lookout tower west of the bay is conspicuous from seaward. The narrow channel into **Bull Creek,** at the southwest side of the bay, has a controlling depth of about 9 feet over the bar. In 1963, shoaling to ½ foot extended 1.1 miles eastward of **Northeast Point.** The controlling depth in Bull Creek from Northeast Point to Bull Narrows was 2 feet in March 1963; the creek is used occasionally as an anchorage. **Bull Breakers** extend 4 miles southward from **Bull Island,** on the southwest side of the entrance to Bull Bay, and are marked at their outer end by a buoy. The 131-foot steel skeleton lookout tower of the former Bull Island Lifeboat Station is prominent.

Chart 1239.—Price Inlet, between Bull Island and **Capers Island,** had a depth of about 4 feet over the bar in 1963. The channel is unmarked. In March 1963, breakers extended across the entire area, and the controlling depth in **Price Creek** from the inner edge of the bar to the Intracoastal Waterway was 5 feet. The inlet, the best between Bull Bay and Charleston, is used by local fishermen. With average weather conditions, there are heavy breakers on the shoal on the eastern side of the channel and small breakers on the west side. Good anchorage is available in Price Creek.

Capers Inlet, between Capers Island and **Dewees Island,** has a depth of about 3 feet over the bar. In March 1963, breakers extended across the entire entrance, and the controlling depth was 5½ feet in **Capers Creek** from the inner edge of the bar to the Intracoastal Waterway. The channel is narrow and unmarked, and is seldom used. Because of the shoal that extends eastward on the south side of the inlet and breaks the southwesterly seas, the channel can be entered when the wind is southwest. A shoal bare at about half tide extends southward along the eastern side of the inlet. There are numerous stumps and snags outside the high waterline in Capers Creek.

Dewees Inlet, between Dewees Island and **Isle of Palms,** had a depth of about 6 feet over the bar in 1963; thence, deeper water inside to the Intracoastal Waterway via **Dewees Creek.** The channel is narrow, unmarked, and seldom used. Breakers extend across the entrance to the inlet. A water tank at the pleasure resort near the southwest end of Isle of Palms and a lookout tower on Dewees Island are prominent; a pier projects seaward from the resort.

Breach Inlet is between Isle of Palms and Sullivans Island. There is very little water over the bar, and breakers extend entirely across the entrance under almost all weather conditions. Currents are extremely strong in this inlet. A highway bridge over the inlet has a fixed span with a clearance of 5 feet.

Charts 491, 470.—Charleston Harbor, 264 miles southwestward of Cape Hatteras and 65 miles northeastward of Savannah River, is the approach to the city of Charleston and to Cooper and Ashley Rivers. The harbor is easy of access day or night in clear weather, and is one of the best harbors of refuge on the South Atlantic coast.

Charleston, the largest city and port in South Carolina, is at the confluence of Cooper and Ashley Rivers.

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The distance from the ends of the jetties to the city wharves is 7 miles. The city is in the center of a rich agricultural district for which it is the distributing point. Numerous manufacturing plants are in and near the city. The principal wharves are along the west bank of Cooper River. Imports are coffee, cotton, wool, bananas, frozen meats, plywood, automobiles, steel products, naval stores, and petroleum products. Exports are dried milk, cotton textiles, wood pulp, lumber, heavy machinery, chemicals, fertilizer, and scrap iron.

Prominent features.—The entrance to Charleston Harbor is between converging jetties which extend nearly 3 miles seaward. Prominent to the northward of the entrance are several tanks on Sullivans Island, and one on Isle of Palms. **Fort Moultrie** and the town of **Sullivans Island** are on the north side of the entrance; the 155-foot conical tower of the abandoned old Charleston Lighthouse is south of the entrance; **Fort Sumter** is on the southwest side of the channel just inside the entrance.

The prominent fixed red lights marking the top of the central span piers of the Cooper River bridge can be seen from the channel between the jetties, and are useful in connection with Mount Pleasant Range. When Mount Pleasant range line is extended northwestward to the bridge, it intersects the bridge just west of the midpoint between the two bridge lights. Prominent fixed red lights also mark the top of the central span of piers of the bridge where it crosses Town Creek, west of Drum Island.

Charleston Light (32°54.5′ N., 79°50.6′ W.), 163 feet above water, is shown from a triangular tower, upper half red, lower half white, near the Coast Guard station on Sullivans Island. The candlepower of the light is greatly increased during periods of low visibility. A radiobeacon is at the light.

Boundary lines of inland waters.—The line established for Charleston Harbor is described in **82.35**, Chapter 2.

Channels.—A Federal project provides for a channel 35 feet deep over the bar and through the entrance into the major reaches of Cooper River and Town Creek to Goose Creek, 13.6 miles above the mouth; and a connecting channel into Shipyard Creek 30 feet deep. A 35-foot Navy-maintained channel extends from the head of the Federal project in Cooper River to a turning basin at a Naval facility, about 2.6 miles above Goose Creek; thence 30 feet for another 0.8 mile. The channels require constant dredging to maintain them at or near project depths, due to the silting of Cooper River. The controlling depths are published in Notice to Mariners. **South Channel,** from the main channel to off the Battery is no longer maintained. In March 1963, centerline depths were from 24 to 20 feet. The channels are well marked by lighted ranges and other aids to navigation.

Anchorages.—The principal anchorage for deep-draft vessels is in the triangle westward of the junction of Rebellion Reach of the main channel with South Channel. The limits of the anchorage grounds and regulations are given in **202.173**, Chapter 2.

Dangers.—Vessels approaching must guard against an inshore set which may amount to a knot or more due to indraft of current into the various inlets. In this area, preceding a northeasterly or following a southerly gale, a hazy atmospheric condition may be encountered, which results in low visibilty of lights even in fine weather when it is clear overhead. During the periods when this condition prevails, it is reported that excessive inshore sets have been experienced.

Rattlesnake Shoal, 3 miles offshore and the same distance east-northeastward of the north jetty at the entrance to Charleston Harbor, is about 2 miles long east and west; its least depth is about 9 feet. A buoy is east of the outer end of the shoal.

A semicircular practice mining area in which there is an available depth of 20 feet is about 8 miles northeastward of the sea buoy and about 13.5 miles eastward of Charleston Light. It is marked by a lighted buoy.

Routes.—From northward, the safer approach to Charleston Harbor, and the one generally used by deep-draft vessels, is outside Frying Pan Shoals Lightship. The course should be shaped west-southwesterly to pick up Cape Romain lighted whistle buoy 2CR, and then the Charleston sea buoy. From southward, a northeast course, from a point 2 miles southeastward of Savannah Lightship, will lead to the Charleston sea buoy.

Tides.—The mean range of tide at Charleston and Fort Sumter is about 5 feet. At Fort Sumter the tides occur about 10 minutes earlier than at Charleston. Daily predictions for Charleston are given in the Tide Tables.

Currents.—Off the entrance to Charleston Harbor the tidal currents are rotary with velocities of about 1 knot. Near the entrance to the jetties the current sets fair with the channel at strengths of flood and ebb and can be expected to set across the channel with a velocity of about 0.2 knot about 3 hours after strength of flood and ebb, setting northeastward and southwestward, respectively.

In the channel between the west end of the south jetty and the submerged jetty, the average velocities of the current at strengths of flood and ebb are about 1.5 knots and 2 knots, respectively.

Daily predictions for Charleston Harbor, off Fort Sumter, are contained in the Tidal Current Tables, and predictions for a number of other locations in the harbor and tributaries can be obtained through the use of Table 2 of the Tidal Current Tables.

Weather.—The climate is equable, and the port is comparatively free of fog and high winds. The Weather Bureau office is at the Municipal Airport about 12 miles outside the city. Barometers may be compared there. See Appendix for the **Charleston climatological table** and **storm warning displays.**

Pilotage is compulsory for all foreign vessels and for United States vessels under register in the foreign trade. Pilotage is optional for United States vessels in the coastwise trade which have on board a pilot licensed by the Federal Government. The pilot boats cruise in the vicinity of the sea buoy and pilots will board day or night. The pilot boat is painted black with CHARLESTON PILOT II in white on the sides. The auxiliary pilot boat is painted white. They fly the code flag **H**, are equipped with radiotelephone (2738 kc. and 2182 kc.) and VHF 156.8 mc, and are in direct communication by radio-

telephone with the pilot office in Charleston. The boats are equipped with radar. Pilots may be obtained by wire, by radiotelephone through the Charleston Marine Operator, phone: Raymond 2-1585, or by prior arrangement through the ship's agents.

Towage.—Tugs are available at all hours by arrangement through the ship's agents. They usually meet vessels at or near the Customhouse Reach. Tugs also can be engaged for salvage or deep-sea towing.

Quarantine.—Vessels subject to quarantine will be boarded by an officer of the Public Health Service upon arrival at the dock. An outpatient clinic is maintained by the Public Health Service. The quarantine office and the clinic are in the customhouse. The nearest Public Health Service hospital is at Savannah. There are several large public and private hospitals in Charleston.

Customs.—Charleston is a customs port of entry and marine documents are issued. The customhouse is on the waterfront about a half mile northward of the Battery. Vessels are usually boarded at the dock between 8:30 a.m. and 5:00 p.m.; at other times and on Saturdays, Sundays, and holidays, by special arrangement through the ship's agents.

Immigration officials are stationed at Charleston. They usually board at the dock from 8:00 a.m. to 5:00 p.m., Mondays through Saturdays; at other times and on Sundays and holidays, by special arrangement through the ship's agents.

Harbor regulations.—The South Carolina State Ports Authority is the administrative body exercising jurisdiction over the Port of Charleston. A harbormaster enforces the port regulations.

Wharves.—The wharves are located on the west bank of Cooper River, Town Creek, and in Shipyard Creek. The three State Ports Authority terminals are the only general cargo terminals in the port. They have modern fireproof transit sheds and are equipped with the most modern cargo handling equipment. All have marginal wharves with 35 feet of water alongside. State Piers 2, 3, and 4 are in front of the customhouse; pier 4 being used for banana handling.

State Piers 8 and 9 are at the foot of Columbus Street just below the Grace Memorial Bridge; Pier 9 is equipped with banana handling equipment. State Piers 15 and 16 are at North Charleston about 9 miles above the Battery. Piers 8 and 15 are equipped with 50-ton gantry cranes. The State Ports Authority grain elevator, just above Pier 16, has a capacity of 600,000 bushels and its marginal wharf is equipped with a conveyor gallery with five shiploading downspouts. The Charleston Army Terminal wharf is just above the grain elevator, about 10 miles above the Battery. The several oil-terminal wharves are dispersed along the west bank northward of the bridge. Several dry-bulk and petroleum-handling marginal wharves in Shipyard Creek have from 33 to 35 feet alongside. Dry storage warehousing to a capacity of over 1,500,000 square feet and cold storage warehousing of over 400,000 square feet are available in the port.

The **Charleston Naval Shipyard** is on the west bank of the Cooper River 6 miles above the Battery. Just north of the shipyard is **North Charleston,** the site of several oil wharves, a cotton compress, and several bulk-commodity piers.

The Coast Guard depot and offices of the **Captain of the Port** are on the east bank of Ashley River, 0.9 mile above the Battery.

Supplies.—Supplies, provisions, and marine hardware can be obtained at Charleston. Bunker oil can be had at the oil terminals, but vessels are usually bunkered at the docks from oil barges. Coal can be obtained by barge. Water is available on the principal piers and can be delivered by barge.

Repairs.—Charleston Harbor has facilities for drydocking and hauling out. The largest floating drydock has a capacity of 7,500 tons and can accommodate vessels up to 480 feet in length. The drydock plant is equipped to make general hull and engine repairs. Several repair yards in the area provide facilities for small boats and yachts.

Wrecking and salvage gear is available for normal operations and special equipment can be brought in.

Communications.—The Port of Charleston is served by three trunkline railroads (Atlantic Coast Line, Seaboard Air Line, and Southern) connecting with the beltline serving the riverfront terminals. A number of steamship lines connect the port with the principal foreign ports; frequent sailings are maintained by most of the lines. The municipal airport, 12 miles northwestward of the Battery, is served by three air lines. Truck and bus lines serve the port.

Chart 470.—Ashley River empties into Charleston Harbor from northwestward on the southwest side of Charleston. There are no towns or villages of importance above the city. The principal landings are at numerous phosphate works, all of which have wharves extending to the channel. In September 1963, the centerline depths in the river were 16 feet from the entrance for 2.6 miles to the first two U.S. Route 17 highway bridges, and thence 14 feet for about 3.5 miles to the head of the improved channel.

A municipal marina is on the northeast side of Ashley River 1.3 miles above the Battery and 0.3 mile north of the entrance of **Wappoo Creek,** which is a part of the Intracoastal Waterway. In March 1963, the controlling depth into the basin was 18 feet. Gasoline, diesel fuel, water, electricity, showers, restrooms, lounge, telephone, and taxi service, and some food supplies are available. There is a machine shop which has some marine hardware, and there is a small-boat launching ramp; wet open and covered storage and ample berthing space with depths of 3 to 15 feet alongside are available. Hull, engine, and electronic repairs can be obtained at three boatyards.

Two U.S. Route 17 highway bascule bridges cross Ashley River about 2 miles above the Battery. The first has a clearance of 18 feet for the central 50 feet; the second has a clearance of 14 feet. Drawspan regulations for these bridges are given in **203.245,** Chapter 2. The Seaboard Air Line Railroad bridge, 3 miles above the Battery, has a swing span with a clearance of 9 feet.

State Route 7 highway bridge, 6.2 miles above the Battery, has a fixed span with a clearance of 50 feet. The Atlantic Coast Line Railroad bridge, 10 miles above the Battery, has a bascule span with a clearance of 3 feet. The overhead power cable nearby has a clearance of 74 feet.

In March 1963, there was a controlling midchannel depth of 4 feet from the upper limit of the Federal project to 2 miles above **Greggs Landing.**

Hog Island Channel and **Shem Creek** lead to **Mount Pleasant** on the lower east side of Charleston Harbor. A Federal project provides for a channel 10 feet deep to a terminal basin at Mount Pleasant. In March 1963, the controlling depth in Hog Island Channel was 6 feet from the Intracoastal Waterway to the entrance of Shem Creek, thence 3 feet to Cooper River. In Shem Creek the depth was 9 feet to the highway bridge, thence 3 feet for another 0.2 mile. A shipyard on Shem Creek at the foot of Wharf Street makes hull and engine repairs and has a machine shop and three marine railways, the largest of which can haul out craft up to 80 feet in length. Gasoline, diesel fuel, fresh water, restrooms, showers, berthing, electricity, and telephone service are available at the yard and restaurants and lodging are nearby. Several small wharves are above the shipyard on both sides of the creek. U.S. Route 17 highway bridge, 0.4 mile above the mouth of the creek, has a 36-foot fixed span with a clearance of 12 feet. An overhead power cable with a clearance of 40 feet crosses the creek about 0.2 mile above the bridge.

Cooper River enters Charleston Harbor from northward on the eastern side of Charleston; the main channel of the harbor extends several miles up this river. **Drum Island** is 2 miles above the mouth of the river. The channel on the westerly side of this island is known as **Town Creek.**

Naval degaussing ranges cross the channel between **Shutes Folly Island** and Charleston close northward of the Battery and from Hog Island to Drum Island; they are marked by lighted and unlighted dolphins.

A fixed cantilever bridge spans Town Creek, Drum Island, and Cooper River on the east side of Charleston, 5.7 miles above the mouth. Clearances are: over Town Creek 135 feet; over Cooper River, 150 feet for a width of 300 feet and 135 feet for a width of 1,000 feet. In 1963, a similar bridge was under construction close southward of the existing bridge.

Shipyard Creek joins Cooper River from the west about 1 mile above the north end of Drum Island. There is considerable traffic in oil, phosphates, and lumber on this waterway.

Chart 680.—In March 1963, depths of 20 feet or more were available in Cooper River from the Naval facility about 3.4 miles above Goose Creek to **The Tee,** 26 miles above the Battery. There the river divides into East and West branches. This section of the river is bordered by marshland, with occasional bluffs 15 to 20 feet high. A **restricted area** has been designated in Cooper River near the Naval Ammunition Depot; limits and regulations are given in **207.164b,** Chapter 2.

In **East Branch** the controlling depth in March 1963 was 10 feet to **Pompion Hill Chapel,** 6 miles above The Tee. The channel is narrow and follows the ebb-tide bends. In **West Branch** the controlling depth in March 1963 was 16 feet to the Seaboard Airline Railroad bridge 4 miles above The Tee. The first bend west of The Tee is a bad spot; deep water is on the inner side of the bend. The railroad bridge has a swing span with a channel width of 30 feet and a clearance of 8 feet. The nearby overhead cable has a clearance of 85 feet. Drawspan regulations for the bridge are given in **203.245,** Chapter 2. Extreme caution is necessary at the bridge; the current is strong, and about 40 minutes is needed to open the draw. The mean range of tide at the bridge is 4.2 feet.

About 12 miles above The Tee, a tailrace canal enters West Branch from **Lake Moultrie.** The distance along the canal from West Branch to the lake is about 4 miles. Two bridges cross the canal with minimum clearance of 50 feet. A marginal wharf 200 feet long is on the west side of the canal about a mile above the junction with West Branch.

A depth of about 11 feet is available from the Seaboard Airline Railroad bridge over West Branch to the tailrace canal and thence to the dam. The lock in the dam has a length of 180 feet, a width of 60 feet, and a depth over the miter sills of 12 feet; the vertical lift is 75 feet. A draft of 14 feet has been taken to the lake with favoring tides. Light-draft vessels can navigate to Columbia, S.C., by way of Lake Moultrie, Lake Marion, and the Congaree River. The last 18 miles are treacherous because of the twisting channel and varying water levels caused by a dam above Columbia. The lakes are fouled by submerged trees. Navigation should not be attempted by strangers.

Charts 470, 681.—Wando River empties from the northeast into Cooper River eastward of Drum Island. Mooring dolphins in depths of 21 to 34 feet are on the west side of the entrance abreast of **Hobcaw Creek.** Buoys mark the channel as far as Cainhoy.

Cainhoy is a town on Wando River about 9 miles above Drum Island. In March 1963, a depth of 10 feet could be taken from the entrance to the mouth of Guerin Creek, 1.5 miles above State Route 41 highway bridge; thence 8 feet for another 3.4 miles, and then 2 feet to Wards Bridge. Just westward of the town there is a shipyard with a machine shop which makes repairs to steel hulls of boats and barges, and to engines. A marine railway can haul out boats up to 100 feet in length. The yard has berthing in 10 feet of water at a 300-foot pier. On the south side of the river just northwest of the bridge there is a shipyard that has two floating drydocks, each of which can haul out vessels up to 200 feet in length

and 1,250 tons. The yard has berthing in 18 feet of water at the pier. State Route 41 bridge and a cable cross the river about 0.4 mile above Cainhoy; the highway bridge has a swing span with a clearance of 6 feet, and the overhead power cable has a clearance of 45 feet. Drawspan regulations for the bridge are given in **203.245**, Chapter 2.

Wando River continues for about 7 miles to **Wards Bridge** at the head of navigation. An overhead power cable crossing the river about a mile south of the bridge has a clearance of 30 feet. **Guerin Creek** flows into Wando River from the northeast about 2 miles above Cainhoy. **Guerin Bridge**, a fixed structure at the head of navigation, is some 3 miles above the mouth of the creek.

7. CHARLESTON HARBOR TO SAVANNAH RIVER

Charts 1239, 1240.—From Charleston Harbor to Savannah River the coast trends in a southwesterly direction for 65 miles. The coast is low and timbered, and is broken by St. Helena, Port Royal, and Calibogue Sounds, and by numerous inlets from which there is access to the interior by way of the rivers emptying into them. Shoal water extends 3 to 8 miles offshore.

Chart 792.—Lighthouse Inlet, between **Morris Island** and **Folly Island,** has no channel across the bar; entrance should be attempted only with local knowledge on a rising tide with a smooth sea. In March 1963, the controlling depth over the bar and upstream to **Secessionville** was 3 feet; the inlet is used only by local fishermen. Small craft pass into Charleston Harbor by way of **Lighthouse Creek** and also into numerous sloughs north of Folly Island. **Folly Beach,** an amusement park on Folly Island, is connected by highway with Charleston. The buildings and lights are prominent from seaward.

Stono Inlet, between Folly Island and **Kiawah Island,** is 10 miles southwestward of Charleston Harbor entrance. A shifting bar obstructing the entrance to the inlet is marked by a lighted whistle buoy; the channel is marked by several buoys which may be moved from time to time to mark the best water. In March 1963, the controlling depth over the bar was 5 feet. The inlet, which is used by local fishermen, should not be attempted without local knowledge.

Stono River, which joins the inlet from northward, is of little commercial importance except in its upper reach above **Elliott Cut,** where it forms part of the Intracoastal Waterway. In March 1963, the controlling depth from inside the inlet bar for about 12 miles to the highway bridge was 11 feet, thence 7 feet to a junction with the Intracoastal Waterway at Elliott Cut. Vessels usually enter the river by way of the waterway from Charleston. In the summer numerous pleasure craft use Stono River and Folly River to reach Folly Beach. The highway bridge about a mile below Elliott Cut has a swing span with a clearance of 8 feet.

Folly River flows into Stono Inlet from the northeast and **Kiawah River** from the west. Both are relatively unimportant. Folly River is used by pleasure craft and local fishermen desiring to reach Folly Beach. In March 1963, the controlling depth was 4 feet from its junction with Stono River at **Bird Key Island** for a distance of 4.5 miles upriver. Markers include lights and daybeacons. About 1.8 miles above the entrance, there are two marine railways which can haul out vessels up to 55 feet in length for general repairs. Gasoline, diesel fuel, ice, and provisions are available nearby. State Route 171 highway bridge about 2 miles above the entrance has a fixed span with a clearance of 10 feet. **Folly Creek** enters Folly River from the north about 1.6 miles above the mouth. State Route 171 highway bridge about 2.6 miles above the creek mouth has a fixed span with a clearance of 10 feet. An overhead cable about 0.4 mile above the bridge has a clearance of 48 feet.

North Edisto River, 20 miles southwestward of Charleston Harbor entrance, is of little commercial importance, and rarely used. From its entrance shoals extend offshore as much as 3 miles, forming a shifting bar over which, in March 1963, there was a controlling depth of 8 feet. The entrance is marked by a lighted whistle buoy, and the channel by a **314°** lighted range and by buoys which are moved, when practicable, to indicate the best water. The entrance is well defined by breakers.

Two tributaries of North Edisto River, **Wadmalaw River** from eastward and **Dawho River** from westward, comprise part of the Intracoastal Waterway. **Bohicket Creek** entrance is about 2.5 miles above the entrance to North Edisto River. **Rockville,** a town about 1.1 miles above the mouth of Bohicket Creek, has several piers and docks with 5 to 11 feet of water alongside at which fresh water can be obtained. In March 1963, the controlling depth was 15 feet up the creek to Rockville. **Steamboat Creek** entrance 6 miles above North Edisto River entrance, is marked by a daybeacon.

The mean range of tide in North Edisto River entrance is 5.8 feet. On the bar the direction of the current is generally across the channel. The flood current sets about westward, and the ebb eastward; both have considerable velocity. Inside the bar, in the channel between the breakers, the ebb current is to be guarded against, especially when it sets across the north breakers. Predicted currents for the North Edisto River entrance may be obtained from the Tidal Current Tables.

Chart 793.—The entrance to **St. Helena Sound** is 7 miles wide between **Bay Point,** the southern extremity of **Edisto Island,** on the northeast and **Hunting Island** on the southwest. An abandoned lighthouse, 128 feet high, on the northern part of Hunting Island, makes a good landmark. There are several channels through the shoals which extend about 6 miles seaward from the sound entrance. The buoyed channel, in March 1963, had a controlling depth of 15 feet over the bar. In March 1963, shoaling to 12 feet was found at the inner end of the

sound southwestward of Combahee Bank. The mean range of tide on the bar and in the entrance to the sound is about 6 feet.

Most important of the several navigable rivers emptying into the sound are South Edisto, Ashepoo, Coosaw, Morgan, and Harbor Rivers; the first three are links in the route of the Intracoastal Waterway.

South Edisto River, which empties into St. Helena Sound immediately westward of Bay Point, is of little commercial importance. A marina in **Big Bay Creek,** just inside the entrance of South Edisto River on the north side, has a small pier with 5 feet alongside, where gasoline, diesel fuel, water, and some supplies are available. **Edisto Beach State Park** is about 2 miles northeastward. Above its junction with Dawho River, the South Edisto is known as **Edisto River.** An unmarked channel into South Edisto River, about 3 miles southeastward of Bay Point, has depths of 12 to 16 feet over the ocean bar. In March 1963, the controlling depth from Bay Point at the entrance to a junction with the Intracoastal Waterway at Fenwick Cut was 10 feet and from Watts Cut to the Seaboard Air Line Railroad bridge at Fenwick, about 20 miles above Bay Point, the controlling depth was 7 feet. The river is usually entered from the Intracoastal Waterway; the entrance from the ocean is rarely used. The mean range of tide is 6 feet in the lower part of the river. Currents at the entrance have a velocity of about 1.8 knots; predictions may be obtained from the Tidal Current Tables. See Appendix for **storm warning display.**

The railroad bridge has a swing span with a clearance of 3 feet; drawspan regulations are given in **203.245,** Chapter 2. The rails have been laid across the swing span in such manner that extensive dismantling is necessary to open the bridge. A draft of about 3 feet can be taken about 8 miles above this bridge to the Atlantic Coast Line railroad bridge at **Jacksonboro,** which has a fixed span with a clearance of about 9 feet at low water.

Ashepoo River flows into St. Helena Sound from northward on the west side of **Otter Islands.** A highway bridge over the river, 13 miles above the mouth, has a swing span with a clearance of 10 feet; drawspan regulations are given in **203.245,** Chapter 2. An overhead power cable across Ashepoo River, just westward of the highway bridge, has a clearance of 63 feet. The Seaboard Air Line railroad bridge, 4 miles above the highway bridge, has a swing span with a clearance of 5 feet. An overhead cable at this bridge has clearance of 84 feet. This bridge requires extensive dismantling to open; drawspan regulations are given in **203.245,** Chapter 2. In March 1963, the river had a controlling depth of 9 feet to the second bridge.

Coosaw River, which enters the head of St. Helena Sound from westward, is important only as a link in the Intracoastal Waterway. The river channel is irregular in depth, partly because of the phosphate dredges which once operated here.

Chart 794.—Combahee River, 3 miles above the mouth of Coosaw River, had a controlling depth of 10 feet, in March 1963, for a distance of 9 miles above the entrance. The river is navigable for craft drawing up to 5 feet to a highway bridge 20 miles above the entrance. The Seaboard Air Line railroad bridge, 12 miles above the mouth of Combahee River, has a swing span with a channel width of 42 feet and a clearance of 6 feet. U.S. Route 17 highway bridge, 8 miles above the railroad bridge, has a swing span with a clearance of 10 feet. Drawspan regulations for these bridges are given in **203.245,** Chapter 2. The mean range of tide is 6.2 feet at the mouth of the river and 4.4 feet at the highway bridge.

New Chehaw River, on the north side of the entrance to Combahee River, is unimportant and has no traffic. **Old Chehaw River** enters the Combahee River from northward about 2 miles above New Chehaw River. The town of **Wiggins** is about a mile above the junction of Old and New Chehaw Rivers.

Bull River is 5 miles above the mouth of the Coosaw River. It divides into **Williman Creek** and **Wimbee Creek** 2 miles above the mouth, passes north and south of **Williman Islands,** and rejoins as Wimbee Creek 4.5 miles above the lower junction.

Chisolm is a small town on the south bank of Wimbee Creek about 1.5 miles above the lower junction with Williman Creek; the controlling depth to Chisolm, in March 1963, was 8 feet. The Seaboard Air Line railroad swing bridge over Wimbee Creek, 1 mile above the upper junction with **Schooner Channel,** has a swing span with a channel width of 40 feet and a clearance of 5 feet; drawspan regulations are given in **203.245,** Chapter 2. The nearby overhead cable has a clearance of 80 feet. The controlling depth, in March 1963, was 8 feet to the bridge by the way of Bull River, Williman Creek, and Schooner Channel; between Chisolm and the upper junction with Schooner Channel, Wimbee Creek is nearly dry in places at low water.

Parrot Creek, which enters Coosaw River on the south side directly opposite Bull River, is a 2-mile link between Coosaw and Morgan Rivers. The controlling depth through the creek, in March 1963, was 11 feet. Daybeacons mark the north entrance.

Lucy Point Creek, about 2 miles westward of Parrot Creek, also connects Coosaw and Morgan Rivers; the controlling depth through the creek, in March 1963, was 6 feet. A wharf and a shrimp-packing plant are just inside the Coosaw River entrance to the creek. An overhead power cable across the creek, just inside the entrance from Coosaw River, has a clearance of 75 feet. A daybeacon marks the entrance.

Charts 793, 794, 1240.—Morgan River flows into St. Helena Sound from westward. The river is about 8 miles long, and at its head connects with Chowan Creek, a tributary of Beaufort River; at the divide, this passage is nearly dry at low water where U.S. Route 21 highway

bridge has a 28-foot fixed span with a clearance of 4 feet. The mean range of tide near the head of Morgan River is about 7 feet. **Coffin Creek**, on the south side of Morgan River near the mouth, has a shrimp-packing plant 1.7 miles above the creek mouth where gasoline, diesel fuel, and emergency supplies can be obtained. In March 1963, the controlling depth was 0.5 foot. On **Village Creek**, about 0.8 mile above Coffin Creek, there are two shrimp-packing plants where some fuel and supplies may be obtained, in an emergency only. In March 1963, the controlling depth was 4 feet from the entrance to the shrimp-packing plants 1.5 miles upstream. On **Edding Creek**, about 1.5 miles west of Village Creek, is **Edding Point Camp**, where gasoline, some provisions, fresh water, and motel and restaurant accommodations are available. In March 1963, the controlling depth in the creek was 7 feet for a distance of 2.5 miles.

Chart 793.—Fripps Inlet, between Hunting Island and **Fripps Island**, is obstructed at its mouth by shoals over which no more than 2 to 4 feet can be taken in the smoothest weather. A highway bridge across the inlet has a fixed span with a clearance of 15 feet. **Harbor River**, at the head of the inlet, connects with St. Helena Sound to the eastward, and **Story River** connects the inlet with Trenchards Inlet and Station Creek to the westward. In March 1963, the controlling depth was 3 feet in Harbor River and 5 feet in Story River. U.S. Route 21 highway bridge over Harbor River, 0.5 mile above the mouth, has a swing span with a clearance of 15 feet; drawspan regulations are given in **203.245**, Chapter 2. An overhead power cable crossing along the southwest side of the bridge has a clearance of 94 feet. **Wards Creek**, on the north side of Harbor River 0.25 mile above the highway bridge, has a shrimp-packing plant about 1.2 miles above the mouth where gasoline, diesel fuel, and emergency supplies may be obtained. In March 1963, the controlling depth was 4 feet.

Skull Inlet, 3 miles southwest of Fripps Inlet, is a narrow passage with little water over the bar.

Chart 571.—Pritchards Inlet, 5 miles northeast of Port Royal Sound, is a narrow passage from the ocean to **Moon Creek** which connects with the upper part of Trenchards Inlet; there is very little water over the bar.

Trenchards Inlet, just northeast of Port Royal Sound, has a bar which extends about 2 miles from shore; the narrow unmarked channel over the bar has a controlling depth of about 4 feet. This inlet is connected at its head by Station Creek which joins Port Royal Sound to the westward.

Port Royal Sound, one of the largest deep-water harbors on the Atlantic Coast between Cape Henry and Key West, has an entrance about 2 miles wide between **Bay Point** on the northeast and **Hilton Head**, on the southwest. It is 80 miles south of Charleston and is the ocean entry to Port Royal and Beaufort.

Prominent features.—The entrance is between shoals that extend up to 10 miles offshore. The land on both sides of the entrance is low and marshy, and fringed by sand beaches and timbered land. The breaking shoals are prominent. **Port Royal Sound Lighted Whistle Buoy 2PR (32°05.0′ N., 80°35.0′ W.)** marks the entrance.

Channels.—A Federal project provides for a dredged channel 27 feet deep across the bar and through the sound to Bay Point, thence 24 feet in Beaufort River to a 27-foot turning basin in Battery Creek at Port Royal. In December 1963, project depths were available in the channel from the bar to Port Royal. There are several unmarked channels leading through the breakers, **South Channel**, lying westward of the dredged channel, with 12 feet, and **Southeast Channel**, between Martins Industry and St. Michaels Breaker just north of it, being the more important. The dredged channel is well marked by lights, lighted ranges, and buoys. The channel in Beaufort River, from the dredged channel northward to Beaufort, had a controlling depth of 12 feet in March 1963.

Anchorages.—Port Royal Sound has natural depths of from 26 to 50 feet and is sometimes used as a harbor of refuge in winter. The best anchorage is off the mouth of Beaufort River westward of Bay Point. The holding ground on the rocky bottom south of Bay Point is poor. There is also good anchorage in 22 to 26 feet to the eastward of the dredged channel off the mouth of Chowan Creek.

Dangers.—The breaking shoals extending almost 10 miles off Bay Point, eastward of the entrance channel, and for about 8 miles off Hilton Head Island, are the principal dangers. In thick weather, vessels should not approach the entrance too closely before picking up the pilot, especially on the flood, when the current sets directly onto the shoals: **Martins Industry**, the outermost shoal, **St. Michaels Breaker**, just north of it, and the **Great North Breaker**, between it and Bay Point. **Gaskin Bank, Fishing Rip**, and **Joiner Bank** are to the westward of the entrance channel.

Tides and currents.—The mean range of tide is 6.4 feet on the bar, 7.2 feet at Port Royal, and 7.4 feet at Beaufort. The tidal currents on the bar have a velocity of 1.5 knots, off Hilton Head 1.8 knots, and at Beaufort River entrance from 1.5 to 2.0 knots. Winds greatly influence the velocity of the tidal current, especially on the runout after prolonged easterlies, which on the ebb often reaches 5 knots. The current generally sets fair with the channel, except at the turn from the entrance channel into Bay Point Reach, where a strong current sets diagonally across the channel. Here, on the ebb, vessels should exercise caution lest they be set onto St. Michaels Breaker, eastward of the bar channel. The tidal currents in the sound have a velocity of 2.0 knots or more at times. The tide rips on Fishing Rip and Middle Shoal sometimes have the appearance of breakers. Predictions for a number of places in Port Royal Sound and vicinity are given in the Tidal Current Tables.

Weather.—The climate is usually temperate and mild. Fog occurs mostly in the winter and may be experienced from October to April, or whenever after a very warm day there is a sharp drop in temperature at night. It usually burns off in the forenoon. Easterly winds bring

in the fog and westerly winds clear it away. See Appendix for **storm warning display.**

Pilotage is compulsory for all foreign vessels and for United States commercial vessels under register in the foreign trade. Pilotage is optional for United States vessels which have on board a pilot licensed by the Federal Government. The pilot boat is equipped with radiotelephone, 2738 kc. and 2182 kc. The pilot usually boards at lighted whistle buoy 2PR off the entrance. A pilot may be obtained by wire, or radiotelephone through the Charleston Marine Operator, phone: Jackson 4-7245, or by prior arrangement through the ship's agents. Pilots will take vessels in day or night.

Towage.—Tugs are available on order from Charleston or Savannah.

Quarantine, customs, and **Immigration** requirements are attended to by officers from Charleston. Vessels are usually boarded at the dock. Prior arrangements should be made through the vessel's agents. A marine hospital is at Savannah.

Harbor regulations.—There are no local harbor regulations as such. The Director controls the State Port Authority pier at Port Royal and the City Manager controls the municipal pier at Beaufort.

Wharves.—The State Port Authority Pier, which is on the north side of Battery Creek at the entrance, is 500 feet in length and of modern concrete construction. It had 23 to 28 feet alongside in March 1963. A 75-ton stiff-leg crane with a 125-foot radius is north of a large steel and concrete warehouse on the wharf. Seafood-processing wharves above and below the state pier had from 7 to 16 feet alongside in March 1963. The municipal (city) pier at Beaufort, west of the bridge, in March 1963, had from 11 to 21 feet alongside and was in fair condition. Water and electricity are on the pier. It has about 450 feet of berthing space.

Supplies.—Provisions of all kinds can be obtained at Port Royal or Beaufort. Bunker C and diesel fuel are brought in by barge from Savannah. Good fresh water is piped to the State pier at Port Royal. Marine supplies may be obtained.

Repairs.—The nearest large drydock is at Savannah. There are machine shops and minor above-water hull and engine repairs can be made.

Communications.—Rail freight and bus connections are available. There are good highways to the outer islands and to Savannah, Charleston, and inland places.

Beaufort River, which flows into Port Royal Sound from northward just inside Bay Point, is the approach to the U.S. Marine Corps Recruit Training Depot on Parris Island, Port Royal, and Beaufort. The river is a link in the Intracoastal Waterway; above the improved portion depths of 12 feet or more can be taken to the city of Beaufort.

Station Creek joins Beaufort River from eastward 1 mile above Bay Point. An inside route used only by local fishermen leads from Port Royal Sound to St. Helena Sound through Station Creek, Story River, and Harbor River. In March 1963, the controlling depths were: Station Creek, 2 feet; Story River, 5 feet; and Harbor River, 3 feet.

Chowan Creek, which empties into Beaufort River from northeastward about 5 miles above Bay Point, connects at its head with Morgan River. Passage to Morgan River is restricted about 5 miles above the mouth of Chowan Creek by U.S. Route 21 highway bridge and by the shoals in that vicinity.

Parris Island, on the west side of the entrance to Beaufort River, is the site of a U.S. Marine Corps Recruit Training Depot. The dock on Parris Island opposite the mouth of Chowan Creek had a depth of 19 feet alongside in March 1963. The remains of an old U.S. Naval graving dock are adjacent to the pier. Several tanks and the many large buildings on the island are prominent.

Battery Creek empties into Beaufort River from northwestward 7 miles above Bay Point. Above the turning basin at Port Royal the creek, in March 1963, had a controlling depth of 15 feet to State Route 281 highway bridge, and thence 7 feet in a narrow winding channel to about a half mile below the railroad bridge. At this point, 4.4 miles above the mouth, overhead power cables crossing the creek have a clearance of 12 feet. The highway bridge has a swing span with a clearance of 12 feet. Drawspan regulations are given in **203.245,** Chapter 2.

Archers Creek, a narrow passage leading westward from the mouth of Battery Creek to Broad River, is shoal at its eastern end. In 1961, there were exposed piling at its western end. About midway of its length, a highway bridge has a 34-foot fixed span with a clearance of 20 feet. The creek, along with **Ribbon Creek,** is included in the **danger zone** of a rifle range; limits and regulations are given **204.80,** Chapter 2.

Port Royal, a town on the north bank of the entrance to Battery Creek, is one of the oldest settlements on the Atlantic Coast and of marked historical interest. The large modern State Port Authority Terminal is here, as are several seafood-processing plants. It is a terminus of a branch of the Atlantic Coast Line Railroad (the branch was formerly the Charleston and Western Carolina Railway). General cargo, wood pulp, machinery, and newsprint are handled at the State pier. Shrimp, crabs, oysters, and fish are processed and trucked inland from the fish piers above and below the State pier.

Beaufort, on the point of land jutting eastward into Beaufort River 11 miles above Bay Point, is a city of great historical interest. There are good hotels, motels, banks, a hospital, and numerous small businesses. A good portion of the commercial life of the city is dependent on the proximity of a U.S. Naval hospital, the Marine Corps Recruit Training Depot, and the Marine Corps Air Station. It has good highway connections with the mainland, and the other islands and beaches. It is served by a branch of the Atlantic Coast Line Railroad. Principal commodities handled are fish, crabs, oysters, which are trucked inland after processing, and truck farming. There are three wharves westward of the bridge, a seafood-processing plant wharf, a marine service wharf and the municipal (city) wharf, which have depths of from 8 up to 21 feet alongside. There is a city manager form of

government headed by the Mayor. There is fair anchorage in the stream off the wharves.

Small-craft facilities.—There is a marine service wharf west of the bridge and berthing for a small fee is available at it and at the municipal wharf close westward of it. Water and electricity are available at both wharves. A launching ramp is available at the municipal parking lot about 0.2 mile west of the municipal wharf. There is a marina and boatyard on Factory Creek east of the bridge. Its marine railway can haul vessels up to 65 feet in length. There is a machine shop on the premises, and hull and engine repairs can be made. Wet open storage is available.

Gasoline, diesel oil, fresh water, ice, showers, restrooms, overnight berthing, telephone, and electricty are available at the marine service wharf and at the marina. Provisions of all kinds, marine supplies, and laundry facilities are available at Beaufort.

Broad River, which enters Port Royal Sound on the west side of Parris Island, extends northwestward about 16 miles. The river is not difficult to navigate as far as Whale Branch. About 3 miles above the mouth of Archers Creek the river is crossed by State Route 170 highway bridge which has a swing span with a clearance of 12 feet; drawspan regulations are given in **203.245,** Chapter 2.

Chart 794.—The Seaboard Air Line Railroad bridge over Broad River, 2 miles above Whale Branch, has a swing span with a clearance of 7 feet; drawspan regulations are given in **203.245,** Chapter 2. **Pocotaligo River, Tulifiny River** and **Coosawhatchie River** are shallow streams which empty into the head of Broad River.

Whale Branch, which connects Broad River with Coosaw River to the eastward, had a controlling depth of 7 feet in March 1963. Overhead power cables crossing the branch, about 3.5 miles above the mouth, have a minimum clearance of 54 feet. The Atlantic Coast Line Railroad bridge over the branch, 4 miles from Broad River, has a swing span with a clearance of 5 feet. The U.S. Route 21 highway bridge, 1.5 miles above the railroad bridge, has a swing span with a channel width of 34 feet and a clearance of 5 feet. Drawspan regulations for these bridges are given in **203.245,** Chapter 2.

Brickyard Creek, 5 miles eastward of the highway bridge over Whale Branch, connects Coosaw River with Beaufort River to the southward and is a link in the Intracoastal Waterway. The mean range of tide is 7.3 feet at the mouth of the creek.

Chart 571.—Chechessee River empties into Port Royal Sound from westward. The State Route 170 highway bridge crossing the river 10 miles above the mouth has a fixed span with a clearance of 20 feet. In March 1963, a least depth of 18 feet was available from the mouth of the Chechessee River to just above **Copps Landing** on the **Colleton River,** 5 miles above the mouth. These rivers are of no commercial importance.

Mackay Creek joins Chechessee River from westward about 1 mile above its mouth. An unlighted route from Port Royal Sound to Calibogue Sound is through Mackay Creek past the north side of Pinckney Island. This passage is more difficult than the route through Skull Creek, but equally deep water can be found by those having local knowledge. In March 1963, the controlling depth in Mackay Creek was 9 feet. State Route 46 highway bridge over Mackay Creek from **Buckingham Landing** to **Last End Point** has a fixed span with a clearance of 25 feet. An overhead power cable crossing the river just north of the bridge has a clearance of 43 feet.

Skull Creek, a link in the Intracoastal Waterway, enters Port Royal Sound from southwestward about 4 miles above Hilton Head and is described in Chapter 12.

Chart 440.—Calibogue Sound is entered between Hilton Head Island and **Daufuskie Island,** about 5 miles northward of Tybee Light. The entrance is obstructed by shifting shoals through which are several crooked channels. The best channel extends from Tybee Roads northward just eastward of the lighted range. In March 1963, the controlling depth was 7½ feet on the bar. Inside the bar, depths are ample.

Cooper River, of importance only as a section of the Intracoastal Waterway, empties into Calibogue Sound from westward about 3 miles above the entrance to the sound.

Chart 571.—May River, which empties into Calibogue Sound from westward about 6 miles above the entrance, is the approach to the town of **Bluffton,** 7 miles above the mouth. The controlling depth in the river to Bluffton was 10 feet in March 1963. **Brighton Beach,** a small town about 3 miles downriver from Bluffton, has two small-boat launching ramps. The overhead power cable near **Buck Point** has a clearance of 35 feet over the narrow northern channel and 68 feet over the southern channel. The clearances for the power cable west of Bluffton (Chart 1240) are 53 feet over the northern channel and 48 feet over the southern. Passage is sometimes made from May River to Cooper River by way of **Bull Creek.** An overhead cable with a clearance of 46 feet crosses Bull Creek between Bull and Savage Islands. The tides meet in Bull Creek, forming flats. In March 1963, the creek was found to be bare at low water at the junction of **Savage Creek,** thence 1 foot to a junction with May River.

Broad Creek flows into Calibogue Sound from eastward, about 1.2 miles above the entrance to the sound, and extends 6 miles into Hilton Head Island. The creek is of no importance. In March 1963, the controlling depth was 9 feet for a distance of 5 miles.

A marina in **Palmetto Bay,** 3.5 miles upstream from the entrance of Broad Creek, has berths, wet and dry storage, and a 2-ton marine lift. Gasoline, diesel fuel, water, electricity, telephone, restrooms, and restaurant facilities are available.

Chart 440.—Savannah River, the boundary between the States of South Carolina and Georgia, is 65 miles southwestward of Charleston Harbor and 105 miles north-

ward of the entrance to the St. Johns River. It is navigable for deep-draft vessels to the upper end of Savannah Harbor, 19 miles above the outer ends of the entrance jetties, and for barges to the city of Augusta, 172 miles above Savannah. Deep-draft vessels approach the entrance from outside the lightship.

Savannah, on the south bank of Savannah River about 15 miles above the outer end of the jetties, is the second largest city and chief port of the State of Georgia. It is a leading southern port, and is the main distributing point for the surrounding country. The city has considerable coastwise and foreign trade, and is connected with coastal cities to the north and south by the Intracoastal Waterway which crosses Savannah River several miles below the waterfront terminals. The climate is equable, and high-velocity winds are infrequent. The water-borne commerce is of a widely varied nature, principally petroleum and petroleum products, sugar, lumber, cement, cotton, textiles, gypsum, naval stores, fertilizers, bagging paper and paper products, tall oil, tea, coffee, burlap, molten sulphur, sodium sulfate, iron and steel products, vehicles, agricultural machinery, and scrap iron and steel.

Prominent features.—Savannah Lightship (31°56.6′ N., 80°39.8′ W.), with red hull and the name SAVANNAH in large white letters on the sides, is 12 miles southeastward of the entrance to Savannah River; the light is 66 feet above the water. The lightship has a fog signal and a radiobeacon. The code flag signal and radio call is NNCX.

In 1964, a light station tower was under construction about 1 mile west-northwestward of the lightship. When the light station is completed, the lightship will be discontinued.

Tybee Light (32°01.3′ N., 80°50.8′ W.), 144 feet above the water, is shown from an octagonal brick tower, lower 50 feet black, middle part white, and upper part black, on the northeast end of Tybee Island.

The flashing red lights atop the three WSAV radio towers on **Whitemarsh Island** are prominent from seaward in clear weather, as is the large chemical plant southwestward of Mackey Point.

Boundary lines of inland waters.—The line established for Savannah River is described in **82.40,** Chapter 2.

Channels.—Federal project depths are 36 feet for 8.5 miles across the bar through Tybee Roads to Cockspur Island, thence 34 feet for 16.4 miles in the main channel to the turning basin just above Kings Island, and thence 30 feet for 2 miles to the head of the project about 1,500 feet below the U.S. Highway 17 bridge; the project also provides for suitable turning basins above the city waterfront terminals. The channels are well marked and are generally maintained; controlling depths are published in the Notice to Mariners.

Anchorages.—Most vessels usually anchor northwestward of the sea buoy where depths range from 19 to 45 feet with good holding ground.

Dangers.—The set of the tidal currents in and out of the various sounds and inlets should be carefully considered by vessels approaching Savannah by the inshore route. There are several unmarked obstructions in the approaches and a dangerous wreck (PA) is charted between the lightship and the sea buoy. The **danger area** of an Air Force air-to-air and air-to-water gunnery and bombing range is about 15 miles seaward of the lightship; limits and regulations are given in **204.81,** Chapter 2.

Bridges.—The Eugene Talmadge Memorial highway toll bridge near the western edge of the city waterfront, 13 miles above the mouth, has a fixed span with a clearance of 136 feet over the center span width of 400 feet. U.S. Route 17A highway served by this bridge also crosses Back River, just northward, over a trestle with a 34-foot fixed span which has a clearance of 10 feet. The only other bridge crossing the improved deepwater channel is the Seaboard Air Line Railroad bridge, about 2 miles above the city. It has a lift span with a clearance of 10 feet down and 135 feet up. The railroad then crosses Back River on a trestle with a 30-foot fixed span which has a clearance of 11 feet. The U.S. Route 17 (Houlihan) highway bridge about a mile above Port Wentworth at the head of the Federal project, has a swing span with a clearance of 8 feet.

Tides and currents.—Daily predictions for both Savannah River entrance and Savannah are given in the Tide Tables. At the bar, high and low waters occur about 30 minutes earlier than at the river entrance. The mean range of tide is 6.8 feet at Tybee Light and 7.4 feet at Savannah.

The velocity of the ebb current from the entrance jetties to Savannah is from 2.6 to 3 knots. The flood current has a velocity of from 1.5 to 2.4 knots. The current is considerably influenced by winds and freshets. The predicted times of slack water and the times and velocities of strength of flood and ebb at the entrance to Savannah River are given in the Tidal Current Tables. Predictions for a number of other places in Savannah River may be obtained from data in the tables.

Currents set in the direction of the channel except at the entrance near Tybee Light, where the flood sets northwestward across the channel. Between the jetties the flood sets 260°. Freshets occasionally occur in the spring, but do not endanger shipping at the wharves.

Detailed results of current observations, including a set of hourly tidal current charts for Savannah River, referred to times of high and low waters at Tybee Light, are contained in Coast and Geodetic Survey Special Publication No. 211, Currents in St. Johns River, Savannah River, and Intervening Waterways.

Weather.—The climate of Savannah is usually mild. Fog is prevalent in the winter or when there is a large drop in temperature. It is often clear on the river when it is thick outside. Easterly winds bring the fog in but it usually burns off in the forenoon. The Weather Bureau office is at the Municipal Airport, 9 miles outside the city, where barometers are compared. See Appendix for Savannah climatological table.

Pilotage is compulsory for all foreign vessels and United States commercial vessels under register in the foreign trade. Pilotage is optional for United States vessels in the domestic trade which have on board a pilot licensed by the Federal Government. The pilot boat is a 65-foot

vessel with black hull and white superstructure and flies the code flag **H**. The auxiliary pilot boat is painted white. Both vessels are equipped with radiotelephone on 2738 kc, and VHF on 156.9 mgc. The pilot boats are in direct communication with the pilot office in Savannah and Savannah Marine Radio Station WSV. The pilot boards at the lighted whistle buoy off the entrance. Pilots may be obtained by radio, by radiotelephone through the Charleston or Jacksonville Marine Operators, phone AD-6-0226 or AD-2-8105, or by prior arrangements through the ship's agent.

Towage.—Vessels usually proceed from the bar to Savannah without assistance. Towboats up to 2,500 hp. are available 24 hours a day at Savannah upon call to assist in docking, undocking, and shifting berth.

Quarantine.—Vessels are boarded by officers of the U.S. Public Health Service at the dock. A Public Health Service hospital is in the city. The quarantine office is at the hospital. There are also public and private hospitals in the city.

Customs.—Savannah is a port of entry and marine documents are issued. Vessels are usually boarded at the dock. The office is in the Customhouse, on the corner of Bull and Bay Streets.

Immigration officials are stationed at Savannah. The office is in the customhouse.

Note.—The services of Quarantine, Customs, and Immigration officials are available from 8:30 a.m. to 5:00 p.m. Mondays through Fridays, and at other times by special arrangement through the ship's agents.

Harbor regulations.—The Savannah District Authority regulates Savannah Harbor and the port. The Georgia Ports Authority owns and operates the State docks and warehouses. A speed limit of 4 knots against the current and 6 knots with the current is in force within the harbor limits.

Wharves.—There are numerous wharves of all types at Savannah with depths alongside up to 34 feet. They range from the American Cynamid Corp. wharf near Mackey Point to the Continental Can Co. wharf at the upper turning basin above Port Wentworth.

Petroleum, fats, vegetable oil, fertilizer, chemicals, gypsum, bulk cement, molten sulphur, and general cargo are handled over the wharves.

On the east bank of the river, on Hutchinson Island, are the Stevens (old Seaboard Airline) general cargo terminal with nine berths, a fertilizer plant, a bulk cement and storage terminal, and an oil terminal. On the south bank, east of the city, is the Atlantic Coast Line Railroad general cargo terminal with four berths.

There are two Savannah State Docks Terminals on the south bank: the Ocean Terminal at and above the Eugene Talmadge Memorial Highway bridge and the Garden City Terminal about 3 miles above the city. Each of the State terminals has seven deep-water general cargo berths of over 4,500 feet of berthing space. The Garden City Terminal has, in addition, two oil handling berths, one equipped to handle molten sulphur, and the terminal has its own fire department. The Ocean Terminal has a sea-train berth equipped to handle loaded freight cars. Both terminals are equipped with 35-ton gantry cranes, 45-ton mobile cranes, and the most modern cargo handling equipment. The Garden City Terminal is connected by the Savannah State Docks Railroad with the five railroads that serve the port and the Ocean Terminal is served by the Central Railroad of Georgia.

The Municipal Dock is just south of Bull Street on the south bank and is used by the Coast and Geodetic Survey and the Coast Guard. When space is available it is suitable for berthing large yachts or transient tugs. Arrangements for berthing are made through the harbormaster and payment is made to the Savannah District Authority. The Office of the Captain of the port is on the wharf. About one half of the other wharves have direct rail connections. There are ample storage and cargo-handling facilities for the existing commerce.

Supplies of all kinds are available in the city. Coal can be procured from barges, and diesel fuel and bunker oils can be obtained at the oil terminals, or at the piers from oil barges. Fresh water is piped to most of the wharves or can be obtained from water barges, or tugs.

Repair facilites include a graving dock 540 feet long, 73 feet wide, and 24 feet deep over the keel blocks at high water. There are two well-equipped machine shops and a 50-ton gantry electric crane, three 25-ton gantry cranes, and a 40-ton locomotive crane. A 50-ton floating crane is available in the harbor. A 1,000-ton floating drydock is also available. Major hull and engine repairs, and electronic repairs can be made.

Communications.—Savannah has rail, water, highway, and air transportation facilities linking up with all parts of the country. Five railroads (Atlantic Coast Line, Central R.R. of Georgia, Savannah & Atlanta, Seaboard Air Line, and Southern) operate out of the city, and there is regular scheduled steamship service to all foreign ports. Three major airlines, several bus lines, and numerous truck lines serve the port. Coastwise shipping is mostly by barge.

Small-craft facilities.—There are no small-craft facilities at Savannah. The nearest place gasoline, diesel fuel, and other services could be obtained, in 1963, was on the Intracoastal Waterway south of Savannah at Thunderbolt, or at Isle of Hope. See Chapter 12 for details.

Above Savannah, the river is generally navigable for drafts of about 6 feet to the city of **Augusta**, a distance of 172 miles. The revised Federal project depth is 9 feet over a width of 90 feet. In March 1963, the controlling depth was reported to be 7½ feet.

The freshet variation above the normal pool level of the **New Savannah Bluff** lock and dam, about 155 miles above Savannah, is about 13 feet ordinarily, with an extreme of 34 feet. The lock is 360 feet long, 56 feet wide, and has a depth over the lower miter sill of 10 feet. The depth over the upper miter sill at normal pool level is 13½ feet; the vertical lift is 15 feet. There is no navigation lock in the dam about 4 miles above Augusta.

Between Savannah Harbor and the lock and dam, the limiting clearances of the drawbridges are minus 3 feet at extreme high water and 13 feet at mean high water. Be-

tween the lock and dam and the Augusta city dam, the head of navigation, the limiting drawbridge clearances are minus 9 feet at flood stages and 26 feet at normal pool level. Drawspan regulations governing the Charleston and Western Carolina Railway Company bridge near Augusta are given in **203.245,** Chapter 2.

There are numerous landings between Savannah and Augusta without wharves or rail connections. A city wharf and warehouse are at Augusta.

A Georgia State barge terminal is at Augusta. There is 9 feet of water alongside and 20,000 square feet of storage space in the transit shed. Modern freight handling equipment up to 10-ton lifting capacity is available and the terminal is served by rail and truck connections. There is barge traffic on the river to Augusta hauling petroleum products upriver and brick downriver. There is an oil terminal at Augusta.

8. SAVANNAH RIVER TO ST. JOHNS RIVER

Charts 1241, 1242, 1243.—The coast from Savannah River to St. Johns River extends in a south-southwesterly direction for about 100 miles. Islands separated by numerous sounds and rivers constitute the entire coast. In general these islands are heavily wooded with marshy areas bodering them on their western sides. The 5-fathom curve extends about 7 miles offshore except in the vicinity of St. Simons Sound where 5 fathoms can be found as much as 12 miles offshore.

Caution must be observed along this section of the coast due to the inshore sets caused by the numerous rivers and sounds. Detailed results of current observations taken at a number of locations in the navigable entrances and passages of this area are contained in Coast and Geodetic Survey Special Publication No. 211, Currents in St. Johns River, Savannah River, and Intervening Waterways. Included is a set of hourly tidal current charts referred to times of high and low waters at Tybee Light.

Boundary lines of inland waters.—The lines established for St. Simons Sound, St. Andrew Sound, and Cumberland Sound are described in **82.45,** Chapter 2.

Danger areas for air-to-air and air-to-water gunnery and bombing ranges are off the Georgia coast; limits and regulations are given in **204.81,** Chapter 2. (See Chart 1111.)

Chart 440.—From Savannah River to Wassaw Sound, a distance of about 7 miles, the coast is formed by the shores of **Tybee Island** which lies in a southwesterly direction. Dangerous shoals extend from the shore of the island for a distance of 4.5 miles.

On the north side of Tybee Island, the **South Channel** of the Savannah River extends from the main channel at the east end of **Cockspur Island** to the southwest end of Elba Island where it again joins the main channel. In March 1963, the controlling depth was 6 feet from the east entrance to near the junction with the Intracoastal Waterway where it was 2½ feet. **McQueens Island** is west of Tybee Island along the south side of South Channel. **Fort Pulaski National Monument** includes Cockspur and McQueens Islands. **Fort Pulaski** on Cockspur Island was built during the period 1829–1847. The Intracoastal Waterway crosses the South Channel through Elba Island Cut. The highway bridge crossing the channel between Cockspur and McQueens Islands has a 36-foot fixed span with a clearance of 10 feet.

Savannah Beach, a summer resort at the northern end of Tybee Island, is conspicuous from seaward. An inside approach to the beach is made through **Lazaretto Creek** and **Tybee Creek.** U.S. Route 80 highway bridge over Lazaretto Creek has a fixed span with a clearance of 35 feet. There are small-boat facilities near the bridge. Gasoline is available. In March 1963, the controlling depth was 4 feet from South Channel through Lazaretto Creek to a junction with Tybee Creek, thence 6 feet to Savannah Beach. A small marina at the beach has two 1-ton lifts. Gasoline, water, electricity, and limited berthing are available.

The remaining portion of Tybee Island is generally low and marshy, although it has many wooded hummocks with numerous creeks winding among them. Several creeks flow into the sea, but they are of little importance as their mouths are obstructed by shoals with crooked channels of 2 to 3 feet in depth.

The southwest part of Tybee Island, separated from the main body by a stretch of marsh, is **Petit Chou Island.** It is distinguishable by a large and heavily wooded hummock which marks the northern point of the entrance to Wassaw Sound.

The entrance to **Wassaw Sound** is about 9.5 miles southward of Tybee Light. Shoals extend offshore a distance of 4 to 4.5 miles from the entrance, forming a shifting bar. In March 1963, the controlling depth was 9 feet through the marked-bar channel. The entrance, used only by small boats, is marked by a lighted buoy and the bar channel buoys.

After crossing the bar at the entrance to Wassaw Sound, a channel with depths of 18 to 43 feet leads through the southern part of the sound and for 6 miles up Wilmington River to the Intracoastal Waterway. The channel is marked by lights and buoys.

Tides and currents.—The mean range of tide varies from about 6.9 feet in the sound to about 7.8 feet up the rivers. The tidal currents in Wassaw Sound reach velocities up to 2 knots. Predictions for a number of places in the sound and vicinity may be obtained from the Tidal Current Tables.

Tybee River (also known in the upper reaches as **Bull River**) flows into Wassaw Sound from northward. It is connected with the South Channel of the Savannah River 5 miles below the city of Savannah by St. Augustine Creek, the upper part of Wilmington River, and Elba Island Cut. The mouth of the river is obstructed by shoals. In March 1963, the controlling depth was 10 feet from the mouth through St. Augustine Creek to a junction with the Intracoastal Waterway. The entrance is marked by a daybeacon. U.S. Route 80 highway bridge, 5.7 miles above the mouth, has a swing span with a clearance of 6 feet; drawspan regulations are given in **203.404,** Chapter 2.

Wilmington River flows into Wassaw Sound from northwestward. The upper end of the river from the junction with Skidaway River is part of the Intracoastal Waterway. **Turners Creek,** which connects the Wilmington and Tybee Rivers, in March 1963 had a controlling depth of 3 feet until near its junction with **Richardson Creek** where it dries. U.S. Route 80 highway bridge over the creek, 1.6 miles above the mouth, has a fixed span with a clearance of 35 feet. In 1963, a new highway bridge was under construction about 2.8 miles above the mouth; it will have a 46-foot fixed span with a design clearance of 34 feet. Boatyards on the creek make hull and gasoline engine repairs, and a marine railway can haul out boats up to 45 feet in length at high water only. Gasoline and water can be obtained at several piers along the creek. Berthing with electricity and wet and dry storage is available. The velocity of the tidal current at the entrance to Wilmington River varies from 1 to 2 knots. Predictions may be obtained from the Tidal Current Tables.

The coast between Wassaw and Ossabaw Sounds is formed by **Wassaw Island,** which is triangular in shape and has a length of about 4.5 miles and a width of about 3.5 miles in its widest part. In general, the island is low and marshy, the strip of firm land forming the coastline being only 0.3 to 0.8 mile wide. The firm land is heavily wooded and has a broad sand beach backed by sand dunes. From this shore dangerous shoals extend to a distance of 3 to 4 miles. The marshy portion of the island is cut by numerous creeks winding among the heavily wooded hummocks. **Romerly Marsh Creek** and **Odingsell River** separate the island from the islands to the westward.

Chart 573.—Ossabaw Sound is a broad opening in the coast about 15 miles southwestward of Tybee Light. Most of the sound is shallow, and shifting shoals extend seaward about 4 miles. **North** and **South Channels** lead through the shoals into the sound. North Channel is marked by buoys. Small local fishing craft are the principal traffic seaward from the sound. Strangers are advised not to enter as breakers sometimes extend clear across the entrance. Vernon River, Ogeechee River, and numerous smaller rivers and creeks enter the sound.

Chart 440.—Vernon River enters Ossabaw Sound from the northwestward. The Intracoastal Waterway traverses a portion of this river. The **Burnside** and **Little Ogeechee Rivers** and several creeks enter the Vernon River. **Montgomery,** a town on Vernon River 5 miles above the mouth, has highway connections with Savannah.

Charts 573, 1241.—Ogeechee River flows into the western part of Ossabaw Sound. The river drains an extensive area and is subject to flood conditions which continually change the channel. Navigation to the Seaboard Air Line Railroad bridge, about 27 miles above the sound, is possible with local knowledge. In March 1963, the controlling depth was 6 feet to the railroad bridge. This bridge has a 40-foot fixed span with a clearance of 14 feet. The adjacent Atlantic Coast Line Railroad bridge has a lift span with a clearance of 4 feet down and 41 feet up. Drawspan regulations are given in **203.245,** Chapter 2. There is a large pulpwood loading dock 5 miles downriver from the railroad bridges which has 13 feet alongside.

The currents in the Ogeechee River and Ossabaw Sound have considerable velocity, particularly the ebb setting out of the river. Current predictions for several locations in Ossabaw Sound and vicinity can be obtained from the Tidal Current Tables. The mean range of tide is about 7 feet, decreasing to about 1 foot at the highway bridge, 28.5 miles above the sound.

Chart 573.—The coastline between Ossabaw Sound and St. Catherines Sound is formed by the eastern shore of **Ossabaw Island,** which lies in a southwesterly direction and has a length of 8 miles and a width of 6 miles. The eastern half of the island is heavily wooded. The north end forms the south shore of Ossabaw Sound.

The seaward side of the island appears unbroken by streams, and shows as a white sand beach backed by heavy woods. Dangerous shoals extend offshore nearly 5 miles.

The southwestern point of the island borders on St. Catherines Sound and is thickly wooded. The western half is almost entirely marshy and is cut up by numerous creeks which provide access to the higher ground to the eastward. On the west the island is separated from the marshes of the mainland by Bear River and **Florida Passage.**

St. Catherines Sound is about 22 miles southwestward of Tybee Light. The entrance is over a shifting bar which extends 5 miles offshore. The entrance buoy is 6.5 miles offshore. In March 1963, the controlling depth in the marked bar channel was 8 feet. The points on its northern and southern sides are wooded.

There are no towns on the sound and strangers seldom enter. Except for light-draft fishing craft, little traffic crosses St. Catherines Bar. Channels with depths of 13 to 38 feet lead from inside the bar into the entrances of its tributaries. The main body of the sound is exposed and becomes quite rough in moderately bad weather. Protected anchorage for small vessels is in **Walburg Creek** on the south side of the entrance to the sound.

The mean range of tide in the sound is 7.1 feet, increasing to 7.8 feet at Belfast and 7.9 feet at **Kilkenny Club;** see the Tide Tables. Tidal currents have considerable velocity at the entrance and in the tributary rivers. The Tidal Current Tables should be consulted for current predictions.

The Intracoastal Waterway crosses St. Catherines Sound just inside the entrance, and affords passage northward through Bear River and Florida Passage to Ossabaw Sound, and southward through North Newport River and Johnson Creek to Sapelo Sound.

Three main rivers enter the sound. **Bear River** and **North Newport River,** which form a portion of the Intra-

coastal Waterway, flow into the sound from the northwestward and southwestward, respectively. **Medway River** enters the sound from the westward. In March 1963, there was a controlling depth of 10 feet to **Sunbury**, a small settlement on the western shore 7 miles above the mouth of Medway River. Water can be obtained at the wharf which serves an oyster plant and has a depth of 6½ feet alongside.

Belfast, a town on **Belfast River**, is reached by way of the Medway River and Belfast River. In March 1963, the controlling depth in Belfast River was 4½ feet to Belfast. A pile of rocks, bare about 3 feet at low water, stands in the midchannel with surrounding depths of 8½ feet off the bluff at Belfast.

St. Catherines Island forms the coast from St. Catherines Sound to Sapelo Sound, lies in a nearly north and south line, and has a length of 9 miles and a width at its widest part of about 3 miles. The island is flat and much of it is marshy with the higher part heavily wooded.

When viewed from a distance seaward, only dense woods in level silhouette are to be seen on St. Catherines Island. Closer inspection reveals a white sand beach, with sand dunes 20 feet high near the center of the island which show up from some directions. A prominent sand dune 3 miles south of the north end of the island and about 1 mile north of McQueen Inlet, is reported to show well from seaward. **McQueen Inlet**, the only break in the shoreline visible from seaward, is unimportant, as it is blocked by shoals at low water. Dangerous shoals extend offshore for 5 miles.

The island is separated from the marshes lying between it and the mainland by Walburg Creek, Johnson Creek, and South Newport River. The entrance to Sapelo Sound is between the south point of this island and the north point of Blackbeard Island.

Chart 574.—Sapelo Sound is about 33 miles southwestward of Tybee Light. A lighted whistle buoy is 15 miles off the entrance. About 8 miles from the entrance the break in the shore can be seen on a clear day. The tower of the abandoned lighthouse 10 miles southwestward of the sound can also be seen from off the bar and is a good landmark. Vessels should stay in a depth of over 5 fathoms until the bar channel buoys are seen because of the shoals extending about 5 miles offshore.

With the aid of the chart, and on a rising tide and a smooth sea, vessels should have no difficulty in entering during daylight hours by following the buoys. In March 1963, the controlling depth on the bar was 15 feet. A comparison of the surveys made since 1859 shows virtually no change in the bar except in the vicinity of the shoalest part of **Experiment Shoal**, which has moved more than 0.25 mile southward. The slough between the shoal and St. Catherines Island also has deepened and extended, and now shows up as a swash channel with a least depth of 9 feet. Another unmarked channel south of the main channel has a reported depth of 8 feet, and is used by fishing boats.

No towns of any importance are on the sound or tributaries. In northeasterly weather, anchorage can be made in the lower part of South Newport River with fair protection.

The mean range of tide is 6.9 feet; see the Tide Tables for tidal differences on Sapelo River and its tributaries. In the entrance to the sound the velocities of flood and ebb are 2.1 and 2.5 knots, respectively. The Tidal Current Tables should be consulted for current predictions.

The Intracoastal Waterway enters Sapelo Sound from the northward through South Newport River and continues southward to Doboy Sound through Sapelo River, Front River, Creighton Narrows, and Old Teakettle Creek.

South Newport River flows into the sound from northward just inside the entrance. In March 1963, the controlling depth in the river was 5½ feet through **Cross Tide Creek** to its junction with North Newport River, thence 5 feet down that river to the Intracoastal Waterway. **Sapelo River**, entering the sound from westward, is used only by small fishing boats, except for the lower part below **Front River** which forms a part of the Intracoastal Waterway.

In March 1963, a draft of 13 feet could be carried from the deeper waters of Sapelo River into the mouth of Front River, at the head of which a dredged channel through **Creighton Narrows** offers passage to Old Teakettle Creek and thence to Doboy Sound. The Intracoastal Waterway follows this route.

Mud River, flowing into the head of Sapelo Sound from southward, is a broad shallow body of water.

Julienton River enters Sapelo River from the northwest about 3 miles above the mouth. Shrimp boats base at **Shellman Bluff** on **Broro River**, locally known as **Shellman Creek**, which enters Julienton River about 4.5 miles above its mouth. Gasoline, water, ice, provisions and a 2-ton hoist are available. In 1963, it was reported that with local knowledge 6 feet could be carried up Julienton River and Broro River to the shrimp dock. Other facilities are at **Continment Bluff** and **Dallas Bluff** on Julienton River, a short distance above Shellman Creek. These include gasoline, diesel fuel, water, ice, provisions, and lodging.

Pine Harbor (Fairhope) is on Sapelo River about 10.5 miles above the mouth. In March 1963, the controlling depth was 1½ feet from the junction of Sapelo River and the Intracoastal Waterway to the landing at Pine Harbor.

The coastline from Sapelo Sound to Doboy Sound is formed by the shores of **Blackbeard** and **Sapelo Islands**. These are separated by **Blackbeard Creek**, which empties into **Cabretta Inlet**. From all points of view, they appear as a single island and are described as such. Taken together they have a length of 10 miles in a south-southwesterly direction and a width of 4 miles. Large portions of both islands are heavily wooded. These islands present no well-marked distinguishing features, except the usual sand beach backed by dense woods in level outline and the abandoned lighthouse tower near the south point of Sapelo Island. The western part of Sapelo Island consists almost entirely of broad marshes with numerous creeks. Most important of these is Duplin River, which has deep water for several miles and affords

means of communication to the island. Sapelo Island is separated from the marshes lying between it and the mainland by Mud River and New Teakettle Creek.

Blackbeard Island is a game refuge under the control of the U.S. Fish and Wildlife Service.

Doboy Sound is 45 miles southwestward of Tybee Light and 16 miles northeastward of St. Simons Light. The entrance, between Sapelo Island and Wolf Island, is about 1 mile wide and obstructed by shifting shoals extending about 4.5 miles offshore. When approaching the sound, vessels should stay in a depth of 5 fathoms or more until the entrance buoys are sighted. If there is too much sea to cross the bar, vessels are advised to enter via St. Simons Sound and the Intracoastal Waterway.

The marked channel over the bar at the entrance to Doboy Sound is not considered safe for strangers except on a rising tide and a smooth sea. The bar has been changing over the past years. In March 1963, the controlling depth was 5½ feet. An unmarked swash channel with a least depth of 5 feet makes into the sound close under the south point of Sapelo Island. The channels are used by local shrimp boats.

Doboy Sound extends northwestward about 5 miles from the bar with a width of about 0.8 mile. The mean range of tide is about 6.8 feet in the sound and about 7.3 feet at Darien. Tidal currents in the sound have a velocity of 2 knots at the entrance. Predicted currents may be obtained from the Tidal Current Tables. Good anchorage is found anywhere in the channel of the sound upstream from **Commodore Island** except in the cable area.

The Intracoastal Waterway enters Doboy Sound through Old Teakettle Creek and passes southward through North River, Darien River, Rockdedundy River, and Little Mud River to Altamaha Sound.

Duplin River, entering Doboy Sound from northward, is a small stream about 5 miles long. In March 1963, the controlling midchannel depth was 11 feet from the entrance to **Pumpkin Hammock,** thence 6 feet for another 2 miles. A large private dock is on the eastern bank of the river, 0.3 mile upstream from the entrance, with a depth of 15 feet alongside.

Sapelo, a town on the southerly end of Sapelo Island, is reached by boat going up **South End Creek** on high tide only. In an emergency some services and supplies can be obtained here. In March 1963, the controlling depth was 2½ feet at entrance and bare halfway to the town.

Old Teakettle Creek enters the sound from northward about 1 mile northwestward of Duplin River, and forms a part of the Intracoastal Waterway. **Shellbluff Creek** which enters Old Teakettle Creek from the westward about 0.7 mile from its northern entrance, in March 1963, had a controlling depth of 1½ feet to the small packing plant at **Valona.** The docks are privately owned by a shrimp-boatbuilding yard with a small marine railway for hauling them out. Diesel fuel, water, ice, and telephone services are available.

Atwood and **Hudson Creeks** are small streams emptying into the head of Doboy Sound from the northwestward. In March 1963, the controlling depth at Atwood Creek was 4 feet for a distance of 2 miles, and 9 feet in Hudson Creek to the mouth of the small creek leading to a small shrimp-packing plant at **Meridian Landing,** which is about 1.5 miles by road from **Meridian.**

Carnigan River enters the head of the sound from southwestward, and is connected with North River by a branch known as **Buzzard Roost Creek. North River** enters Doboy Sound west of Doboy Island. It extends westward 6 miles to the town of **Ridgeville,** where it joins **May Hall Creek,** which, running southward, connects with Darien River 5 miles above its mouth. **Doboy Island** is wooded and has several buildings on its southwest end. A small private landing is on the west side of the island.

Back River, on the southern side of Doboy and Commodore Islands, forms another, and little used, entrance from the sound to North and Darien Rivers.

South River, also little used, empties into Doboy Sound from southwestward about 0.8 mile inside the entrance. It extends in a general westerly direction for 3 miles, where it joins **Little Mud River,** a part of the Intracoastal Waterway.

Darien River extends southwestward for a distance of 11.5 miles, where it joins the Altamaha River. The controlling depth, in March 1963, was 9 feet from Doboy Sound through the Intracoastal Waterway and Darien River to the highway bridge at Darien. Several buoys mark the river channel. Care is necessary when navigating this river due to the shoals and numerous floating snags. Water is fresh in the river at Darien after the ebb has been running for about 3 hours. The best route from Doboy Sound to the Darien River is via the Intracoastal Waterway.

Darien is 8.5 miles above Doboy Island on the north bank of Darien River. Fishing and pulpwood are the main industries. Some shrimp and shad fishermen base here. It has telephone communications, and a good highway passes through the town from Savannah to Brunswick, 18 miles away. Gasoline, diesel fuel, ice, fresh water, and supplies are available. Two marine railways, owned by a packing company, can haul out fishing boats up to 55 feet in length. The depth of water alongside the wharves was 8 to 17 feet, in March 1963. U.S. Route 17 highway bridge crossing the river at the town has a fixed span with a clearance of 31 feet. The overhead cable about 100 yards west of the bridge has a clearance of 51 feet.

Chart 575.—Between Doboy Sound and Altamaha Sound is **Wolf Island,** which is about 2.5 miles long in a north-south direction. The island is almost entirely marsh, cut by numerous creeks.

Altamaha Sound is 48 miles southwestward of Tybee Light and 12 miles northeastward of St. Simons Light. The entrance and the sound are obstructed by shoals which are dangerous to navigation. An unmarked shifting channel through the shoals extends 4 miles from the entrance. It is advisable to enter Altamaha Sound via the Intracoastal Waterway. The mean range of tide in the entrance is 6.6 feet. For current predictions, see the Tidal Current Tables.

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Altamaha River is formed by the confluence of the **Oconee** and **Ocmulgee Rivers,** 110 miles above the town of Darien and 119 miles above its mouth, and flows in a general southeasterly direction, entering the western end of Altamaha Sound. The river is subject to freshets and depths change radically.

In 1962, the controlling depth was 3 feet during 8 months of the year to **Milledgeville,** a city on the Oconee River 126 miles above the junction with the Altamaha River, and to **Macon,** a city on the Ocmulgee River 178 miles above the junction. The depths are ½ to 1½ feet less during the summer low-water period.

U.S. Route 17 highway bridge over **South Altamaha River,** 2.5 miles south of Darien, has a fixed span with a clearance of 44 feet. Drawspan regulations for the bridges crossing Altamaha, Oconee and Ocmulgee Rivers are given in **203.245,** Chapter 2. An overhead power cable on the west side of the bridge has a clearance of 64 feet.

Little Mud River enters Altamaha Sound from northward about 2.5 miles inside the entrance. The Intracoastal Waterway passes through it. **Buttermilk Sound,** which enters Altamaha Sound from the southwestward, has an average width of 0.5 mile. At its head the sound connects with Frederica River and Mackay River, the latter connecting with Back River. These three rivers enter the western end of St. Simons Sound from northward, and Mackay River with Buttermilk Sound forms part of the Intracoastal Waterway.

Chart 1242.—The coast between Altamaha and St. Simons Sounds is formed by the shores of **Little St. Simons Island, Sea Island,** and St. Simons Island. These islands are separated only by stretches of marsh traversed by small streams, and from seaward appear as one body of land although from certain points the marshes, alternating with patches of trees, give the land an unusually broken appearance.

St. Simons Island is the main body of land between the two sounds, and in general description the other two islands may be considered as parts of it. The three taken together are 11 miles long and 6 miles wide at the northern end, diminishing gradually to 2.5 miles near the southern end. Immediately along the coast and in the central parts it is heavily wooded. Between the two wooded portions is a stretch of marsh from 1 to 1.5 miles wide extending nearly the whole length of the island, and to the westward it is separated from the mainland by extensive marshes, through which flow the **Frederica** and **Mackay Rivers,** joining Altamaha and St. Simons Sounds.

Charts 575, 447.—The northern portion of St. Simons Island is marshy and traversed by **Hampton River,** a sizable stream flowing in an easterly and southeasterly direction, which separates St. Simons and Little St. Simons Islands and enters the sea 5 miles below Altamaha Sound. The dangerous shoals on both sides of the channel are unmarked; strangers should not attempt entrance from seaward without local knowledge. In March 1963, the controlling depth was 4½ feet from Buttermilk Sound to Village Creek.

Village Creek flows into Hampton River from the southward, about 1.5 miles above its mouth. It goes through a stretch of marsh separating Sea Island and St. Simons Island. After a crooked course of several miles, it joins the **Blackbank River,** a narrow and twisting stream flowing to the southward between the two islands and entering the sea 4 miles south of Hampton River. The controlling depth, in March 1963, was 6 feet for 2 miles above the mouth, thence 1 foot to and through the cut to Blackbank River and the Sea Island Bridge. Village Creek is dry above the cut at low water. The highway bridge crossing Blackbank River to Sea Island has a 15-foot fixed span with a clearance of 7 feet; overhead cables about 200 feet south of the bridge have a clearance of 16 feet.

Chart 447.—St. Simons Sound, 0.8 mile wide at the entrance, lies 61 miles southwestward of Tybee Light and 27 miles northward of Amelia Island Light. The sound forms a good harbor and is the approach to the city of Brunswick. The entrance is obstructed by dangerous shifting shoals, forming a bar which extends for a distance of 5.5 miles offshore.

Brunswick is on the eastern bank of Oglethorpe Bay and Academy Creek opposite Andrews Island, 7.5 miles above St. Simons Light. It is 4.5 miles west of the Intracoastal Waterway route which connects it with ports to the north and south. The city is the second largest port of commercial importance in Georgia. It is 104 miles south of Savannah and 82 miles north of Jacksonville by coastwise routes. The principal shipments from the port are naval stores, wood pulp, steel products, chemicals, and resin extracts. The principal receipts are salt, gypsum, and petroleum products. The principal industries are wood creosoting, seafood processing and manufacture of naval stores, paints, marine and stationary boilers, steel fabrication, wood pulp, and chemicals.

Brunswick Harbor comprises the improved channel across the bar, St. Simons Sound, Brunswick River, and Turtle River.

Brunswick River enters the sound from southwestward just inside the entrance and provides access for ocean-going vessels to the city of Brunswick. For a distance of 2.8 miles above its mouth, the river has an average width of 1.3 miles, but the deepwater channel averages only 0.3 mile in width. Above **Brunswick Point** the river has an average width of 0.7 mile to **Andrews Island,** which divides it into two branches. The southern branch is known as **Turtle River** and the northern branch, on which the city of Brunswick is situated, is known as **Oglethorpe Bay** to the mouth of **Academy Creek** and thence as **East River** to its junction with Turtle River.

Bridges.—The only bridge crossing the main channel is the Sydney Lanier (U.S. Route 17) highway bridge at Brunswick, 5.4 miles above the mouth, which has a lift span with a clearance of 24 feet down and 139 feet up.

State Route 303 highway bridge crossing Turtle River, just above the head of the improvement, has a swing span

with a clearance of 5 feet. Just above the bridge is an overhead power cable with a clearance of 55 feet. A highway bridge under construction close eastward of the existing bridge will have a fixed span with a design clearance of 35 feet. There is little river traffic above these bridges.

Prominent features.—St. Simons Light (31°08.0′ N., 81°23.6′ W.), 104 feet above the water, is shown from a white conical tower attached to a brick dwelling on the north side of the entrance to the sound. A Coast Guard station is 1.2 miles northeastward of the light. The abandoned lighthouse on the north end of Little Cumberland Island, at the entrance to St. Andrew Sound, and the two tanks on Jekyll Island, can be seen to the southward. Near the beach eastward and northeastward of St. Simons Light are many homes and summer residences extending to the vicinity of Hampton River. The water tank on St. Simons Island about 0.4 mile north of the light, the towers of the lift bridge crossing Brunswick River, and the tall stacks of the Hercules Powder Company in Brunswick are prominent.

Boundary lines of inland waters.—The lines established for St. Simons Sound are described in **82.45,** Chapter 2.

Channels.—A Federal project provides for a channel 32 feet deep through the bar, thence 30 feet deep in Brunswick River and Oglethorpe Bay to the foot of Second Avenue, and thence 27 feet to Academy Creek; 30 feet deep in Turtle River to the Allied Chemical Company wharf; 24 feet deep in Academy Creek; 10 feet deep in Terry Creek; and 20 feet deep in Back River for a distance of 1.1 miles above the lift bridge. In 1963, the controlling depths were 29 feet through the bar channel, thence 27 feet in Brunswick River and Turtle River to the head of the project; 30 feet in Brunswick Harbor (Oglethorpe Bay) to the foot of Second Avenue; thence 18 feet to Academy Creek. Centerline controlling depths: in 1961, 7 feet in Academy Creek, and in February 1963, 12 feet in Back River and 2½ feet in Terry Creek.

Lighted whistle buoys are 15 miles and 8 miles, respectively, off the entrance to St. Simons Sound. The channel through the bar is marked with lighted and unlighted buoys, and the channels inside the sound are marked with lighted ranges, and lighted and unlighted buoys.

Dangers.—Shoal areas and spoil areas are in the approaches from the outer lighted whistle buoy to the midchannel lighted whistle buoy at the entrance to the bar channel. These should be avoided in heavy weather.

Anchorages.—There is good anchorage anywhere along the sides of the channel off the range lines in St. Simons Sound or Brunswick River. Depths of 22 to 79 feet may be found in the sound between Jekyll Island and St. Simons Islands, and depths of 17 to 30 feet in the Brunswick River directly westward of Jekyll Island. In the area westward of the Brunswick Harbor Range, across the channel from Brunswick, anchorage is only for small craft. Small vessels can also anchor in East River near the mouth of Academy Creek.

Tides and currents.—The mean range of tide is about 6.5 feet on the bar and 7.3 feet at Brunswick. Tidal currents normally follow the general direction of the dredged channel across the bar with a velocity of 2 knots. During northeasterly weather there is a strong southerly set across the bar channel and in southeasterly weather a strong northerly set. Current predictions for a number of locations in the vicinity of St. Simons Sound may be obtained from the Tidal Current Tables.

Fog is prevalent from December through March and sometimes into April, but usually clears in the forenoon. Any large drop in temperature may bring in fog. See Appendix for **storm warning display.**

Pilotage is compulsory for all foreign vessels and United States vessels under register in the foreign trade. Vessels with less than 10-foot draft are exempt. Pilotage is optional for coastwise vessels under enrollment which have on board a pilot licensed by the Federal Government. Pilots board incoming vessels, day or night, just outside St. Simons Lighted Whistle Buoy "STS", and all incoming vessels should meet the pilot there, with due regard for existing condition and safety of the vessel. The pilot boat is a white 32-foot launch, flies the code letter "P", and is equipped with radiotelephone. Pilots may be obtained by wire or radiotelephone through the Jacksonville Marine operator to Brunswick Bar Pilots Association, St. Simons Island (ME. 8–2242), or by prior arrangement through the ship's agents.

Towage.—Tugboats of 500 hp. are available 24 hours daily at Brunswick, and on 4 hours notice at Fernandina Beach and Kings Bay. More powerful tugs may be obtained from Savannah or Jacksonville.

Quarantine.—Vessels subject to quarantine are inspected by an officer of the Public Health Service upon arrival at berth. An outpatient office of the Public Health Service is maintained. The Brunswick City Hospital maintains a ward for seamen.

Customs.—Brunswick is a port of entry and marine documents are issued. Vessels are usually boarded at the dock, otherwise by special arrangement through the ship's agents.

Immigration.—There is no immigration office at Brunswick. Inspectors are sent from Savannah when such services are required.

Harbor regulations are under control of the Brunswick Port Authority, and the harbormaster boards all vessels on arrival at the dock after pratique is granted.

Wharves.—Most of the piers and wharves are along the west side of Brunswick. The port has berthing facilities for deep-draft vessels at four terminals with a depth of 30 feet alongside. The State Dock is a marginal wharf with 1,100 feet of berthing space; two warehouses and transit sheds on the dock have 100,000 square feet of storage space. A 45-ton mobile crane and modern cargo handling equipment are available; the wharf has a double-tracked 52-foot apron. Other deep-water oil, chemical, and bulk-handling piers and wharves are mostly on the east bank of Turtle River above the city. Seafood handling wharves are along the channel northward of the State Dock.

Supplies.—Diesel fuel is available at the docks; bunker C by barge. Good water is piped to all the piers. Gasoline, ice, provisions, and ship chandlery are available.

Repairs.—Good facilities for repair are available. The largest of several marine railways is capable of hauling out vessels 110 feet in length. Complete machine, boiler, steel, and wooded fabrication facilities are available. One wharf is equipped with a 50-ton stiff-leg crane. The nearest large drydocks are at Jacksonville and Savannah.

There are no special facilities at the port for use in wrecking or salvage operations. Such equipment can be obtained from Savannah or Jacksonville.

Communications.—The port is served by the Southern Railway and the Atlantic Coast Line Railroad. Two major airlines provide air connections to cities on the Atlantic coast and make western connections from the airport on St. Simons Island about 6 miles east of the city. Several bus and truck lines serve the port.

St. Simons Island (town) is a summer resort with a concrete fishing pier at the south end of St. Simons Island. The T-head pier had depths of 14 to 21 feet alongside, in February 1963.

Frederica River joins St. Simons Sound from the northward about 1 mile inside the entrance and for several miles, to the junction with Mackay River, is the main route of the Intracoastal Waterway. In February 1963, the controlling depth was 9 feet from the north end of Lanier Island to a junction with the Intracoastal Waterway at Mackay River.

Mackay River enters the sound from northward, but is obstructed by a highway bridge, about 1.5 miles above the mouth, which has a 34-foot fixed span with a clearance of 8 feet. To the northward of **Lanier Island** the river is joined by Frederica River and becomes the route of the Intracoastal Waterway.

Little River is west of Mackay River and flows into Back River. A highway bridge, about 0.7 mile above the mouth, has a 33-foot fixed span with a clearance of 8 feet.

Back River, an alternate route of the Intracoastal Waterway, enters St. Simons Sound from northward. In February 1963, the controlling depth was 12 feet from St. Simons Sound to **Belle Point Creek,** thence 5½ feet to a junction with Mackay River. The toll highway bridge, 1.5 miles above the mouth, has a lift span with a clearance of 9 feet down and 85 feet up. Above the bridge the channel to the head of the improvement is marked by daybeacons and an unlighted range.

Terry Creek flows into Back River 0.5 mile above the highway bridge and leads westward 1.5 miles to the city of Brunswick. The entrance is marked by a **245°** unlighted range. In February 1963, the controlling depth was 2½ feet to the yacht club basin on the east side of the city. About 1.3 miles above the mouth, the creek is crossed by a highway bridge with a 34-foot fixed span with a clearance of 8 feet. The yacht club basin is within the city limits of Brunswick and offers good protection from storms; it has 450 feet of dock space and a float with 10 feet of water alongside. Gasoline, ice, and fresh water are available; provisions and diesel fuel may be delivered from the city. There is a small-boat launching ramp and a 2-ton lift at the basin.

Plantation Creek and **Clubbs Creek** offer a protected short cut between Back River and Brunswick River, and can be used safely by small craft on a rising tide. In February 1963, the controlling midchannel depth in Plantation Creek was 4 feet and in Clubbs Creek 8 feet.

South Brunswick River enters Turtle River from westward opposite Andrews Island. State Route 303 highway bridge, 3 miles above the mouth, has a 36-foot fixed span with a clearance of 12 feet.

Fancy Bluff Creek, a tug and barge route from Little Satilla River, enters South Brunswick River from the southwest 1.3 miles above the mouth. U.S. Routes 17 and 84 highway bridge about 2.3 miles from the north entrance, has a fixed span with a clearance of 18 feet. The overhead power cable close southwest of the bridge has a clearance of 44 feet. The controlling depth through the creek to Little Satilla River, in February 1963, was 5 feet.

Cedar Creek enters Brunswick River from the south, about 1.2 miles from Brunswick Point. State Route 50 highway bridge, 1 mile above the entrance, has a 30-foot fixed span with a clearance of 10 feet. The controlling depth, in February 1963, was 3 feet.

Jekyll Creek enters Brunswick River from southward about 2.5 miles above its mouth. With Jekyll and St. Andrews Sounds, it forms part of the Intracoastal Waterway to Fernandina Beach. See chapter 12.

Chart 448.—From St. Simons Island to St. Andrew Sound the coast is formed by the shores of Jekyll Island which extends nearly north and south for a distance of 6.5 miles and has a width of 2 miles. **Jekyll Island** is a State Park; several large park buildings, formerly private homes, are on the west side of the island, and on the east side are large motels and recreational buildings, bath houses, and the large prominent Aquarama (a large indoor swimming pool and auditorium). The island is wooded all along its eastern shore and dark woods which are quite level in silhouette stand out in the background. Shoals extend 3 to 5 miles offshore. Two conspicuous gold spherical water tanks on top of slender green standpipes are about 3.1 and 4.6 miles from the north end of the island. The towers of the lift bridge over the Intracoastal Waterway on the west side of the island can be seen offshore.

The western portion of Jekyll Island at the north and south ends is marshy, bordered by Brunswick River, Jekyll Creek, and Jekyll Sound. A marina on the Intracoastal Waterway on the west side of the island is described in Chapter 12.

St. Andrew Sound, between Jekyll Island and Little Cumberland Island, is about 7 miles southward of St. Simons Sound and 17 miles northward of St. Marys Entrance.

Boundary lines of inland waters.—The lines estab-

lished for St. Andrew Sound are described in **82.45,** Chapter 2.

The entrance to the sound is over a shifting bar which extends about 5 miles offshore. Vessels should stay in 5 fathoms or more until the outer buoy is sighted. The channel into the sound is marked by buoys. An abandoned lighthouse is on the north end of Little Cumberland Island. Vessels with a draft of about 10 feet should have little difficulty entering the sound. In February 1963, the controlling depth was 14 feet in the buoyed entrance channel. There is a licensed pilot at Brunswick. The entrance is used only by local shrimp boats.

In the sound are extensive shoals, between which channels lead to the principal tributaries: Jekyll Sound on the north, Satilla River on the west, and Cumberland River on the south.

Tides and currents.—The mean range of tide is 6.8 feet. The current velocity is about 2 knots in the entrance; predictions are given in the Tidal Current Tables.

The best anchorage in the sound is in the channel on the western side of Little Cumberland Island in 17 to 27 feet, good holding ground. Good anchorage is also found in the entrance to Jekyll Sound westward of Jekyll Point.

The Intracoastal Waterway, which crosses the sound, enters from the northward through Jekyll Creek and Jekyll Sound and passes southward through Cumberland River to Cumberland Sound and St. Marys Entrance.

Jekyll Sound, which enters St. Andrew Sound from northward just inside the entrance, has many shoals. Three channels lead to its three principal tributaries. **Jekyll Creek** enters the sound from northward, forming a part of the Intracoastal Waterway. Its northern part connects with Brunswick River. **Jointer Creek** enters Jekyll Sound from northwestward. It is crooked and has several narrow branches, all of which except Cedar Creek are blocked by the Jekyll Island Highway. A small boat can navigate from Brunswick River to Jekyll Sound by way of Cedar and Jointer Creeks, or through Turtle River, Fancy Bluff Creek, and Little Satilla River.

Little Satilla River enters Jekyll Sound from westward. In February 1963, the controlling depth was about 10 feet from the entrance to Fancy Bluff Creek. Small craft going to landings on the river enter from South Brunswick River through Fancy Bluff Creek.

Satilla River enters St. Andrew Sound from the westward through a narrow channel in the shoals. In February 1963, shoaling to 1 foot was found just below the bend 9 miles above the entrance. Shrimp boats going to **Woodbine,** 22 miles above the mouth, use Bailey Cut which was reported to have a controlling depth of about 4 feet at its eastern entrance. U.S. Route 17 highway bridge at Woodbine has a fixed span with a clearance of 50 feet. The Seaboard Air Line Railroad bridge to the westward has a swing span with a clearance of 12 feet. Drawspan regulations are given in **203.245,** Chapter 2. An overhead power cable between the bridges has a clearance of about 60 feet. Traffic in this area consists mostly of sand tows and shrimp fishermen. A boatyard and shrimp dock on the south bank about 0.4 mile east of the highway bridge has a marine railway that can haul out craft up to 70 feet in length. There is 8 to 10 feet of water at the 90-foot T-head pier. Diesel fuel and fresh water are on the dock and gasoline can be obtained by truck. Hull and engine repairs can be made in an emergency. Food, lodging, and marine supplies can be obtained in the town. The water is brackish at Woodbine with no worms and fresh above Burnt Fort. The controlling depth is about 6 feet from Woodbine to **Burnt Fort,** 45 miles above the mouth of the river. State Route 252 highway bridge at Burnt Fort has a fixed span with a clearance of 20 feet.

The mean range of tide is 6.6 feet at the mouth and 3.2 feet at Burnt Fort. The freshet variation at **Waycross,** 142 miles above the mouth, is about 12 feet. There is reported to be no appreciable rise at Woodbine during freshets.

Cumberland River enters St. Andrew Sound from southward just inside Little Cumberland Island. Its general direction is southerly for a distance of 11 miles, where it joins Cumberland Sound. The Intracoastal Waterway follows this route which is well marked by ranges in the more difficult sections.

Brickhill River branches from Cumberland River about 5 miles above the mouth and rejoins it at **Cumberland Dividings. Floyd Creek** enters Cumberland River from westward about 4.5 miles above the north end of Little Cumberland Island, and joins with Satilla River through a cut to form an alternate passage to the Intracoastal Waterway.

Chart 1242.—Between St. Andrew Sound and St. Marys Entrance, the coastline, extending in a southerly direction for about 16 miles, is formed by the shores of Little Cumberland and Cumberland Islands. These two islands are separated only by a stretch of marsh and **Christmas Creek,** and appear as one island from seaward. The coastline shows a broad white sand beach backed by an almost continuous range of sand dunes with dense woods backing them.

The north end of **Little Cumberland Island,** heavily wooded, has a prominent buff colored bluff and is marked by an abandoned lighthouse.

Cumberland Island is almost entirely covered by woods, though somewhat marshy to the westward. The island is separated from the mainland by extensive marshes through which flow the Cumberland and Brickhill Rivers. The extreme southern point of the island, which forms the north side of the entrance to Cumberland Sound, has several conspicuous sand dunes.

From the north end for about 9 miles from the entrance to St. Andrew Sound, the coast is bordered by dangerous shoals extending 3 to 5 miles offshore. For the remaining distance to St. Marys Entrance there is a depth of 3 fathoms to within 1 mile of the beach.

Chart 453.—St. Marys Entrance and **Cumberland Sound** are 16 miles southward of St. Andrew Sound and

19 miles northward of St. Johns River. The sound is the approach to the city of Fernandina Beach, the town of St. Marys, the docks at Kings Bay, and an inland passage to St. Andrew Sound through its connection with the Cumberland River.

Fernandina Beach, the principal city on Cumberland Sound, is on the east bank of Amelia River, 2 miles south of the entrance. It is the shipping port for woodpulp and paper products; bulk sulphur, salt cake, caustic soda, and fish meal are received. Some coastwise and foreign shipping serve the port, which also includes the wharf at Kings Bay.

Prominent features.—Amelia Island Light (30°40.4′ N., 81°26.6′ W.), 107 feet above the water, is shown from a 64-foot white conical tower 2 miles southward of the entrance to Cumberland Sound. The water tank at Dungeness 2 miles north of the entrance, the water tank 1.6 miles south of the entrance, and the homes along the beach 2 to 3 miles south of the entrance, are also prominent from seaward.

Fort Clinch, on the south side of the entrance at the north end of Amelia Island, is a State park, museum, and recreation area. The old fort and a large red brick building near the inshore end of the south jetty are conspicuous. Camping facilities and a small-craft launching ramp are at the northwest end of the island on the east side of the channel to Fernandina Harbor.

Channels.—A Federal project provides for a channel 32 feet deep through the bar to the turning basin in Amelia River off the Rayonier wharf, and 34 feet through Cumberland Sound to the wharf at Kings Bay. In 1963, the controlling centerline depths were 25 feet through the entrance bar channel, thence 26 feet to the turning basin off the Rayonier wharf. In February 1963, the controlling depth through Cumberland Sound to the wharf at Kings Bay was reported to be 30 feet after dredging.

The entrance to the sound is marked by two stone jetties. The jetties are awash at halftide, making them a menace to navigation when visibility is limited. Currents are strong off the ends of the jetties. The natural channel between the jetties is subject to frequent change. The currents scour out the channel during spring tides, but the shoals build up again during neap tides.

A lighted whistle buoy is 5 miles off St. Marys entrance. The channel through the bar and the channels inside the sound are marked with lighted ranges, lights, and lighted and unlighted buoys.

Fishing vessels going northward out of the sound use the natural channel off the end of the north jetty marked by a buoy. Strangers are warned against using it as there is danger of being set into the end of the jetty. A shoal with a least depth of 6 feet extends more than a mile southeastward from the outer end of the south jetty.

Anchorages.—There is good anchorage along the sides of the channels in Cumberland Sound and in the Amelia River according to draft.

Tides and currents.—The mean range of tide is 5.7 feet at the entrance and 6.1 feet at Fernandina Beach. The tidal currents at the entrance have considerable velocity and are dangerous at times, especially on the flood which generally sets northwestward and on the ebb which sets southeastward except during northeast winds, when there is a strong southerly set off the end of the jetties on both tides. It has been reported that this set sometimes attains a velocity exceeding 5 knots. Large vessels are cautioned not to enter the entrance channel before the pilot boards. Freshets in the St. Marys River may cause the ebb to run 7 or 8 hours. Current predictions for Cumberland Sound vicinity may be obtained from the Tidal Current Tables.

Weather.—Winters are usually mild. Fog is prevalent in March and at any time when there is a sharp drop in temperature. See Appendix for **storm warning displays.**

Pilotage for Fernandina Beach, Kings Bay, and St. Marys is compulsory for all foreign vessels and United States vessels under register in the foreign trade. Pilotage is optional for coastwise vessels which have on board a pilot licensed by the Federal Government. The pilot station is on Amelia Island and, weather permitting, the pilot will board any hour of the day or night. The pilot boat is a 30-foot launch with gray hull and bright orange superstructure, and flies the code letter **P**. The boat is equipped with radiotelephone and can be contacted during the day on 2738 kc. or 2182 kc. Pilots may be obtained by wire, by radiotelephone through the Jacksonville Marine Operator, phone 261–3824 or –3495 or by previous arrangement through the ship's agents.

Towage.—Tugs can be obtained day or night on four hours' notice to the towing company at Brunswick, Ga.

Quarantine.—Vessels subject to quarantine are inspected by an officer of the Public Health Service upon arrival at berth. The nearest Public Health Service hospital is at Savannah. A county hospital is at Fernandina Beach.

Customs.—Fernandina Beach is a port of entry and marine documents are issued. The customhouse is in the Federal Building on Atlantic Avenue.

Immigration.—Arrangement for immigration inspection is made through the vessel's agents with the Immigration Office at Jacksonville.

Harbor regulations.—All vessels are docked and undocked under the direction of the harbormaster, who is also the pilot. All vessels should proceed through the harbor at slow speed, and not over 5 knots, as there are many craft moored along the waterfront.

Wharves.—Deep-draft vessels use two wharves which have 29 to 32 feet of water alongside. Numerous smaller wharves with lesser depths operate for the shrimp fishing fleet. The Municipal Wharf and Municipal Marina are at the foot of Atlantic Avenue. The new Florida Marine Welcome Station, the first marine station of its kind, is on the municipal wharf. Berthing with electricity, gasoline, diesel fuel, fresh water, and a concrete launching ramp are available. Lodging and restaurants are nearby.

Supplies.—Fresh water, gasoline, diesel fuel, provisions, and marine supplies are obtainable. The fresh water piped to the wharves is from artesian wells and, having some mineral content, should be treated for use in boilers.

Repairs.—Facilities are not available for large vessels. Jacksonville is the nearest place for repairs and hauling out services. A marine railway can haul out vessels up to 68 feet in length and 6 feet in draft; hull repairs can be made.

No special facilities are available for wrecking or salvage operations. Such equipment can be obtained from Jacksonville.

Communications.—Fernandina Beach is served by a bus which makes connections with the Seaboard Air Line Railroad at **Yulee,** 5 miles inland. Improved highways connect with the mainland and there is local bus service to Jacksonville.

The Intracoastal Waterway enters Cumberland Sound from the Cumberland River and continues through the Amelia River on the south.

Beach Creek extends northward into Cumberland Island from a point just inside the entrance to Cumberland Sound. In February 1963, there was 2 feet at the entrance and the creek dried about 0.2 mile below Dungeness.

Kings Bay, in the northern part of Cumberland Sound, about 6 miles up the Intracoastal Waterway, has a 2,000-foot concrete pile wharf with 30 feet alongside. There are two large transit sheds on the wharf which is primarily used for handling high explosives. Two 10-ton mobile cranes are available. The terminal is a U.S. Army installation leased to a terminal operating company. **Pilotage, towage, quarantine, customs,** and **immigration** are the same as for Fernandina Beach.

St. Marys River, the principal tributary of Cumberland Sound, enters from westward, and is a portion of the boundary between Georgia and Florida. It is used primarily by shrimp fishermen and tugs towing pulpwood and sand as far as St. Marys, and above that point by pulpwood tows. The controlling depth in the channel to St. Marys is about 14 feet. Above St. Marys a vessel with a draft of 10 feet or less should have little difficulty going as far as Kings Ferry, 32 miles above the mouth, on a rising tide. The river is very crooked and some of the turns are sharp. The mean range of tide is 5.8 feet at the entrance, 6 feet at St. Marys, 5.1 feet at Crandall 5 miles above the mouth, 3 feet at Kings Ferry, and 1.5 feet at the Atlantic Coast Line Railroad bridge, 48 miles above the mouth. The water is fresh above the Seaboard Air Line bridge, 20 miles above the mouth. Pilots for the river are available at Fernandina Beach.

U.S. Route 17 highway bridge at Wilds Landing, 20 miles above the mouth of St. Marys River, has a swing span with a clearance of 5 feet. The Seaboard Air Line Railroad bridge just upstream has a swing span with a clearance of 5 feet. Drawspan regulations are given in **203.245,** Chapter 2. The overhead power cable about 250 yards above the railroad bridge has a clearance of 71 feet.

The town of **St. Marys** is on the north bank of St. Marys River, 4 miles above the mouth. The larger wharves here have about 13 feet of water alongside. The larger of the two marine railways can haul out boats up to 65 feet in length. Gasoline and diesel fuel can be obtained by truck and fresh water is available on the wharves. Rail, telegraph, and telephone communications, and ordinary provisions are available.

A good haven for small vessels, particularly in northeasterly weather, can be found at St. Marys. Launches also can obtain refuge in bad weather by anchoring near the pulp mill 1 mile up North River or near the bridges 16 miles above St. Marys on the St. Marys River.

North River branches from St. Marys River about 2 miles above its mouth. A draft of 7 feet can be carried to the pulp mill dock up the river.

Bells River branches from St. Marys River about 1.5 miles above the town of St. Marys. It flows in an easterly direction to its junction with the Amelia River at Fernandina Beach. In February 1963, the controlling depth was about 5 feet. **Chester,** a town on the river, has a number of small docks which were in poor condition in 1963.

Jolly River branches eastward from Bells River about 6 miles above its mouth, and empties into Cumberland Sound at the mouth of St. Marys River. The controlling depth, in February 1963, was about 9 feet.

Lanceford Creek branches from Amelia River west of Fernandina Beach. The southern entrance where it joins Amelia River dries clear across; the eastern entrance into Bells River had a midchannel depth of 12 feet in February 1963, and a midchannel depth of 8 feet was then carried to the docks at **Black Rock.** The creek widens off the docks into tidal flats which bare at low water. Small boats cross from the creek to Amelia River at high tide through **Soap Creek,** which passes through numerous mud flats and oyster beds that bare at low tide.

Chart 1243.—From St. Marys Entrance to St. Johns River the coast is formed by the shores of Amelia, Talbot, Little Talbot, and Fort George Islands. **Amelia Island** is nearly north and south, with a length of about 12 miles and a width varying from 1 to 2.5 miles. The island is low and gently undulating with heavy woods along the shore.

From seaward no prominent natural features distinguish Amelia Island from other land in the vicinity. It shows a long line of dark woods, irregular in outline, with numerous tall trees rising conspicuously above the general level. In front of these woods a range of sand dunes, partly covered with coarse grass and scrub, backs the broad stretch of white sand beach. About 2 miles from its northern end, the white tower of Amelia Island Light rising from a grove of large trees is a conspicuous landmark. About 3 miles south-southeast of Amelia Island Light is a pier extending 800 feet into the ocean.

The western portion of Amelia Island is marshy. Separating the island from the mainland is a broad stretch of marsh through which flow the Amelia and South Amelia Rivers connecting Cumberland Sound and Nassau Sound.

Chart 577.—**Nassau Sound** is 10 miles southward of Amelia Island Light and 6 miles northward of St. Johns River. The entrance is obstructed by shifting shoals which extend about 1.5 miles seaward and form a shallow bar. Breakers form across the entire entrance. Small craft are advised to not attempt passage through the

shoals without local information. The mean range of tide in Nassau Sound is 5.4 feet. Route A1A highway toll bridge, 1 mile above the entrance, has a swing span with a clearance of 15 feet. Drawspan regulations are given in **203.245,** Chapter 2. A small-craft launching ramp is on the south side at the east end of the bridge.

South Amelia River and Nassau River are the principal tributaries of Nassau Sound. **South Amelia River** enters from the northward and is a portion of the Intracoastal Waterway.

Nassau River enters Nassau Sound from the northwestward. Occasional sunken logs and numerous shoals are a menace to navigation. **Nassauville** is a small settlement on the north bank of the river, 7 miles above the entrance to the sound, with private piers adjoining private homes and a fishing camp. Local knowledge is necessary to carry the best water to Nassauville and **Christopher Creek,** where there is a private marine railway which can haul out craft up to 50 feet in length in an emergency.

Alligator Creek connects South Amelia River and Nassau River. Its twisting channel leads through tidal flats and between oyster bars.

Sawpit Creek enters the sound from the westward. Route A1A highway bridge, crossing the creek about 0.3 mile above the mouth, has a 38-foot fixed span with a clearance of 15 feet. A portion of this creek forms a part of the Intracoastal Waterway.

Talbot Island, about 4 miles in length and 1.5 miles in width, is partly wooded and partly marshy. Along the marshy eastern shore flow several creeks which separate Talbot and Little Talbot Islands. Talbot Island, Little Talbot Island, and Fort George Island comprise a State park and recreation area and are connected to Amelia Island and the mainland by a paved highway and bridges. The road also leads to Jacksonville along the north bank of the St. Johns River with a ferry connection at Fort George to the south bank at Mayport.

Little Talbot Island, a strip of low flat land about 4 miles in length and averaging about 0.8 mile in width, lies in a north-south direction. The island is wooded along its outer coast. From seaward it shows a strip of dark woods with many conspicuous sand dunes near the beach. Its south end runs off in a low point of bare sand bordering on Fort George Inlet.

Fort George Inlet is a narrow body of water separating Little Talbot and Fort George Islands. The inlet changes rapidly due to shifting sands at its entrance, and should never be used without local knowledge. The Heckscher Drive (State Routes 105–A1A) highway toll bridge near the entrance to the inlet has a 38-foot fixed span with a clearance of 15 feet. An overhead power cable at the bridge has a clearance of 32 feet.

Fort George Island is westward and southward of Fort George Inlet. Its eastern shore, forming the coastline, shows a broad strip of white sand beach backed by a range of high hills. The island is separated from the mainland by Sisters Creek. Fort George Island formerly called Pilot Town, is a town on the St. Johns River near the south end of the island opposite Mayport.

9. ST. JOHNS RIVER

Charts 569, 577.—St. Johns River, the largest in eastern Florida, is about 248 miles in length. It rises in the St. Johns Marshes near the Atlantic coast below latitude 28°00′ N., flows in a northerly direction, and empties into the sea north of St. Johns River Light in latitude 30°24′ N. The river is the approach to the city of Jacksonville and a number of towns near its shores. Some of these places are winter resorts while others are centers of farming districts and citrus groves. Sanford is the present head of commercial navigation, although small boats have navigated the river as far as Lake Washington, 188 miles south of Jacksonville.

Jacksonville is on the west side of St. Johns River as it turns southward, 21 miles above the entrance. The harbor is the largest deep-water port on the east coast of Florida. Because of its geographic location, it has become a major southeastern bulk storage warehousing, distribution, and railroad center. The principal exports are lumber, paper products, tobacco, naval stores, scrap metal, machinery, automotive products, steel products, and citrus fruits. The principal imports are crude oil, gasoline, diesel and jet fuel, fertilizer materials, coffee, sugar, iron and steel products, automobiles, canned meats, tile, marble, and general merchandise.

Prominent features.—St. Johns Light (30°23.1′ N., 81°23.9′ W.), 83 feet above the water, is shown from a white square tower a mile south of St. Johns River jetties; the radiobeacon antenna is 60 yards east of the light tower. Water tanks are prominent along the beaches to southward.

Boundary lines of inland waters.—The line established for the entrance to St. Johns River is described in **82.50,** Chapter 2.

Channels.—A Federal project provides for a channel 34 feet deep from the ocean to Commodore Point via Terminal Channel, thence 30 feet deep to the Florida East Coast Railway bridge at Jacksonville. The main channel is maintained at or near project depth.

A lighted whistle buoy is 3 miles off the entrance to the river. The entrance channel, between two converging rubblestone jetties, and the channel in the river are marked by lighted and unlighted buoys, lights, and lighted ranges.

Anchorages.—Anchorage areas have been established in the St. Johns River in the vicinity of Jacksonville; limits and regulations are given in **202.183,** Chapter 2. Special small-boat anchorages are 4.5 miles south of Jacksonville; see **202.1** and **202.73,** Chapter 2, for limits and regulations.

Vessels waiting outside the entrance can anchor in depths of 36 to 50 feet north-northeastward of the jetties if wind and sea permit. Pilots sometimes anchor vessels in the channel opposite Mayport Basin while waiting for the weather to clear upstream, but this anchorage is not recommended due to the strong currents. The usual merchant ship anchorages are off the Municipal Terminal and off Commodore Point, but both are constricted in size.

Dangers.—The principal danger in the northern approach to the St. Johns River is the bar at the entrance to Nassau Sound on which a number of vessels have been lost. In each case, the vessel was standing in for the coast on a southwesterly course, each obtained a sounding of over 9 fathoms (high water) in the deep hole a short distance outside the bar, and stranded before obtaining another sounding. A contributary cause for the disasters is the prevailing northerly current, which is felt until well inside the 10-fathom curve, except with northeasterly or northerly winds.

In the southern approach, broken ground with least depths of 5 to 6 fathoms lies from 4 to 6 miles from the coast for a distance of 15 miles northward of St. Augustine Light.

Bridges.—Five bridges cross St. Johns River at Jacksonville. The fixed high-level Matthews highway toll bridge, 0.5 mile north of Commodore Point, has a clearance of 152 feet across Terminal Channel and 87 feet across Arlington Cut. Main Street (Alsop) highway bridge, the first of four bridges crossing the river at Hendricks Point, has a lift span with clearances of 40 feet down and 135 feet up; the second, Acosta highway bridge, 0.3 mile upstream from the Main Street bridge, has a lift span with clearances of 56 feet down and 164 feet up; the third, the Florida East Coast Railway bridge adjacent to it, has a bascule span with a clearance of 5 feet; the fourth, the Fuller Warren highway toll bridge, has a bascule span with a clearance of 44 feet at the center; drawspan regulations are given in **203.430,** Chapter 2.

Routes.—Along the coast from Charleston to Jacksonville, the course between the outer lighted whistle buoys is from 10 to 15 miles offshore. Vessels making for St. Johns River entrance should guard against an inshore set which may amount to a knot or more due to the currents into the inlets. In thick weather, vessels approaching from the northeastward should be mindful of the fact that deep holes may be encountered which may lead them to believe that they are farther offshore than they actually are. Approaching from the southward, vessels clear Hetzel Shoal before heading for the lighted wreck buoy about 10 miles southeastward of the entrance, then steer

for the lighted whistle buoy off the entrance. A set of 0.5 to 0.8 knot in a northerly direction parallel with the coast may be expected in this area due to the prevailing current, except with northerly or northeasterly winds. Southbound light-draft vessels can avoid the northerly set due to the prevailing current by following the coast at a distance of from 3 to 5 miles to abeam Ponce de Leon Inlet Light, and then shaping the course to pass outside of Hetzel Shoal lighted whistle buoy 8.

Tides and currents.—The mean range of tide is 4.9 feet at St. Johns River entrance and about 1.2 feet at the railroad bridge at Jacksonville. From Jacksonville to Palatka the mean range of tide is about 1 foot. At low-water stages, tidal action is felt to Lake George. See the Tide Tables for daily predictions at Mayport and several places on St. Johns River.

The tidal currents are strong in St. Johns River as far as Jacksonville. The currents at the entrance between the jetties require special attention. In 1963, the Bar Pilots reported that one hour after the beginning of a blow from any direction from north through east to south, a very strong current sets with the wind across the end of the jetties, and the conditions are usually dangerous especially in heavy weather. Under these conditions, the positions of the buoys should not be relied upon as they often drag from station.

The velocity of the current between the jetties is 1.9 knots on the flood and 2.3 knots on the ebb; at Mayport, 2.2 knots on the flood and 3.1 knots on the ebb; at Mile Point, 2.5 miles above the entrance, about 2.8 knots; and at Jacksonville, (Commodore Point), about 1 knot. The flood is increased by northeasterly and easterly winds and the ebb by southwesterly and westerly winds. See the Tidal Current Tables for daily predictions of the tidal current in St. Johns River entrance and for a number of places on St. Johns River.

The tidal currents above Jacksonville average less than a knot. The winds have considerable effect on the water level and velocity of the currents. Strong northerly and northeasterly winds raise the water level about 2 feet at Jacksonville, about 1 foot at Palatka, and about 1.5 feet at the mouth of Dunns Creek. Strong southerly and southwesterly winds lower the water level about 1 to 1.5 feet, increase the ebb, and decrease or may interrupt the flood. The currents in Deep Creek are weak, being due primarily to the winds and tide. There is a moderate drainage current in the Oklawaha River. The wind has no appreciable effect on the water level at the head of Dunns Creek and in Lake Crescent.

The river water may be fresh at Jacksonville at low water with westerly winds, while with northeasterly winds the water may be brackish to Palatka.

Freshets.—The flood stages in the river usually occur during the fall and are about 1 foot above ordinary low-water level at Jacksonville, 2 feet at Palatka, 3 feet at Lake George, 5 feet at Sanford, and 6.5 feet at Lake Harney.

Weather.—Winters are usually mild and summers are tempered by sea breezes from the Atlantic Ocean. Fog is frequent in winter, rolling in with any easterly wind and often remaining across the entrance when it has cleared elsewhere. In calm weather smog from the fertilizer and paper plants in the area often obscures the channel above Dame Point. The Weather Bureau station is at Imerson Airport, just north of Trout River entrance, and barometers can be compared there. See Appendix for **Jacksonville climatological tables and storm warning displays.**

Pilotage.—Pilotage is compulsory for all foreign vessels and for United States vessels under register. Pilotage is optional for United States coastwise vessels which have on board a pilot licensed by the Federal Government. Twenty-four-hour daily pilotage service is maintained at the port. The pilot boat is painted black with PILOT in white letters on the hull. It has a white superstructure and flies a blue flag with a white **P** on it. The pilot boat is equipped with radiotelephone and maintains watch on 2738 kc. Incoming vessels are boarded between the sea buoy and the entrance and outgoing vessels are boarded at the dock. The bar pilots maintain a lookout for approaching vessels from the pilot station on the south side of the entrance to Mayport Basin at the naval station and will come out to a vessel making a signal. Arrangements for pilotage is usually made through the vessel's agents in advance or by calling the pilot station on radiotelephone. Upriver pilots can be obtained from the towboat company at Jacksonville or through the ship's agents.

Towage.—Tugboats and docking pilots are available 24 hours a day at Jacksonville.

Quarantine.—Vessels are usually boarded at the docks between 7 a.m. and 7 p.m. weekdays. Special arrangements through the vessel's agents are necessary to board in the stream, after hours, or on Saturday, Sunday, and holidays. An outpatient clinic is maintained by the U.S. Public Health Service at the Federal Building. There are public and private hospitals in and about Jacksonville. Deratization and fumigation services are available.

Customs.—Jacksonville is a customs port of entry and marine documents are issued. The port comprises the City of Jacksonville and St. Johns River from the sea to the Clay County line at the Naval Air Station. Vessels are usually boarded at the docks, or in the stream by special arrangements through the ship's agents. The customshouse is in the Federal Building.

Immigration.—Jacksonville is an Immigration port of entry; the office is in the Federal Building. Vessels are usually boarded at the dock.

Harbor regulations.—The various terminals have regulations for their wharves and operations. No harbormaster has been appointed in recent years. The Board of Pilot Commissioners controls the appointment of bar and State pilots.

Wharves.—The facilities consist of an extensive system of wharves, both municipal and private, some of which are equipped with the most modern facilities for handling all kinds of cargo. Three piers are owned by the city and operated by the Municipal Docks and Terminals of the city of Jacksonville. The piers of the Commodore Point Terminal Company are the largest of the privately

owned piers, having a 3,000-foot berthing space at the marginal wharf parallel to the channel. The Municipal Docks and Terminals Railway, owned by the city, has direct connections with all trunk lines serving Jacksonville and handles freight to the docks.

The depth of water at the principal piers ranges from 25 to 34 feet. Good rail and highway connections are available along the entire waterfront with a system of freeways giving access to all of the terminals. The Municipal Terminal is equipped with mechanical freight handling equipment. A bulk storage plant has a grab-bucket conveyor for discharge of bulk cargoes from ships' holds into storage warehouses. There are a number of oil terminals, including the large naval fuel depot, with deep-water berths having depths of 31 to 34 feet alongside.

Supplies.—Supplies of all kinds in any quantity can be obtained. Ship chandlery and marine supplies are available. Good fresh water in unlimited quantities is available at the terminals or from barges in the stream. Bunker fuel and diesel fuel are available at the oil terminal wharves or from barges in the stream.

Repairs to all kinds of hulls and machinery can be made. Jacksonville is well-equipped to handle any type of ship from large oceangoing vessels to the smallest pleasure craft. The largest of the two large floating drydocks can handle vessels up to 695 feet in length and 18,000 tons displacement. Several boatyards in the area have marine railways or vertical lifts that can haul vessels up to 200 feet in length and 200 tons in weight. All types of shipyard equipment are available including a 30-ton floating crane and a 40-ton gantry crane at one of the shipyards.

Salvage and wrecking gear, including diving equipment, is available.

Small-craft facilities.—There are a number of boatyards and marinas in Jacksonville and vicinity. There is a yacht storage and repair yard on the west bank just above the Florida East Coast Railway bascule bridge that has three piers, two of which have covered berths for craft up to 100 feet in length. Dry storage is available for craft up to 60 feet in length. The main pier is 400 feet in length with 25 feet alongside. Vertical lifts at the yard can handle craft up to 110 feet in length and 150 tons in weight. Gasoline, diesel fuel, fresh water, electricity, telephone, restrooms, showers, and laundry facilities are available. Markets and restaurants are nearby.

Communications.—The port is reached by four railroad lines: Atlantic Coast Line Railroad, Seaboard Airline Railroad, Florida East Coast Railway, and Southern Railway. These railroads are connected by the Jacksonville Terminal Company Railway to the three general cargo terminals. There are a number of oil terminals, a barge terminal, and a container cargo and lift-on and lift-off van service. Numerous steamship lines connect with all the principal foreign ports. Jacksonville has barge traffic also with upriver points and along the Intracoastal Waterway. Bus and truck systems operate over the excellent highways and an extensive system of freeways which reach the city. The city has a Chamber of Commerce whose Traffic Bureau is actively concerned with the welfare and development of the port. Three airlines serve the port.

Chart 569.—Mayport Basin (Ribault Bay) is on the south side of the St. Johns River just inside the entrance jetties and westward of **St. Johns Point.** A deep channel leads along the inshore end of the south jetty to the basin. It is marked by a directional light, lights, and lighted and unlighted buoys. The waters of the turning basin are within a **prohibited area** of the U.S. Naval Station Reservation; commercial and pleasure vessels are prohibited from entering except in cases of extreme emergency; limits and regulations are given in **207.165,** Chapter 2.

Mayport is a town on the south bank of St. Johns River, 3 miles inside the entrance jetties. It has a ferry connection with the town of **Fort George Island** across the river. The wharves at Mayport are private and are used by fishing vessels. There is a marina and a yacht basin with depths of from 8 to 12 feet. Gasoline, diesel fuel, fresh water, ice, restrooms, charter boat hire, showers, electricity, and bottled gas are available. Shops and restaurants are nearby.

Chart 577.—The Intracoastal Waterway crosses the St. Johns River 5.3 miles from the entrance through Sisters Creek on the north and Pablo Creek on the south.

Broward River, on the north side and 13 miles from the entrance to St. Johns River, has depths of 1 to 3 feet to Cedar Heights. The Heckscher Drive (State Route 105) highway bridge at the mouth has a 40-foot bascule span with a clearance of 13 feet; see **203.245,** Chapter 2, for drawspan regulations. An overhead power cable at the bridge has a clearance of 40 feet. The Atlantic Coast Line Railroad bridge 0.4 mile upstream has a swing span with a channel width of 40 feet and a clearance of 8 feet.

Trout River, north of Jacksonville, has depths of 7 feet to the mouth of Ribault River and 3 feet to the highway bridge 4.5 miles above the mouth. The Atlantic Coast Line Railroad bridge, 0.5 mile above the entrance, has a swing span with a clearance of 1 foot. The span is normally kept open except for the passage of trains. On the east side at the south end of the bridge, there is a small boatyard with a marine railway that can haul vessels up to 100 feet in length or 75 tons. The yard also has an 8-ton vertical lift and can make hull and engine repairs. There is about 4 feet of water to the yard. The Main Street (U.S. Route 17) highway bridge 0.6 mile upstream has a fixed span with a clearance of 29 feet. The old highway bridge, adjacent to the westward, except for the channel span, remains as a fishing pier. The overhead power cable at the bridge has a clearance of 60 feet. The Seaboard Air Line Railroad bridge just upstream has a swing span with a channel width of 46 feet and a clearance of 2 feet; see **203.245,** Chapter 2, for drawspan regulations. The overhead power cable, 0.5 mile above the bridge, has a clearance of 45 feet. The U.S. Route 95 Expressway toll highway bridge, 2 miles above the mouth, has a fixed span with a clearance of 29 feet. A marina, where gasoline and outboard motor repairs can be obtained, is on the east side at the south end of the

bridge. State Route 115 highway bridge, 4.5 miles above the mouth, has a 40-foot fixed span with a clearance of 18 feet.

Groups of piles, sunken wrecks, and barges are near the shores of Trout River. There are numerous private piers and landings on the river. When outboard motorboat races are held in the river near the mouth of **Moncrief Creek,** several barrel buoys temporarily mark the course. In February 1963, Moncrief Creek was dry at low water almost to the mouth. An overhead power cable, 0.2 mile above the entrance, has a clearance of 55 feet.

Chart 685.—St. Johns River south of Jacksonville. The route from Jacksonville to Sanford, a distance of 123 miles, is well marked by lights and daybeacons, and is comparatively easy to navigate with the aid of the charts. However, if a local pilot is desired, fishermen from Jacksonville, Palatka, Welaka, or Sanford will serve. The river is partly obstructed by hyacinths at certain times of the year and floating snags are a continual menace to navigation. The snags and overhanging trees are periodically removed by the snag boats of the Corps of Engineers. The unimproved creeks tributary to the St. Johns River may be obstructed by logs and hyacinths.

Fish traps, pilings, and remains of old wharves are generally found close inshore or on the bars in midstream. Fish traps are usually constructed of small poles and are frequently destroyed and rebuilt. In some cases, they extend several feet above high water and can be avoided in daylight hours, but in some places they have been broken off below the water and are a serious menace to small boats. In some areas where the water is 2 feet or less, a fine stem grass grows nearly to the suface of the water. This grass fouls the propellers of small boats and makes navigation difficult.

Channels.—A Federal project provides for a channel 13 feet deep from Jacksonville to Palatka, a distance of 48 miles, thence 12 feet to Sanford, an additional 75 miles. In October 1963, the controlling depth was 12 feet from Jacksonville to **Federal Point,** thence 9 feet to Palatka, thence 10 feet to Welaka, thence 12 feet to Sanford.

A **measured nautical mile** on course **38°56′** is near the northwest shore of the St. Johns River between **Winter Point** and the Ortega River. The target at each end of the course has two pile structures 8 feet apart and perpendicular to the course with a steel rod at the top of each pile. The piles are connected by an observer's platform.

Ortega River is 3 miles south of Jacksonville on the west side of St. Johns River. In October 1963, the controlling depth was 6½ feet across the bar at the entrance, thence 8 feet to the railroad bridge, thence 5½ feet for a distance of 1.4 miles above the second highway bridge. The Grand Avenue (State Route 211) highway bridge, at the entrance to the river connecting **Ortega** and **St. Johns Park,** has a bascule span with a clearance of 9 feet. The Roosevelt Boulevard (U.S. Route 17) highway bridge, 0.7 mile upstream, has dual 40-foot bascule spans each with a clearance of 8 feet; see **203.431,** Chapter 2, for drawspan regulations. The overhead power cable at the bridge has a clearance of 65 feet. The Atlantic Coast Line Railroad bridge adjacent to this bridge has a 40-foot bascule span with a clearance of 2 feet.

The Timquana Road highway bridge crossing the river 1.9 miles above the railroad bridge has a 42-foot fixed span with a clearance of 18 feet.

There are three yacht basins on the north bank of the river near the mouth; one about 0.5 mile above the entrance; a second adjacent to the railroad bridge, and the third about 0.3 mile above the railroad bridge. The largest marine railway can haul out boats up to 65 feet in length. General hull, engine, and electronic repairs can be made. Gasoline, diesel fuel, water, ice, electricity, showers, restrooms, launching ramps, provisions, marine hardware, and other services are available.

Cedar River, a tributary of the Ortega, enters from the northward about 1.5 miles above the mouth. In October 1963, the controlling depth was 6 feet from the entrance to the highway bridge 1.4 miles above the entrance. The Blanding Boulevard highway bridge, 0.6 mile above the mouth, has a 31-foot fixed span with a clearance of 16 feet. The San Juan Avenue highway bridge, 1.4 miles above the mouth, has a 39-foot fixed span with a clearance of 11 feet. There are two small marinas on the east side of the river, the first one is just south of the Blanding Boulevard highway bridge and the other just south of the San Juan Avenue highway bridge. Gasoline, water, ice, electricity, and launching ramps are available at each. The first marina also has a 4-ton marine lift. There is limited berthage with depths of 4 to 5 feet alongside.

The St. Johns River from **Christopher Point,** 5 miles south of Jacksonville, to just below **Beauclerc Bluff,** is a **seaplane restricted area; see 207.165a,** Chapter 2, for limits and regulations.

On the west side of St. Johns River at the entrance of **Pirates Cove** is the Florida Yacht Club. There is berthage for 10 boats at the finger piers inside the bulkhead. In October 1963, a depth of 6 feet could be taken to the piers and there were depths of 5 to 8 feet alongside. Water and electricity are available on the piers.

A dredged channel leading to a large pier at **Piney Point** about 6 miles south of Jacksonville and on the west side of the river, in October 1963, had a controlling depth of 9 feet. A dredged channel on the west side of the river about 2.4 miles south of Piney Point, in October 1963, had a controlling depth of 11 feet.

Orange Park, 10 miles south of Jacksonville on the west bank of the St. Johns River, is a winter resort.

Doctors Lake, 11 miles south of Jacksonville, in October 1963, had a controlling depth of 12 feet in the entrance, thence general depths of 7 to 12 feet to the head of the lake. It is an excellent fishing ground for sportsmen and a haven for small boats in stormy weather. U.S. Route 17 highway bridge at the mouth has a swing span with a clearance of 10 feet. A sunken barge is 460 feet southward of the center pier of the bridge on the upstream side. Gasoline may be obtained at a small-boat basin on the south side of the entrance.

There is a marina on the south side of the lake entrance just west of the highway bridge. There is berthage for 21 boats up to 40 feet in length with depths of 4½ to 7 feet alongside. Gasoline, water, ice, electricity, restrooms, restaurant, limited marine hardware, covered wet and dry storage, and two surfaced launching ramps are available. There is a 10-ton portable lift that can lift boats up to 40 feet in length for general hull and engine repairs.

Julington Creek, 13 miles south of Jacksonville on the east bank, in October 1963, had a controlling depth of 5 feet to State Route 13 highway bridge about a mile inside the entrance, thence 4½ feet for another 1.3 miles. The highway bridge has a 44-foot fixed span with a clearance of 15 feet. An overhead power cable with a clearance of 40 feet crosses the creek at the bridge on the east side.

There is a marina on the north side of the creek just east of the highway bridge that has covered berthage for 36 boats up to 45 feet in length with depths of 5½ to 7 feet alongside. Gasoline, water, ice, electricity, restrooms, showers, restaurants, surfaced launching ramp, and limited hardware are available. There is also a 15-ton fixed marine lift that can lift boats up to 43 feet in length for general hull and engine repairs.

Black Creek, 18 miles south of Jacksonville, is navigable for vessels of 8-foot draft for about 15 miles to the town of **Middleburg.** In October 1963, there was a controlling depth of 8½ feet to U.S. Route 17 highway bridge, thence depths of 17 feet or more to the Atlantic Coast Line Railroad bridge. The creek is used by small boats as a refuge during hurricanes. The trees along the bank form an excellent windbreak. Just inside the entrance is U.S. Route 17 highway bridge with a swing span which has a clearance of 10 feet. About 2.2 miles above the highway bridge an overhead power cable has a clearance of 54 feet. The Atlantic Coast Line Railroad bridge, 5 miles above the mouth, has a 50-foot swing span with a clearance of 6 feet. An overhead power cable with a clearance of 49 feet crosses the creek just above State Route 218 highway bridge near Rideout, about 7.2 miles above the mouth. The bridge has a 40-foot fixed span with a clearance of 20 feet. State Route 218 highway bridge across the south fork at Middleburg has a 40-foot fixed span with a clearance of 14 feet. A highway bridge across the north fork at Middleburg has a 30-foot fixed span with a clearance of 16 feet. Gasoline may be obtained at a small-boat landing on the south side of the entrance to Black Creek where there is a launching ramp.

Green Cove Springs, a town on the west bank of St. Johns River 20 miles south of Jacksonville, is a winter resort. The municipal dock is in ruins. The waters in the vicinity of the piers at the inactive U.S. Naval station southeastward of Green Cove Springs are included in a **naval restricted area**; limits and regulations are given in **207.166,** Chapter 2. Sections of a bridge, 22 miles south of Jacksonville, which were removed, extend out into the river 333 yards from the south shore and 500 yards from the north shore. State Route 16 highway bridge 0.5 mile upstream, crossing the river from **Red Bay Point** to **Smith Point,** has a fixed channel span with a clearance of 45 feet. There are submerged obstructions in the river from **Magnolia Point,** 4 miles below the bridge, to Smith Point. The areas are outlined on the chart and should be avoided.

Trout Creek and **Sixmile Creek** have a common entrance 24 miles south of Jacksonville. These creeks are navigable for about 3 or 4 miles upstream. In October 1963, the controlling depth was 6½ feet. State Route 13 highway bridge, 0.5 mile above the entrance of Trout Creek, has a 40-foot fixed span with a clearance of 14 feet. Gasoline and a surfaced launching ramp are available at the fishing camp just above the bridge. State Route 13 highway bridge, 1 mile above the entrance to Sixmile Creek, has a 40-foot fixed span with a clearance of 11 feet.

Chart 686.—Rice Creek, 44 miles south of Jacksonville, has been dredged to a Federal project depth of 12 feet for about 2.9 miles above the mouth. In October 1963, the controlling depth was 12 feet in the dredged channel in Rice Creek and Little Rice Creek, thence 8 feet in the access channel to the paper plant. The channel is marked by a **273°30′** lighted range, lights, buoys, and daybeacons. The Atlantic Coast Line Railroad bridge, 0.6 mile above the mouth, has a swing span with channel width of 30 feet and a clearance of 3 feet. U.S. Route 17 highway bridge, 0.8 mile above the mouth, has a swing span with a channel width of 41 feet and a clearance of 9 feet. The overhead power cable at the bridge has a clearance of 60 feet. The creek is used by fuel barges going to the paper plant about 0.3 mile up **Little Rice Creek (South Fork).** All of the paper is shipped by rail.

Palatka is an important city and railroad center on the St. Johns River, 48 miles south of Jacksonville. There are several large sawmills here. A yacht storage house and basin, about 0.2 mile southwestward of the highway bridge, has a vertical-lift that can haul out boats up to 40 feet in length. A 400-foot wharf with depths of 6 to 8 feet alongside provides covered storage for boats up to 40 feet in length. A dry-storage loft with a ½-ton overhead crane can handle boats up to 20 feet in length. Fresh water, gasoline, and electricity are available.

U.S. Route 17 highway bridge across the St. Johns River at Palatka has a bascule span with a clearance of 21 feet. The city dock, just eastward of the yacht basin, in November 1963, had a depth of 11 feet on the end, 14 feet on the north side and 9 feet on the south side. Fresh water and electricity are available at the wharf, and hotels, restaurants, and provisions are available in the town.

Wilson Cove, 0.7 mile south of Palatka, is very shallow and fouled by hulks, piling, and concrete-ballast blocks.

An overhead power cable with a clearance of 159 feet crosses the St. Johns River 2.5 miles above the highway bridge.

Along the southern shore of the St. Johns River, about

4.5 miles above Palatka between **San Mateo** and **Edgewater,** submerged piling of old piers are a menace to inshore navigation. Keep at least 150 yards off this shore.

Dunns Creek, 6.5 miles above Palatka, is navigable for small fishing and pleasure boats. In October 1963, the controlling depth was 4 feet to Crescent Lake, a distance of 7.5 miles. Some of the bends in the creek are sharp. Northeast storms raise the height of water in the creek. U.S. Route 17 highway bridge crossing the creek, 0.8 mile above the mouth, has a swing span with a clearance of 11 feet. The span is hand operated and moves slowly. Pass through either opening; the southwest side has a deeper channel. An overhead cable at the bridge has a clearance of 70 feet. Boats may land on either bank at the bridge. An overhead telephone cable with a clearance of 55 feet crosses at **Monroe Landing,** 3.8 miles above the mouth. From St. Johns River the creek should be entered from a point northeast of its mouth, passing about 50 yards off the fish traps on the east side of the entrance. The eastern entrance of **Polly Creek** lies just to the west of the mouth of Dunns Creek and care should be taken not to confuse the two.

Cross Creek crosses Dunns Creek 0.5 mile inside the entrance. The easterly section of the creek is obstructed by a row of piling in Dunns Creek.

Crescent Lake is about 11 miles long and has a maximum width of about 2 miles. The general depth, in October 1963, was between 8 and 13 feet, gradually shoaling toward shore. There are no periodic tides in the lake, the range of tide in Dunns Creek becoming zero near its end. Sudden squalls in the lake cause a chop dangerous to small boats. In the center of the lake, the bottom is soft mud. Near the shore, the bottom changes to hard sand. Large patches of hyacinth drift about the lake with the changing wind. The lake appears to be free of sunken logs but when navigating near the shore a close watch should be maintained for broken-off piling and sunken logs. On the west side of the lake, between Dunns Creek and Crescent City, are several fishing camps where gasoline can be obtained.

Crescent City is on the west side of the lake about 6.5 miles from the north end. There is a small municipal pier, a fishhouse, and several private piers at the town; all except the municipal pier are in ruins. The municipal pier had a depth of 10 feet alongside in October 1963. The mole and small slip across the lake at **Shell Bluff Landing** are in ruins and not used.

In October 1963, a draft of 5 feet could be taken into and for a distance of 5 miles up **Haw Creek** at the head of Crescent Lake. Above this point navigation is obstructed by trees and logs. About 3 miles above the mouth is the hulk of a gunboat sunk during the Civil War.

Dead Lake is about 1 mile long and 0.5 mile wide at the head of Crescent Lake, and in October 1963, had a general depth of 8 feet in the center. A daybeacon marks the entrance to the lake. St. Johns Park and the ruins of a dock are on the northeast shore. Considerable hyacinths are found at times in the lake.

Chart 687.—At **Buffalo Bluff,** 9.8 miles above Palatka, the St. Johns River is crossed by the Atlantic Coast Line railroad bridge which has a bascule span with a clearance of 7 feet.

At the settlement of **Saratoga,** 3.5 miles north of Welaka, is a small wharf with clock faces on the cupola of the shelter roof. There is a depth of 12 feet at the end of the wharf.

Welaka is a town on the east side of the St. Johns River, 18 miles above Palatka and 66 miles south of Jacksonville. There are several landings where gasoline, water, ice, and some marine supplies can be obtained with depths of 12 to 17 feet alongside the piers. A marine railway can haul out boats up to 35 feet in length for general repairs. A pilot for Silver Springs and Lake Harney is here. The town has good highway connections, and a hotel. Provisions are available.

Oklawaha River has its source in the system of large lakes in the central part of the peninsula of Florida and flows in a general northerly direction, then eastward, emptying into the St. Johns River 19 miles south of Palatka. Do not confuse the entrance of **Bear Creek** to the southward with the mouth of the river. The river is extremely tortuous and obstructed by shoals; snags are liable to be encountered by boats. The downstream current is about 1 knot.

The controlling depth in Oklawaha River, in October 1963, was 8 feet for a distance of 2 miles, thence in June 1962, 4½ feet to **Silver Springs Run,** 46 miles above the mouth, thence 3½ feet in the canal to **Moss Bluff Lock,** 57 miles above the mouth, and thence 5½ feet to **Leesburg,** 75 miles above the mouth. The lock at Moss Bluff has a width of 30 feet, length of 125 feet, and depth of 7 feet over the sill. Information about the pool level of the dam is given in **207.170,** Chapter 2. State Route 19 highway bridge crossing the river about 2.5 miles above the mouth has a fixed span with a clearance of 34 feet at low water stage. The minimum clearances for the bridges with swing spans that cross the river are: channel width 34 feet; clearance 1 foot at high water and 4 feet at low water stage. See **203.434,** Chapter 2, for drawspan regulations. Pilots for the river can be obtained at Palatka and Welaka. An overhead power cable at **Orange Springs Ferry,** crossing about 2 miles east of **Orange Springs,** about 20 miles above the mouth, has a clearance of 59 feet.

A ferry consisting of a tug and barge crosses St. Johns River 4.2 miles south of Welaka just below Mt. Royal. A hotel and a good wharf are at **Fort Gates,** 5.3 miles south of Welaka. There is a depth of 10 feet alongside. Gasoline can be obtained at several fishing camps along the river.

Georgetown is a small town on the east bank of St. Johns River at the north end of Lake George, 8 miles south of Welaka. A ferry consisting of a tug and barge crosses the river between the town and **Drayton Island.**

Lake George, the first of the larger lakes on St. Johns

River 75 miles south of Jacksonville, is about 10 miles long and 5.5 miles wide. The bottom is fairly uniform with depths of 8 to 12 feet in the center, shoaling rather abruptly near the shores. The improved channel marked by a 347° lighted range at the north end and a 167° lighted range at the south end, lights, and daybeacons cuts through the middle of the lake. In strong northerly and southerly winds the water becomes very rough. Small patches of hyacinth drift about the lake with the changing winds. Numerous old piling are found near the lake shore in 2 to 8 feet of water. The creeks emptying into the lake are shoal. A **naval bombing area** is in the eastern part of the lake; limits and regulations are given in **204.82**, Chapter 2.

Astor is a small village 4.5 miles south of **Zinder Point** at the south end of Lake George. State Route 40 highway bridge, across the St. Johns River here, has a swing span with a clearance of 4 feet. The nearby overhead power cable has a clearance of 50 feet. Gasoline can be obtained at the piers just below the bridge. There are depths of 7 to 13 feet at the piers. A launching ramp is also available.

Chart 688.—The main channel of St. Johns River flows through the northwest portion of **Lake Dexter,** 92 miles south of Jacksonville. This very shallow lake is 3.7 miles long and about 0.9 mile in its widest part. In November 1963, a draft of 4 feet could be carried eastward through Lake Dexter, **Tick Island Creek, Lake Woodruff, Spring Garden Creek,** and the northern portion of **Spring Garden Lake** to De Leon Springs. The channel and aids to navigation are privately maintained. **De Leon Springs** is privately owned, and is one of the larger fresh-water springs in Florida. At the end of the channel are docking facilities, a hotel, two dining areas, complete skin and scuba diving facilities, a grist mill and bakery, camping sites, and complete swimming facilities. There are several separate picnic areas, a large picnic pavilion, and 54 acres of informal gardens. Gasoline and water can be obtained at a boathouse at the park which has 8 feet of water alongside.

On the St. Johns River 14.6 miles south of **Dexter Point,** at **Crows Bluff,** the river is crossed by State Route 44 highway bridge which has a bascule span with a clearance of 10 feet at the center. An overhead power cable with a clearance of 83 feet crosses the river 0.3 mile north of the bridge. Just north of the bridge is a small park with a boat basin, small piers, and a launching ramp. In November 1963, there was a general depth of 7 feet in the basin. Water can be obtained at the park. Gasoline may be obtained at a landing just south of the bridge, which had a depth of 10 feet alongside in November 1963.

A marina, 1.4 miles south of Crows Bluff, has gasoline, water, ice, electricity, restrooms, showers, a motel, limited marine hardware, provisions, and a launching ramp available. There is a 1-ton lift; hull and engine repairs can be made. There are depths of 6 to 12 feet alongside the bulkhead.

Lake Beresford is a small lake, 2.2 miles long north and south and 0.5 mile wide, on the east side of the St. Johns River, 107 miles south of Jacksonville. On the west side of the lake is a yacht club and several boat landings. Gasoline is available at these landings. There is a boat works where a marine railway can haul out boats up to 35 feet in length for hull and engine repairs. Marine supplies are available at the boat works which has a 4-ton marine lift. There is berthage for 32 boats with depths of 5 to 7 feet alongside; wet and covered storage, electricity, and water are available. **Beresford** is a small town and landing near the north end of the lake. In November 1963, the controlling depth was 6 feet from the lake entrance to the dock which had 4 to 6 feet alongside.

Wekiva River, 115 miles south of Jacksonville, in November 1963, had a controlling depth of 5 feet for a distance of about 3 miles above its mouth; above this point the river is little used and is obstructed by trees, logs, and hyacinth. The entrance is difficult to distinguish.

The improved channel of St. Johns River enters **Lake Monroe** 120 miles south of Jacksonville. Near the west end of the lake the river is crossed by three bridges. The Atlantic Coast Line Railroad bascule span and the U.S. Route 17 highway swing span have a minimum clearance of 8 feet. The overhead power cables below and above these bridges have a minimum clearance of 49 feet. On the north side of the river just east of the highway bridge is a dredged slip with a depth of 11 feet and a boat landing where gasoline can be obtained; there are two launching ramps. The new U.S. Route 4 fixed highway bridge nearest the lake has a clearance of 45 feet.

Enterprise is a town on the north shore of Lake Monroe. A channel with a controlling depth of 12 feet, in November 1963, and marked by lights and daybeacons, leads to the wharf of the powerplant west of the town.

Sanford, 123 miles south of Jacksonville, is an important city and railroad center on the south side of Lake Monroe in the heart of the celery district. Inbound water traffic consists of petroleum products. The municipal yacht pier and basin, conspicuous by the remaining cement foundation of a former bandstand, in November 1963, had a depth of 12 feet at the outer end, and in the basin there were depths of from 17 to 6 feet. There are three fuel receiving piers along the waterfront. Provisions, electricity, ice, and a launching ramp are available. Fresh water is piped to the municipal wharves.

Yachts intending to remain any length of time at Sanford usually go to the boat works on the south bank of St. Johns River about 3 miles east of the city. Fresh water, gasoline, diesel fuel, ice, and electricity are available here. Boats 75 feet in length can use the docks and moorings. The marine railway is capable of hauling out boats 55 feet in length. Hull and engine repairs can be made. A wharf 200 feet long provides covered storage for over 50 boats up to 60 feet in length. A depth of 8 feet can be taken to the railway.

St. Johns River above Sanford.—The route from Lake Monroe to Lake Harney, a distance of 15 miles, is marked

by numerous markers. Navigation is not difficult except during periods of high water when the banks are flooded, at which time a local pilot should be taken. A Federal project provides for a channel 5 feet deep between the two lakes. In November 1963, the controlling depth was 5 feet.

State Route 415 highway bridge crossing the St. Johns River, 3 miles east of Sanford, has a hand-operated swing span with a clearance of 4 feet; see **203.430a**, Chapter 2, for drawspan regulations.

At the entrance to **Lake Jessup**, 6 miles east of Sanford, State Route 46 highway bridge crosses the channel entering the lake. It has a 47-foot fixed span with a clearance of 14 feet. A section of the old bridge just downstream extends 45 feet from the west shore and is used as a fishing pier. Lake Jessup is about 8.5 miles long with a greatest width of 2.2 miles. It is very shallow at the entrance and is little used. General depths in the lake are 6 to 8 feet.

St. Johns River flows from **Lake Harney**, 140 miles south of Jacksonville. The lake is about 3.6 miles long with a greatest width of 2.2 miles. It is uniformly 6 to 7 feet deep except along the shores where it shoals. Boats do not generally go above the lake.

Above Lake Harney the St. Johns River continues generally southward through Lake Poinsett, Winder, Washington, Sawgrass, and Hellen Blazes, then into St. Johns Marshes.

10. ST. JOHNS RIVER TO MIAMI

Chart 1111.—The coast from St. Johns River to Cape Kennedy trends south-southeastward for 125 miles. Three inlets, St. Augustine, Matanzas, and Ponce de Leon indent the coast. From St. Johns River to Ponce de Leon Inlet the coast is bold in appearance, with an almost continuous range of sand dunes backed by woods. The section southward of Ponce de Leon Inlet for 25 miles is formed by a very narrow strip of lowland lying between the sea, and Indian River North, and Mosquito Lagoon. From seaward this coast shows a lowline of sand dunes partially covered by grass and scrub trees with distant woods showing over them. The only natural object distinctive in appearance is Turtle Mound, a green hillock about 10 miles south of Ponce de Leon Inlet. When seen from northward and eastward, it is quite conspicuous but is less marked when viewed from other directions. The woods in the vicinity of Cape Kennedy are farther back from the beach and are less distinct when seen from seaward. Many landmarks are available along this stretch of the coast that may be used by southbound vessels proceeding close inshore to avoid the Gulf Stream.

The depths from St. Johns River to Cape Kennedy are irregular. Depths of 5 to 7 fathoms are 1 mile offshore while a depth of 3 fathoms is within 0.4 mile of the shore except off the entrances to St. Johns River, St. Augustine Inlet, Ponce de Leon Inlet, and from about 7 miles north of False Cape to Cape Kennedy.

A **danger area,** 3 miles in radius, about 15 miles southward of St. Johns River entrance is reported to contain unexploded ordnance.

Shoal spots with depths of 33 to 38 feet over them are from 4 to 6 miles offshore and from 12 to 16 miles north-northeastward of St. Augustine Light. These shoals are about 8 miles long in a southeasterly direction and about 2.5 miles wide. A swash channel with depths of 40 to 50 feet is inside these shoals and about 2 miles from the beach.

Off Ponce de Leon Inlet 10 fathoms will be found within 2 miles of the beach. Two shoal spots, with depths of 37 to 39 feet are about 7 miles north-northeast of Ponce de Leon Inlet and about 5.5 miles off the beach. Going southward the 10-fathom curve gradually works offshore to a distance of 10 miles off False Cape. From about 7 miles north of False Cape to Cape Kennedy there are dangerous off-lying shoals.

Chart 1112.—From Cape Kennedy to Fort Pierce Inlet the coast trends generally south-southeastward for 62 miles and is broken only by Sebastian Inlet. The inlet is a narrow dredged channel, not distinguishable from any distance offshore except by the sand spoil bank on the north side which is bare and a little higher than other sand dunes in the vicinity. This section of the coast is formed almost entirely by a low, narrow strip of sand, covered with vegetation, which lies at a distance of 1 to 2 miles from the mainland, from which it is separated by the shallow waters of Banana and Indian Rivers, a part of the Intracoastal Waterway. From seaward the coast shows a line of sand dunes partly covered with grass and scrub palmetto. At several places buildings show prominently from seaward. In the background the heavy woods on the mainland may be seen. Shoals extend 10 miles offshore with a least depth of 29 feet at Bethel Shoal, 28.5 miles southward of Cape Kennedy Light.

From Fort Pierce Inlet to Lake Worth Inlet, the coast trends generally south-southeastward for 43 miles and is broken by St. Lucie and Jupiter Inlets. This section of the coast is formed by a low, narrow strip of sand, covered with vegetation, and separated from the mainland by the shallow waters of Indian River and by the Intracoastal Waterway connection between the Indian River and Lake Worth. From seaward the coast shows a line of sand dunes partly covered with grass and scrub palmetto. In the background the heavy woods on the mainland may be seen. Buildings show prominently from seaward.

From Lake Worth Inlet the general trend of the coast is south for 60 miles to the Miami Harbor entrance. The coastline is broken by Port Everglades, several unimportant inlets, Bakers Haulover Inlet, and the entrance to Miami Harbor. It is formed almost entirely by a low sand beach covered with grass and scrub palmetto, back of which it is wooded. Conspicuous from seaward are the buildings and piers at Palm Beach, Hillsboro Inlet Light, and the large buildings and tanks along the beach from Palm Beach southward, especially at Fort Lauderdale, Hollywood, Miami Beach, and Miami.

This section of the coast is also fairly bold, and the 20-fathom curve runs parallel to the beach at a distance of about 2 miles until in the vicinity of the Miami Harbor entrance where the curve of the shore becomes south-southwestward and the 20-fathom curve is about 4 miles offshore. Between Port Everglades and the Miami Harbor entrance shoaling is rapid, depths of 6 to 8 fathoms being found in places 1.5 miles from the beach.

Chart 1243.—The coast between St. Johns River and St. Augustine Inlet is straight with the 5-fathom curve about 0.5 mile offshore except at the entrances. Offshore shoals along this route have been described previously.

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The first 9 miles south of St. Johns River are marked by the water tanks of **Atlantic, Neptune, Jacksonville,** and **Ponte Vedra Beaches.** Buildings and an amusement park at Jacksonville Beach, about 6 miles south of the river entrance, are very prominent. Otherwise the coast is unmarked except for St. Johns Light and St. Augustine Light.

Charts 1243, 843–SC.—St. Augustine Inlet is 30 miles south of the St. Johns River entrance. **St. Augustine,** the oldest city in the United States and a popular winter resort with several fine hotels, is located 2 miles inside the entrance.

Prominent features.—St. Augustine Light (29°53.1′ N., 81°17.3′ W.), 161 feet above the water, is shown from a conical tower with a black and white spirally banded shaft on the north end of **Anastasia Island,** 1.5 miles south of the entrance to St. Augustine Inlet.

Other prominent features are an elevated water tank about 250 yards southeast of the light, a cupola on the south end of a large building, a church dome, a stack, several tanks and a standpipe in the city, and a radio tower in the northern part of the city. **Castillo de San Marcos** may be seen after entering the inlet.

Channels.—In November 1963, the controlling centerline depth from the sea buoy over the bar and through the marked entrance channel was 13 feet, thence 12 feet deep along the Intracoastal Waterway in the Matanzas River to San Sebastian River entrance, 1.4 miles south of St. Augustine. A lighted whistle buoy marks the approach and buoys mark the channel. The entrance channel is subject to frequent change in depth and direction due to current and storm action. Dangerous and shifting shoals extend 1.5 miles seaward. The entrance buoys are moved with changing conditions.

Anchorages.—There is good anchorage in the Matanzas River at St. Augustine both below and above the bridge. This anchorage, however, is not used as a harbor refuge because during strong northeasterly and northwesterly winds the sea makes the bar impassable even for small vessels.

Routes.—The shore should be given a berth of at least 2 miles when approaching St. Augustine Inlet in order to stay outside of the outer sea buoy. No strangers should attempt to enter without a pilot as the channel shifts frequently.

Tides.—The mean range of tide is 4.5 feet, and high water occurs about 20 minutes later than at Mayport.

Pilots.—All vessels including yachts not having local knowledge of the channel are advised to take a local pilot both entering and leaving the inlet. Pilots are available at St. Augustine. The usual procedure to obtain a pilot is to notify the harbormaster in advance the expected time of arrival so that one may be available outside the bar.

Harbor regulations.—The office of the harbormaster is at the city pier just south of Route A1A highway bascule bridge on the west side of the Matanzas River. The dockmaster is at the city pier.

Customs.—St. Augustine is a customs port of entry; marine documents are not issued.

Wharves.—A number of small private landings are on the east side of the city, north and south of the bridge. The city pier is about 100 yards south of Route A1A highway bascule bridge which crosses the Matanzas River opposite the center of the city. It affords good berths for yachts. Depths of 6 to 18 feet are in the various slips, and from 13 to 20 feet at the face of the pier.

Supplies.—Gasoline, diesel fuel, electricity, and water are obtainable at the city pier. Provisions are available at the many stores in the city.

Repairs.—The repair yards are on San Sebastian River.

The Intracoastal Waterway enters the St. Augustine Inlet from the north through Tolomato River and continues southward through Matanzas River. Clearance of the Bridge of Lions (Route A1A) crossing the Matanzas River at St. Augustine is given in Chapter 12.

San Sebastian River flows past the west side of the city of St. Augustine and empties into the Matanzas River 1.4 miles south of the Route A1A highway bridge. A Federal project provides for a channel 10 feet deep from the entrance to Kings Street Bridge, 2.3 miles above the mouth. In October 1963, the centerline controlling depth was 9½ feet. The channel is marked by daybeacons to the wharves. In stormy southeasterly weather small boats may find a good haven in the river. The overhead power cable crossing the river about 300 yards south of the Kings Street Bridge has a clearance of 76 feet.

An extensive shrimp industry is conducted along the wharves in the upper part of the river, being supplied by seagoing shrimp boats during the shrimp season. Several small shipyards and shrimp boatbuilding yards are located along the river. Shrimp boats up to 60 feet in length can be hauled out for general repairs. Supplies and fuel may be obtained at the wharves.

Chart 1244.—From St. Augustine Inlet to Ponce de Leon Inlet the coast continues straight, broken only by Matanzas Inlet. The 5-fathom curve is within 0.5 mile of the shore except off St. Augustine Inlet and Matanzas Inlet.

An **oceanic spring** is 8.2 miles southeastward of St. Augustine Light and 2.4 miles east of **Crescent Beach.** The location of the spring can be easily detected by the appearance of the water; noticeable swirls, similar to those in a swiftly running stream, can be seen at a distance of about a mile. At times, especially in rough weather, there is a marked disturbance of the water and a yellowish color trails off to the northeastward. In choppy weather, a slick is the most noticeable feature. In fact, it has all the appearances of a shoal or reef.

A closer view shows a slick swirl with a slight overfall, the center of the swirl moving about 100 feet, first to the eastward and then to the westward, and a noticeable streak of current to the northeastward. The swirls and overfalls vary rapidly in intensity, as though large bubbles or intermittent volumes of water were being emitted. A boat will be thrown out of the swirl so that it is difficult to hold it in position.

A strong odor, quite similar to the smell of water from the various sulphur springs of Florida, is noticeable, and

under favorable circumstances can easily be detected 2 miles away.

Matanzas Inlet is 11 miles southward of St. Augustine Light. It affords an outlet for Matanzas River, which extends northward to St. Augustine and southward, following the coast for a distance of 8 or 10 miles to **Graham Swamp.** The inlet is obstructed by a shifting bar and is no longer used by boats of any type. In 1963, breakers extended all the way across the entrance. A water tank is prominent on the south side of the entrance at **Summer Haven.** The Intracoastal Waterway passes through a land cut of the Matanzas River just inside the entrance.

State Route A1A highway bridge across the inlet has a 41-foot fixed span with a clearance of 10 feet. An overhead power cable crossing on the west side of the bridge has a clearance of 39 feet. **Fort Matanzas National Monument** is about a mile northwestward of the inlet.

At **Marineland,** 13.6 miles southward of St. Augustine Light, is a conspicuous building housing an oceanarium.

Flagler Beach is 26.5 miles southward of St. Augustine Light. The hotel and ocean pier are good landmarks. The T-shaped pier extending offshore is 650 feet long and 20 feet wide.

Daytona Beach is a popular winter resort about 42 miles southward of St. Augustine Light. The buildings, water tanks, and radio towers are visible from seaward. The large recreation pier on the oceanfront is a prominent landmark for passing vessels. Facilities are described with the Intracoastal Waterway in Chapter 12.

Chart 1245.—From Ponce de Leon Inlet to False Cape the coast is straight. The 5-fathom curve is about 0.5 mile offshore for a distance of 24 miles. Beyond this distance dangerous shoals will be found up to 15 miles offshore.

Ponce de Leon Inlet is 53 miles southward of St. Augustine Light and 41 miles northwestward of Cape Kennedy Light. It is used by fishing parties, and shrimp and commercial fishermen bound for New Smyrna Beach or Daytona Beach, and an occasional stranger entering for an anchorage.

Ponce de Leon Inlet Light (29°04.8′ N., 80°55.7′ W.), 159 feet above the water, is shown from a red brick conical tower just north of the entrance to the inlet.

The entrance to the inlet is obstructed by shifting shoals which form a bar extending about 0.7 mile seaward. In October 1963, the depth in the entrance channel was 2 feet. With a continued west wind there is sometimes very little water anywhere on the bar and breakers extend all the way across. Local knowledge is necessary for entering and a stranger should attempt it only in an emergency or when the sea is smooth. The entrance channel moves with the season; it leads north in the winter and south in the summer. The current is very strong. The mean range of tide is 2.3 feet; high water occurs about the same time as at Mayport. The entrance channel is marked by buoys which are frequently shifted in position with changing conditions.

A Coast Guard station is on the south side of the entrance to Ponce de Leon Inlet. In October 1963, the controlling depth in the channel from the Intracoastal Waterway to the station was 9½ feet; see Appendix for **storm warning display.** Supply and repair facilities inside the inlet are described in Chapter 12.

The Intracoastal Waterway is just inside the entrance to Ponce de Leon Inlet, passing through Halifax River from the north and Indian River North from the south.

About 10 miles southward of Ponce de Leon Inlet is **Turtle Mound,** a prominent hill 50 feet high. It is under the protection of the Florida State Historical Society. The original Indian name was **Mount of Surruque.** It was charted on Florida maps in 1564. Spanish galleons stopped here for repairs, wood, and water.

Eldora is a fishing camp 11.5 miles southward of Ponce de Leon Inlet.

False Cape is the name given to a small part of the coast which it resembles when seen from seaward, about 7.5 miles northward of Cape Kennedy Light.

The towers and buildings at the missile center in the vicinity of Cape Kennedy are conspicuous from all directions.

Cape Kennedy (Cape Canaveral), where the coast makes a sharp bend westward, is low and sandy. The shore in the vicinity of the cape is constantly moving eastward. **Cape Kennedy Light (28°27.6′ N., 80°32.6′ W.),** 137 feet above the water, is shown from a white and black horizontally banded conical tower 1 mile inshore from the cape. A radiobeacon is at the light.

Broken ground and shoals extend 13 miles north and northeastward from Cape Kennedy. The outer shoals consisting of **Hetzel Shoal, Ohio Shoal,** and **The Bull** have a least depth of 11 feet. The inner shoals consisting of **Chester Shoal** and **Southeast Shoal** have depths of 2 to 18 feet. A lighted whistle buoy is 2.5 miles northeastward of Hetzel Shoal and lighted whistle and bell buoys are off the southern end of Southeast Shoal. In a heavy sea the shoals are marked by breakers, but with a smooth sea there is nothing to indicate them except their relative positions to Cape Kennedy Light and the lighted buoys. Only small light-draft vessels should pass inside the outer shoals.

Several wrecks are eastward of Cape Kennedy within 13 miles of the shore. They have been cleared by a wire drag to a least depth of 43 feet.

The effect of the Gulf Stream may be expected well in on the shoals, and this should be kept in mind in approaching the cape from southward, as a vessel will generally overrun her log. In approaching the cape stay in at least 15 fathoms from southward and at least 13 fathoms from northward, to avoid the shoals. Vessels are advised to use great care when navigating in the vicinity of the shoals off Cape Kennedy.

A **danger zone** for a missile testing area extends 3 miles offshore from False Cape to the entrance of Canaveral Harbor southwestward of Cape Kennedy; limits and regulations are given in **204.85,** Chapter 2. **Canaveral Bight,** on the south side of the cape, is in the danger zone.

Chart 456.—Canaveral Harbor is 4 miles southwest of Cape Kennedy Light and 150 miles south of the entrance to the St. Johns River. The town of **Cape Canaveral** is on the south side of the channel 1 mile inside the entrance. The principal receipts into the harbor are petroleum products, cement, and building materials. The shrimp and fishing fleet operates in and out of the harbor in season.

Channels.—A Federal project provides for an entrance channel 37 feet deep and an inner channel leading to the turning basin 35 feet deep. The channel is maintained at or near project depths. The entrance to the harbor is protected by jetties. The approach channel is marked by a **310°** lighted range and lighted buoys; the entrance channel between the jetties is marked by a **270°** lighted range and lighted and unlighted buoys.

Dangers.—A spoil area, marked by a lighted buoy, is southward of the approach channel. A **restricted area** has been designated around the Navy pier; limits and regulations are given in **207.171,** Chapter 2.

Pilotage is compulsory for all foreign vessels and for United States vessels under register in the foreign trade. Pilotage is optional for United States coastwise vessels who have on board a pilot licensed by the Federal Government. The pilot will board about 3 miles southeast of the jetties. If possible, advance notice of at least 24 hours should be given.

Quarantine.—A quarantine officer will board vessels at the Canaveral Harbor wharf. The harbor is a customs port of entry; marine documents can be issued at West Palm Beach.

Wharves.—A 400-foot marginal wharf and two dolphin-type facilities for ships to lay against for unloading general and bulk cargo are on the south side of the turning basin in the harbor. The wharves and piers on the north side of the harbor are the property of the Federal Government and are not used by private vessels.

Supplies.—Gasoline, diesel fuel, bunker C, water, and ice are available.

Communications.—Good highways connect with the town of Cocoa and the mainland.

Chart 1246.—From southward of the shoals at Cape Kennedy to Bethel Shoal, a distance of about 43 miles, the shore is straight. The 5-fathom curve is from 0.3 to 1 mile offshore along this section of the coast.

Two large water tanks are prominent about 4.5 miles southward of **Cocoa Beach,** and 13 miles southward of Cape Kennedy Light. **Eau Gallie Beach** is marked by a water tank and a casino with a small fishing pier. **Indialantic** is marked by a prominent white casino and a large water tank.

Sebastian Inlet is 36.5 miles southward of Cape Kennedy Light. In October 1963, there was a controlling depth of 5 feet from the Intracoastal Waterway through the dredged channel of the inside bar, thence 8 feet to the eastern entrance. It was reported by local fishermen that 12 feet could be taken across the bar in smooth seas. The western entrance is marked by private aids. The entrance is protected by a north jetty extending 600 feet from shore and a south jetty extending 500 feet from shore. A steel bulkhead leads in a west-northwest direction for about 1,500 yards from the south side of the inlet into Indian River. A strong current runs through the inlet. The inlet is used by local fishermen and party boats, but should not be attempted by others without local knowledge. In October 1963, a fixed highway bridge with a design clearance of 37 feet was under construction across the inlet.

Thomas Shoal, with a least depth of 26 feet over it, is 7 miles eastward of Sebastian Inlet. **Bethel Shoal,** with depths of 29 to 30 feet over it, is 17 miles southeastward of the inlet and 11 miles offshore. A lighted whistle buoy is northeast of the shoal area.

Chart 1247.—From Bethel Shoal to Jupiter Inlet, a distance of about 50 miles, shoal areas and wrecks are over 10 miles offshore.

The elevated water tank at **Riomar,** 11.5 miles northward of Fort Pierce Inlet, is prominent.

Indian River Shoal, with depths of 10 to 30 feet over it, is about 8 miles northward of Fort Pierce Inlet and extends for about 3 miles offshore.

Chart 582.—Fort Pierce Inlet is 62 miles southward of Cape Kennedy Light and 33 miles northward of Jupiter Inlet Light. Care must be exercised in entering due to the strong currents. In southeasterly weather with an ebb tidal current the entrance is rough.

Fort Pierce, on the west shore of the Indian River inside Fort Pierce Inlet, is the St. Lucie County Seat. Chartered deep-draft vessels use the terminal facilities here during the citrus shipping season. Oil barges dock at the municipal pier. The principal receipts into the harbor are petroleum products and limestone, while the shipments consist of citrus fruits and vegetables. Several fishing vessels operate in and out of the harbor. It is the distributing point for supplies to the surrounding country. The Intracoastal Waterway passes through the Indian River east of the city.

Prominent features.—The lights on the radio tower and water tank south of Fort Pierce turning basin are visible well to seaward in clear weather; another water tank north of the city is prominent. A large white house is on the beach near the inner end of the south jetty; adjoining it is the lookout tower of the Coast Guard station. A tank near the beach, 1 mile south of the entrance, is very prominent. See Appendix for **storm warning display.**

Channels.—A Federal project provides for an entrance channel 27 feet deep, and an inner channel and turning basin 25 feet deep. The channel is usually maintained at or near project depths. **Note.**—In September 1963, C&GS ship SCOTT found shoaling to 22 feet in the centerline of the entrance channel and 19 feet in the harbor channel. Two rubblestone jetties with revetment extensions protect the entrance. The channel is marked with lighted ranges, and lighted and unlighted buoys.

Dangers.—There are a number of shoals and wrecks in

the approaches to the harbor; most of them are marked. A fish haven, about 1.7 miles long and from 0.8 mile to 1.2 miles offshore, is several miles northward of the entrance.

Tides.—The mean range of tide is 2.6 feet at the jetties, and 0.7 foot at the city dock.

Currents.—The tidal currents in the inlet have a velocity of about 3 knots. For predictions see the Tidal Current Tables. It has been reported that a strong current, about 5 knots, runs through the cut parallel with the channel, but at the turn in the channel, extreme caution should be used as the current sets across the channel, flood to the south and ebb to the north. Across Indian River the currents run parallel with the channel, which parallels the causeway fill. At the western end of this fill, cross currents are sometimes encountered, especially where the channel crosses the Intracoastal Waterway. Currents in this section are influenced by the winds.

Pilotage is compulsory for all foreign vessels and for United States vessels under register in the foreign trade. Pilotage is optional for United States coastwise vessels which have on board a pilot licensed by the Federal Government. The pilot will meet vessels off the bar on advance notice.

Quarantine.—Vessels subject to inspection will be boarded upon arrival at the dock by a quarantine officer from West Palm Beach.

Customs.—Fort Pierce is not a port of entry; marine documents are issued by the customs officer at West Palm Beach.

Harbor regulations.—The pilot is the harbormaster at Fort Pierce. Due to tricky currents in the turning basin, running of lines is compulsory for all vessels. The pilot boat will render this service. All vessels moving from one wharf to another shall have the harbormaster aboard. The pilot boat will assist in this movement.

Wharves.—The terminal facilities consist of a turning basin and slips which provide berthing space of about 1,500 feet. Depths of 24 feet are in the slip on the north side of the pier of the Indian River Refrigeration Company. The two piers are 330 feet and 425 feet in length. The southern, or municipal pier, is in poor condition but is used by fishermen. The northern pier is open on both the north and south sides. Vessels also dock across the end of this pier, which is 178 feet in width. No vessel of greater length, however, may lie there. In 1963, the deep-water harbor and berthing facilities were being expanded to the northward.

Supplies of all kinds can be obtained at Fort Pierce.

Repairs.—There is a marine railway 1 mile northward of the terminals at the entrance of **Taylor Creek** that can haul out vessels up to 75 feet in length for hull and engine repairs. Local knowledge is required to carry the best water to the marine railway. A dredged channel marked by daybeacons leads from the Intracoastal Waterway to the entrance of Taylor Creek. The controlling depth, in October 1963, was 14 feet to the railroad bridge, and 12 feet from the channel to the railway and 7 feet at the end of the railway.

Communications.—Fort Pierce is served by the Florida East Coast Railway. Good highways connect with the other towns in the area, and an airport is 3 miles northwest of the town.

Small-craft facilities.—A yacht basin is 1 mile inside the entrance to Fort Pierce Inlet on the south side of the channel at **Faber Point.** It has seven wharves, the largest of which is t-shaped with a depth of 6 feet alongside. The controlling depth was 6½ feet, in October 1963, from the inlet channel to the marina. Open wet storage is available. Gasoline, diesel fuel, and fresh water are piped to two of the wharves. Electricity is available on all the wharves and there is a surfaced launching ramp. West of the marina on the opposite side of the cove is a Coast Guard buoy depot. The controlling depth to the station was 9 feet with 8 feet alongside.

A yacht storage and repair yard on the northwestern end of **Causeway Island** had a wharf 75 feet long with a depth of 8 feet alongside, in October 1963. A marine railway can haul out boats up to 65 feet in length for general repairs on hulls and engines. There is also a 10-ton fixed lift and boats are built at the yard. Fresh water, electricity, marine supplies, and dry storage are available.

The clearances for the bridges crossing the Intracoastal Waterway north and south of the entrance channel are given in Chapter 12.

The city yacht basin is just south of **Moore Creek,** with an approach channel from the Intracoastal Waterway. The entrance channel to the yacht basin is immediately south of the bridge and parallel to it, thence along the waterfront to the basin. Extreme caution should be taken as strong cross currents exist. The overhead cable has a clearance of only about 40 feet where it crosses the entrance channel to the yacht basin. In October 1963, the controlling depth was 6 feet in the channel and turning basin. The wharf is 150 feet in length with approximately 700 feet of transient dockage. An elevator capable of hauling out boats up to 50 feet in length is available. General hull and engine repairs can be made. Fresh water, gasoline, diesel fuel, ice, electricity, restrooms, showers, restaurant, hotel, and marine hardware are available.

A marina on the Fort Pierce side, just south of the Causeway Island highway bridge, has berthage for 20 boats, dry covered and uncovered storage, and a 2½-ton fixed lift that can handle boats up to 22 feet in length for hull and engine repairs. Gasoline, diesel fuel, water, ice, electricity, restrooms, showers, restaurant, and some marine hardware are available. In October 1963, the controlling depth to the marina from the Intracoastal Waterway was 6 feet.

Chart 1247.—For a distance of 13 miles southward of Fort Pierce Inlet, broken ground with 18 to 28 feet over it extends from 2.5 to 6 miles offshore.

Capron Shoal has a depth of 18 feet over it about 3.6 miles southeastward of Fort Pierce Inlet. A buoy is 300 yards northeastward of the 18-foot spot.

St. Lucie Shoal, with 15 to 29 feet over it, lies from 3

to 6 miles offshore, and 22 to 26 miles northward of Jupiter Inlet Light. It is the principal danger in this area. The northern end of the shoal is marked by a lighted whistle buoy and an unlighted buoy is southeast of a 15-foot spot at the southern end.

Several wrecks are eastward of the broken ground within 10 miles of the shore. The wreck about 5 miles northeastward of St. Lucie Shoal has been cleared by a wire drag to a depth of 42 feet. It is marked by a lighted buoy. The unmarked dangerous wreck about 3.5 miles eastward of St. Lucie Shoal has a reported depth of 24 feet over it.

Gilbert Shoal, with 19 to 26 feet over it, is 1 to 1.5 miles offshore about 3 miles north of St. Lucie Inlet. A shoal with a least found depth of 36 feet lies 3 miles eastward of the entrance to St. Lucie Inlet and 13 miles northward of Jupiter Inlet Light.

Charts 1247, 845–SC, 855–SC.—St. Lucie Inlet, forming the mouth of the St. Lucie River and the south end of the Indian River, lies 20 miles south of Fort Pierce Inlet and 13.5 miles north of Jupiter Inlet Light. A jetty extends 0.3 mile offshore on the north side of the inlet. A rock ledge lies across the inlet and extends southward from the east end of the jetty for a distance of a little over a mile. A channel 10 feet deep over a width of 200 feet and a length of 1,300 feet has been dredged through the ledge. In October 1963, the controlling depth was 5½ feet from the Intracoastal Waterway through the ledge to the sea buoy.

Local knowledge is required to enter the inlet as the frequently changing sandbars obstruct the channel leading to the Intracoastal Waterway. The mean range of tide at the jetty is 2.6 feet.

St. Lucie River enters the sea through St. Lucie Inlet and connects with the Gulf coast via the Okeechobee Waterway. A highway bridge crossing the river 3 miles above the junction with the Intracoastal Waterway has a bascule span with a clearance of 21 feet at the center. The Florida East Coast Railway bridge at Stuart has a bascule span with a clearance of 7 feet. The highway bridge just west of the railway bridge has a bascule span with a clearance of 14 feet; another highway bridge under construction to the westward will have a double-leaf bascule span with a design clearance of 13 feet. Overhead cables crossing at the bridges have a clearance of 92 feet.

Cross currents at the entrance to St. Lucie River create a hazardous condition for vessels and barges making the short turn from the Intracoastal Waterway. Vessels should stay 100 yards southward of a line between lighted buoy 4 and daybeacon 6 to avoid hitting the hard ledge on the north side of the channel.

St. Lucie River has several branches of some commercial importance. These, with the main river, form an important center for yachting and fishing in the winter.

Manatee Pocket is a protected body of water about 1 mile in length and 0.2 mile in width. It had a controlling depth of 4½ feet in October 1963. The entrance is 0.6 mile west of the intersection of the St. Lucie River and the Intracoastal Waterway. The channel at the entrance is marked by daybeacons. Gasoline, diesel fuel, and fresh water can be obtained at any of several marine service stations. Small boats can obtain protection from tropical storms in Manatee Pocket. The holding bottom is good. Yachts can anchor anywhere for overnight stops.

Port Salerno, a small town at the head of Manatee Pocket, has a flower-packing plant, a marl plant, and is headquarters for a fishing fleet. There are several boatyards; the largest has two marine railways that can haul out vessels up to 60 feet in length for engine and general repairs. There is also a machine shop on the premises and there are depths of 4½ to 5 feet alongside the pier. Gasoline, diesel fuel, water, and overnight dockage or seasonal storage can be obtained. Groceries can be obtained from nearby stores.

Pilots for the St. Lucie Inlet can be obtained at Manatee Pocket.

At **Port Sewall,** 1.2 miles above the junction of St. Lucie River and the Intracoastal Waterway, there is a boatyard which has two marine railways and can haul out boats up to 48 feet in length. Hull and engine repairs can be made; a machine shop is on the premises. In October 1963, a draft of 3½ feet could be carried to the boatyard and there were 3½ to 4½ feet alongside. Dockage, gasoline, electricity, restrooms, water, ice, and marine supplies are available. Charter boats also may be obtained.

In St. Lucie River west of Light 14 is a private 50-foot wide dock that had 6 feet alongside in October 1963. Passing yachts can stop for fresh water and obtain permission to stay overnight.

Rio is a small real estate development on the north bank of St. Lucie River, 3.5 miles above **Sewall Point.** A dredged channel, which had a controlling depth of 5½ feet in October 1963, leads to a yacht basin. Dockage, water, ice, electricity, gasoline, diesel fuel, showers, restrooms, motel, restaurant, limited marine supplies, and surfaced launching ramps are available.

Stuart is a progressive city on the St. Lucie River, 5 miles above Sewall Point. It is the county seat of Martin County and is located on the Florida East Coast Railway, U.S. Highway No. 1, and the Okeechobee Waterway. The city has a hospital and is the distributing center to the surrounding area which is noted for its winter vegetables, citrus and tropical fruits, poultry raising, ranching, commercial fishing, and flowers.

Gasoline, diesel fuel, fresh water, ice, limited marine supplies, and provisions are available. The municipal dock on the south side of the river east of the bridges, in October 1963, had only 3 feet of water at its end and was unfit for use as a landing. The city dock, on the eastern bank of the river just above the bridges, is in good condition but affords only limited dockage space for one craft on each side and one at the end. In October 1963, there was a depth of 9½ feet at the end, and 6 to 9 feet on the sides; water and electricity are available on the dock.

The oil dock on the north side of the river and just north of the bridge, in October 1963, had a depth of 9½ feet at its face. Gasoline, diesel fuel, and water can be obtained.

There is a small protected basin in **Frazier Creek,** 0.3

mile south of the bridges. Gasoline, water, ice, showers, restrooms, motel, some marine supplies, and dockage for 18 boats up to 23 feet in length are available at the marina. There is also a 1½-ton marine travel hoist. In October 1963, the controlling depth was 5 feet from the waterway to the highway bridge about 0.1 mile above the mouth. The bridge has a 30-foot fixed span with a clearance of 6 feet. See Appendix for **storm warning display.**

Pilots for the St. Lucie Inlet and connecting waterways can be obtained through the Stuart Chamber of Commerce.

West of Stuart St. Lucie River forks. The **North Fork** extends several miles in a north-northwest direction. It is approximately 0.75 mile in width with an even bottom of 10 to 12 feet in depth. The South Fork is described as part of the Okeechobee Waterway, Chapter 12.

Chart 1247.—From St. Lucie Inlet to Jupiter Inlet, a distance of 14 miles, several shoals and wrecks are within about 3 miles of the shore. A depth of 37 feet has been found on the shoal 2.6 miles offshore and 4.3 miles northeastward of Jupiter Inlet Light. A wreck cleared by the wire drag to a depth of 31 feet is 0.3 mile south of this spot. It is marked by a lighted buoy. A wreck dangerous to small vessels is reported 4.2 miles north of Jupiter Inlet Light and about 0.8 mile offshore. It is the bow of a tanker; the anchor winch shows at extreme low water. The shoals and wrecks should be avoided by deep-draft vessels. The 15-fathom curve is a safe guide.

Jupiter Inlet Light (26°56.9′ N., 80°04.9′ W.), 146 feet above the water, is shown from a 105-foot red brick tower on the north side of the inlet, 94 miles south of Cape Kennedy Light. A radiobeacon is at the light. A Loran tower, 650 feet high, is 2.2 miles north-northwest of the light.

Charts 1247, 845–SC.—Jupiter Inlet, an opening in the beach just south of Jupiter Inlet Light, is 14 miles south of St. Lucie Inlet. It leads to Jupiter Sound on the north, Loxahatchee River on the west, and Lake Worth Creek on the south. A short stone jetty is on the north side of the entrance to the inlet, and a concrete apron is halfway across the entrance from the south side. There is a reported depth of 2 feet over the bar, thence in September 1963, a controlling depth of 5 feet to the Intracoastal Waterway. Breakers extend across the bar. Small boats of the fishing fleet use the inlet. It is never used by strangers. The Intracoastal Waterway is 0.5 mile inside the entrance to the inlet.

Chart 1248.—Between Jupiter Inlet and Lake Worth Inlet, a distance of about 10.5 miles, the coast is clear of shoals with the 10-fathom curve about 1 mile offshore.

Chart 291.—Lake Worth Inlet is a dredged cut through the barrier beach 11 miles south of Jupiter Inlet Light and 31 miles north of Hillsboro Inlet Light. The entrance is protected by two jetties and the cut by revetments.

Port of Palm Beach is a deepwater port development 1.1 miles west of the entrance. It is 259 miles south of Jacksonville and 68 miles north of Miami. In addition to foreign cruise vessels, there is considerable coastwise barge traffic. Commodities passing through the port include petroleum products, lumber, bulk cement, general cargo, produce, and concrete aggregates. There is regular passenger and cargo service to the Bahama Islands.

Prominent features.—The ocean pier at Palm Beach, 4.3 miles south of the entrance, shows up well, and hotels and buildings at Palm Beach also are conspicuous from seaward. The lights on several radio towers in the area show prominently at night.

A Coast Guard station is on the south side of **Peanut Island,** 0.8 mile inside the entrance.

Channels.—Federal project depths are 27 feet from sea to a turning basin of the same depth at the Port of Palm Beach. In September 1963, controlling depths were 22 feet on the centerline of the entrance range, thence 29 feet to and including the turning basin. Markers include a **271°30′** lighted entrance range, a **251°** lighted inner harbor range, lights, and lighted and unlighted buoys.

Anchorage.—There is no deepwater anchorage in the harbor. Vessels may find temporary anchorage north or south of the sea buoy clear of the entrance range. Anchorage for craft drawing up to 8 feet is available in the vicinity of Palm Beach.

Dangers.—A reef in the form of a ridge with scattered boulders extends for about 300 yards eastward of Peanut Island about 25 feet north of the improved channel. The reef, with a least depth of about 3 feet over it, is extremely dangerous. All vessels should keep south of buoy 4 as the ebb current sets across the reef in a northeasterly direction at times with sufficient velocity to tow this buoy under the surface. Two fish havens are about 1.5 miles off on either side of the entrance.

See Appendix for **storm warning displays.**

Tides and currents.—The mean range of tide is 2.8 feet at the inlet and 1.8 feet at the Port of Palm Beach. The currents in the inlet are strong and must be carefully guarded against. The current velocity is 2.5 knots on the flood and 3.5 knots on the ebb. Current predictions may be obtained from the Tidal Current Tables.

Pilotage is compulsory for foreign vessels and for United States vessels under register in the foreign trade. Pilotage is optional for United States coastwise vessels which have a pilot aboard licensed by the Federal Government. Arrangements for pilots are usually made by radiotelephone, or through the ship's agent. The pilot boat is a 26-foot double-ender with PALM BEACH PILOTS painted on the sides of the pilot house. The pilots board at the sea buoy.

Towage.—Tug service is available, and can be obtained through the Port of Palm Beach District offices, located just north of the slips, or through the pilot.

Quarantine.—Vessels subject to inspection are boarded by an officer of the U.S. Public Health Service upon arrival at berth.

Customs.—The Port of Palm Beach is a port of entry and marine documents are issued.

Immigration inspectors are available at all times at the port.

Harbor regulations.—The Board of Commissioners of

the Port of Palm Beach District is the principal administrative authority in the port. Berths are assigned by the Port Director who is also a member of the Board of Commissioners.

Port regulations state it shall be unlawful for any vessel, boat, barge, or other watercraft of any kind to anchor in the channel or turning basin, except in cases of actual emergency.

Wharves.—The Port of Palm Beach has two slips with more than 3,000 feet of berthing space and depths of 25 to 30 feet alongside. There are over 56,000 square feet of warehouse space and 200,000 square feet of open storage. Fresh water and bunker C fuel are available at all berths. A spur railroad, operated by the Port of Palm Beach, connects the port area with the Florida East Coast Railway to points north and south. There are no cargo-handling facilities at the port. General cargo is usually handled to and from vessels by ship's tackle, mobile cranes, and fork lifts. Adequate pipelines for the discharge of bulk petroleum cargoes are available in Slip 2. Most of the oil is brought in by tanker.

Supplies.—Fresh water and fuel oil are piped to all berths. Diesel fuel, electricity, provisions, and marine supplies can be obtained.

Repairs.—Only minor hull and engine repairs to large ships can be made at the port. The nearest drydock is at Jacksonville.

Communications.—West Palm Beach and the Port of Palm Beach are served by two railroads (Seaboard Air Line Railroad and Florida East Coast Railway), three commercial airlines, and passenger service to the Bahama Islands. The **Palm Beach International Airport** is 5.5 miles southwestward of the port area.

The Intracoastal Waterway passes through Lake Worth just eastward of Port of Palm Beach. Facilities in the area for yachts and small craft are given in Chapter 12.

Chart 1248.—From Lake Worth Inlet the general trend of the coastline is south for 41 miles to Port Everglades. It is broken by several inlets of little importance. The coast is formed almost entirely by a low sand beach, with more or less conspicuous dunes partly covered by grass and scrub palmetto, and woods in the background. Numerous towns, tanks, radio towers, and scattered buildings are visible from seaward. Conspicuous from offshore are the buildings and pier at Palm Beach, Hillsboro Inlet Light, and the large buildings and tanks at Fort Lauderdale.

The coast between Lake Worth Inlet and Port Everglades is fairly bold. The 20-fathom curve runs parallel to the beach and for a greater part of the distance is less than 2 miles from it.

Palm Beach, a resort on the narrow island between Lake Worth and the sea, is connected to West Palm Beach by highway bridges. The ocean pier here is used only for amusement purposes. Several other towns and cities are along the shores of Lake Worth.

South Lake Worth Inlet, at the south end of Lake Worth, is a small dredged cut through the outside beach, about 200 feet wide. In September 1963, the controlling depth over the bar and to the bridge was 6 feet, thence 3½ feet to the Intracoastal Waterway. The inlet is crossed by Route A1A highway bridge which has a fixed span with a clearance of 17 feet. Only small boats with local knowledge use this cut, and then only at or near slack water. Currents through it have great velocity, and with an easterly wind it is impassable on account of breakers at the entrance.

Boca Raton Inlet is a narrow dredged cut through the beach 5 miles northward of Hillsboro Inlet Light. It is used mostly by party fishermen. The hotel at **Boca Raton** is a prominent landmark. The mouth of the inlet is protected by short jetties. In September 1963, the controlling depth on the bar was 4 feet, thence 5 feet to the Intracoastal Waterway. The bar channel shifts with the winds. Highway A1A bridge crossing the inlet has a 45-foot bascule span with a clearance of 22 feet.

Hillsboro Inlet Light (26°15.6′ N., 80°04.9′ W.), 136 feet above the water, is shown from an octagonal pyramidal skeleton tower with central stair cylinder, lower third of structure white, upper two-thirds black, on the beach on the north side of the inlet. A radiobeacon is at the light.

Hillsboro Inlet, 31 miles southward of Lake Worth Inlet, connects with Hillsboro River and the Intracoastal Waterway. It has considerable importance as a base for party fishermen who run out into the Gulf Stream. In September 1963, the controlling depth was 6 feet over the bar, and 9 feet from inside the entrance to the Hillsboro Club, thence 8 feet to the Intracoastal Waterway. Route A1A highway bridge crossing the inlet has a swing span with a channel width of 49 feet and a clearance of 4 feet; drawspan regulations are given in **203.442,** Chapter 2. An overhead power cable at the bridge has a clearance of 64 feet. Yacht landings are on the south shore on either side of the bridge. A depth of 5 feet is at the landings. Gasoline, diesel fuel, electricity, ice, restrooms, showers, restaurants, motel, supplies, some marine hardware, and fresh water are available.

Southward of Hillsboro Inlet shoaling is rapid, depths of 6 to 8 fathoms having been found 1.5 miles offshore. A wreck 3.2 miles south of Hillsboro Inlet Light and 0.4 mile offshore has a depth of about 10 feet over it. Two small rock islets on each side of a stranded vessel were formed by the jettisoning of a cargo of cement about 5 miles south of Hillsboro Inlet Light and 0.4 mile offshore. They were blasted away during World War II, but until the depth over them has been determined, the area should be avoided by light-draft vessels.

Chart 546.—Port Everglades is a deepwater port on the east coast of Florida, 301 miles south of Jacksonville and 948 miles from New York. It is the third ranking port of the State. Many of the world's large passenger vessels call at this major cruise port. Although principally a consumer port, considerable foreign commerce passes through. Petroleum, about 85 percent of the total, is the principal commodity handled; others include asphalt, molasses, bulk cement, steel products, foreign cars and other vehicles, meat and dairy products, lumber, newsprint, citrus fruits, and a variety of general cargo. Two unmarked

jetties protect the harbor entrance which is virtually landlocked.

Prominent features.—The most prominent of objects seen when approaching the port are two very tall hotel buildings on the north side of the entrance close northward of the north jetty. The numerous hotels and several tanks along the beach, and tanks, radio and television towers in Fort Lauderdale, two tall stacks, a bank of eight bulk cement storage silos, and two tanks in the port area, are also prominent.

Channels.—In 1962, controlling depths were 43 feet over the bar, 40 feet in the entrance channel, and 39 feet in the turning basin, with 35 feet in the north extension; further extension and deepening of the turning basin was in progress in 1964. A lighted whistle buoy marks the entrance, and channel markers include lighted and unlighted buoys, lights, daybeacons, and a 269½° lighted entrance range.

Dangers.—Two submerged breakwaters, extending almost 0.7 mile offshore on either side of the entrance, are unmarked. A large spoil area north of the entrance channel has very little water on it and at times appears above water as an island. A **Naval restricted area** extends 2.5 miles offshore and 2 miles southward of the south edge of the entrance channel; for limits and regulations, see **207.171d,** Chapter 2.

Anchorage.—Deep-draft vessels should await the pilot before anchoring off the entrance. The usual anchorage is between the sea buoy and the outer entrance buoys northward of the entrance range.

Tides and currents.—The mean range of tide is 2.5 feet at the entrance. The tidal currents in the entrance average about 1 knot. Current swirls of varying characteristics are often encountered in the turning basin and make handling of ships difficult. Prevailing winds from the southeast and east coupled with a rising tide are the most hazardous. Caution should be exercised to avoid striking the piers or the rocky sides of the turning basin.

Weather.—Prevailing winds are from the southeast and east. There is little fog usually in late winter during cool westerly winds. The Weather Bureau office is at the airport about a mile south of the port. See Appendix for **storm warning displays.**

Pilotage is compulsory for all foreign vessels and for United States vessels under register in the foreign trade, drawing more than 6 feet of water. Pilotage is optional for United States coastwise vessels which have on board a pilot licensed by the Federal Government. The pilots board at the sea buoy, day or night. The two pilot boats are painted gray with white superstructure, fly the code flag **H,** and are equipped with radiotelephone (2738 kc. and 2182 kc.). Advance notice should be given to the Broward County Port Authority by radio, by radiotelephone through the Fort Lauderdale Marine Operator, or by prior arrangement with the ship's agent.

Towage.—Two large diesel tugs of 1,250 and 1,800 hp. are available for docking and undocking. All orders to the tugs by the docking pilot are given over short-wave radio.

Quarantine.—Vessels subject to quarantine are usually boarded at the dock by an officer of the Public Health Service. An outpatient office is maintained in Fort Lauderdale. There are five general hospitals and several smaller private hospitals in the area.

Customs.—Port Everglades is a port of entry, but marine documents are not issued. The Customhouse is in the port area.

Immigration inspectors are available at the port.

Harbor regulations are established by the Broward County Port Authority. The administration, operation, and maintenance of the port are under the direction and supervision of the port manager. The harbormaster assigns berths and enforces the regulations. The port office is in the Administration Building close westward of Pier 1.

Wharves.—The port had 18 deepwater berths in 1963 with a total of over 11,000 feet of berthing space with 32 to 39 feet alongside. There were seven transit warehouses with a total of over 400,000 square feet of storage space; five having spur tracks to them. The two passenger terminals are at piers 3 and 4. Ten of the berths are in the three slips, two are at the heads of piers 1 and 2, and six are at the marginal wharves in the turning basin. There are lift-on and lift-off van facilities. All berths have fuel and water connections; pipelines are available at most of the berths for handling of petroleum, asphalt, molasses, and other liquid cargoes, and propane gas.

Private facilities for handling and storage of bulk cement are at berth 14, and a privately operated precooling and cold storage plant of 200,000 cubic feet capacity is at berth 10. The port area has storage tanks for over 6 million barrels of petroleum products and asphalt, 1 million barrels of molasses, and also for propane gas. Over 100 acres of open storage is available for lumber, vehicles, machinery, and other open freight, most of it paved. Heavy-lift cranes to a capacity of 100 tons, and most modern cargo handling equipment, including magnet equipped cranes for handling scrap iron are available. The port's beltline railroad, connecting with the two trunkline railroads serving the area, has spur tracks leading to the pier aprons and some of the warehouses. The port has its own fire fighting equipment, including foam generators leading to the oil storage tanks.

Supplies.—Fresh water, bunker C, and diesel fuel are supplied by pipelines at shipside. Complete ship chandlery, ship supplies, marine hardware, and provisions are available.

Repairs.—There are no drydocks in the port. The nearest large drydocks are at Jacksonville. There are machine shops and equipment for above water hull and engine repairs. Radio and electronic repairs can be made.

Communications.—The Florida East Coast Railway and the Seaboard Air Line Railroad serve the port through connections with the Port Everglades Belt Line Railway. Truck and barge lines serve the port and local and interstate bus service is available. Many domestic and overseas airlines serve the port through the **Fort Lauderdale-Hollywood International Airport,** a mile south of the port.

Small-craft facilities.—Yachting and small-craft facilities are centered at Fort Lauderdale close northward of

the port and are described with the Intracoastal Waterway in Chapter 12.

Chart 1248.—Between Port Everglades and the Miami Harbor entrance, 20 miles to the southward, the general trend of the coastline is south, and it is formed almost entirely by a low sand beach. The large buildings and tanks in Hollywood, Miami Beach, and Miami are particularly conspicuous from seaward.

This section of the coast is also fairly bold, and the 20-fathom curve runs parallel to the beach at a distance of about 2 miles until in the vicinity of the Miami Harbor entrance where the curve of the shore becomes south-southwestward and the 20-fathom curve lies about 4 miles offshore. Inside this curve shoaling is rapid, and northward of the Miami Harbor entrance 6 to 8 fathoms are found in places 1.5 miles from the beach.

Hollywood is a popular resort 5 miles south of Port Everglades and about 1 mile west of the Intracoastal Waterway. The Hollywood Hotel, a very prominent structure, is situated on the ocean beach east of the city. A lighted buoy is 10 miles south of Port Everglades and 1.5 miles offshore. Ships wishing to stay beyond the 10-fathom curve should pass 0.6 mile seaward of the buoy.

Charts 1248, 847-SC.—Bakers Haulover Inlet has been dredged through the barrier beach at the north end of Biscayne Bay, 11.6 miles south of Port Everglades, to provide circulation of water in the bay. The channel, in August 1963, had a controlling depth of 13 feet over the bar and to the highway bridge, thence 8 feet to the Intracoastal Waterway. Route A1A highway bridge over the inlet has a fixed span with a clearance of 32 feet; an overhead power cable just east of the bridge has a clearance of 53 feet. Current velocities of about 2.9 knots on the flood and 2.5 knots on the ebb have been recorded in the inlet. For predictions see the Tidal Current Tables.

Many charter-boat fishermen use the inlet in good weather. The tower on the north side resembles a conical lighthouse. A light, visible about 5 miles, is shown from the tower. Several prominent hotels are south of the inlet. The Intracoastal Waterway is 0.4 mile inside the entrance.

Chart 547.—Miami Harbor is a deepwater port on the east coast of Florida under the jurisdiction of the Metropolitan Dade County Seaport Department. It is 324 miles south of Jacksonville, 971 miles from New York, and 151 miles from Key West. It is the fourth ranking port in the State and is of great importance as a cruise port. It is principally a consumer port but considerable foreign commerce passes through. The principal commodities handled are petroleum products, bananas, lumber, steel products, seafood products, meat, sugar, newsprint, building materials, foreign cars and other vehicles, fertilizer, and general cargo. Two unmarked jetties protect the harbor entrance, known as **Government Cut,** which was dredged to form a deepwater entry to the port.

Miami, the State's largest city, covers most of the west shore of Biscayne Bay north of Key Biscayne and is 5 miles from the Gulf Stream, a fact which accounts for its year-round healthful climate. It is an internationally famous winter resort and a popular yachting center, particularly in winter. A large number of small boats that fish and cruise along the Florida Keys operate out of the port.

Miami Beach, the colorful play spot occupying the barrier beach that separates the ocean from the upper part of Biscayne Bay, is also an important yachting center. A number of causeways, with bridges over the channels, form good highway connections with Miami and the mainland communities. The city is principally residential, except for some shops and amusement places. The numerous large hotels take up most of the beach and along Biscayne Bay. Marinas, yacht basins and numerous small private landings are on the west side of the city along the canals and other waterways off Biscayne Bay. An amusement pier extends out into the sea about 0.3 mile north of the jetties. The Coast Guard base and a commercial terminal are northward of the main ship channel near the east end of MacArthur Causeway. The Municipal wharf is on Meloy Channel at the southwestern end of Miami Beach.

Prominent features.—The numerous tall buildings and hotels in Miami and along the ocean front at Miami Beach are visible for miles in all directions. A very prominent landmark in Miami Beach is the tall green and black building of a saving and loan company, on which the red obstruction lights and an illuminated time and temperature sign, flashing from 7 a.m. to midnight, can be seen over 16 miles offshore. A tall stack and water tank on Virginia Key, the abandoned lighthouse on Cape Florida, the aviation light at **Miami International Airport,** a number of radio and television towers, and numerous other tanks and towers are also prominent.

Boundary lines of inland waters.—The lines established along the Florida Reefs and Keys from Miami to Marquesas Keys are described in **82.55,** Chapter 2.

Channels.—A Federal project provides for a 30-foot dredged channel from the sea to the Municipal terminal at Miami with a turning basin of the same depth off the terminal. The channel is maintained at or near project depth. The main channel has been widened at Dodge Island to include the berthing area on the north side of the new Port of Miami Terminal. This area has been dredged to a depth of 32 feet. A shoal marginal area about 100 feet wide extends between the northern edge of the channel and the MacArthur Causeway along almost its entire length. In 1963, the triangular area between the main channel and the north side of Fisher Island, including the shoal area east of Sams Island, was being dredged to 32 feet to provide a turning basin and deepwater berthage at the oil terminal on the island.

A lighted whistle buoy marks the entrance and channel markers include a lighted **249½°** range, lights, and lighted and unlighted buoys.

Causeway Terminal Channel in the slip between the Coast Guard base and the **MacArthur Causeway Terminal** had depths of 31 to 18 feet in August 1963.

A channel leading southward from the main ship channel along the east end of **Dodge Island Terminal** to **Fisher-**

mans Channel had a controlling depth of 15 feet in August 1963.

Meloy Channel branches from the main channel at the inner end of the land cut and extends northwestward along the southwest shore of Miami Beach to MacArthur Causeway. The controlling depth in the channel and along the municipal wharf along its eastern edge was 11 feet in August 1963. The western edge of the channel is buoyed, and an unlighted buoy marks the entrance.

Peninsula Channel branches off the main channel at the inner end of the land cut, and extends westward along the north side of Fisher Island to a junction with Fishermans Channel. The controlling depth to the oil terminal berth on the island was 15 feet in August 1963. From that point westward and along the southwestern side of the island the controlling depth was 8 feet. An unlighted **268°** range marks the channel and a lighted buoy and an unlighted buoy mark its junction with the main channel. A small crossover channel, marked by a private lighted **180°** range, extending from the main channel to Fisher Island, had a controlling depth of 7 feet in August 1963. Fishermans Channel and the other channels in Biscayne Bay are discussed with the Intracoastal Waterway in Chapter 12.

Anchorages.—The anchorage area is north of the sea buoy; limits and regulations are given in **202.188,** Chapter 2. There is no anchorage for deepdraft vessels in the harbor. Yachts and small craft usually moor at marinas or yacht basins in Biscayne Bay or on Miami River, but when these are crowded in winter, they must anchor in the bay. Good anchorage for yachts and small craft is found along the west side of Miami Beach from MacArthur Causeway northward to Bakers Haulover Inlet and southward along the Miami waterfront from the City Yacht Basin to Dinner Key Marina. The harbormaster or dockmaster usually assigns berths.

Large vessels unable to pass quarantine usually anchor outside the harbor; smaller vessels anchor in the channel north of Fisher Island.

Dangers.—Shoals extend about a mile offshore northward of the entrance and vessels approaching from the northward should keep at least 1.5 miles offshore until within 4 miles of the entrance and then haul out for the sea buoy. The outer reefs, for about 10 miles south of the entrance, are unmarked except for the northerly red sector in Fowey Rocks Light, and vessels approaching from that direction should stay outside this sector until well up before closing the sea buoy.

Tides.—The mean range of tide at the harbor entrance is 2.5 feet and in the bay it is 2 feet. High and low waters at Miami (79th Street Causeway) occur 1 hour and 45 minutes later than at Miami Harbor entrance. Daily predictions for Miami Harbor are given in the Tide Tables.

Currents.—Strong tidal currents run in the entrance between the jetties; the current velocity being about 2 knots. A northerly wind causes a considerable southerly set across the ends of the jetties. Vessels are advised to favor the southerly side of the entrance channel during southerly winds, as a pronounced northerly set may be experienced. Daily predictions for Miami Harbor entrance are given in the Tidal Current Tables.

See Appendix for **Miami** and **Miami Beach Climatological Tables** and **storm warning displays.**

Pilotage is compulsory for all foreign vessels and United States vessels under register in the foreign trade. Pilotage is optional for coastwise vessels which have on board a pilot licensed by the Federal Government. The pilots' office is on the north side of the entrance close northward of the jetty. Pilots board at the sea buoy, day or night. The pilot boat will come out to meet any vessel making the signal for a pilot, code flag **G.** The pilot boat is painted black with buff deck and housing, flies the code flag **H,** and is equipped with radiotelephone (2182 kc.). Arrangements should be made in advance by radio, radiotelephone through the Miami Marine Operator (phone: JE 1-3815), or through the ship's agent.

Towage.—There are large tugs of up to 2,000 hp. available in the port. **Salvage,** wrecking, and diving equipment is available.

Quarantine.—The quarantine station is on **Fisher Island** just inside the jetties. Incoming vessels are boarded by Public Health Service officers while underway in the channel off the station. For vessels unable to pass quarantine see anchorages. An outpatient clinic of the Public Health Service is maintained in the Federal Building in Miami. There are more than 10 public and private hospitals in Miami and 3 at Miami Beach. Many others are in the surrounding area.

Customs.—Miami is a port of entry and marine documents are issued. Vessels are usually boarded while underway in the channel off the quarantine station, or on arrival at the dock; otherwise by special arrangement through the ship's agent.

Immigration.—There is an Immigration Service office in the city; vessels are usually boarded on arrival at the dock.

Harbor regulations are established by the Metropolitan Dade County Seaport Department. The Port Director assigns berths and enforces the regulations. It is unlawful for any vessel or other craft to proceed at a speed which will endanger other vessels or structures, or at a speed greater than 6 knots. Official signs are posted indicating limiting speeds through critical portions of the harbor or waterways.

Wharves.—The three city piers west of the turning basin provide over 6,000 feet of berthing space with depths of 28 to 29 feet alongside. Transit sheds and warehouses on the piers or in the port area provide over 305,000 square feet of storage space and over 80,000 cubic feet of cold storage. The two passenger terminals are on piers 2 and 3. Fresh water is piped to all of the berths and pipelines for handling of petroleum cargoes are on pier 1 and the marginal bulkhead wharf extending northward from the pierhead. Mobile cargo handling equipment is available. Heavy-lift floating cranes up to 35 tons capacity are available and a 65-ton stiff-leg crane is on the bulkhead at the shipyard south of pier 3. The depth alongside this bulkhead was 15 feet in August 1963. A beltline railway of the port connects with the two trunkline railroads serv-

ing the area; it has rail sidings on all the piers and to the warehouses.

The new **Port of Miami,** under construction on **Dodge Island** on the south side of the main channel opposite MacArthur Causeway, will be opened in 1964. The marginal wharf will provide 6,500 feet of berthing space with 32 feet along the north side of the island and about 2,000 feet of berthage at the east end of the island, with 15 feet alongside. Three transit sheds on the wharf will provide 600,000 square feet of storage space and 100,000 square feet of warehouse space; 100,000 cubic feet of refrigerated space will be available.

A highway-railway causeway, with bascule bridges over the Intracoastal Waterway, will connect the terminal with Miami. There will be a large passenger terminal and shipside rail trackage of over 4,000 feet and a train makeup yard with 5,000 feet of trackage. The pier aprons will be 60 feet wide. Lift-on and lift-off, roll-on and roll-off, and container service will be provided for, with about 75 acres of paved surface for open storage and container and van storage. Fresh water will be piped to all berths, but bunkering will be by barge or at the oil terminals on Fisher Island.

Note.—Upon completion of the new port, the old municipal terminal west of the turning basin will be closed, and the piers razed to make way for the construction of a civic-commercial-cultural center on the site of the old port.

The **Albury Causeway Terminal** (lower part of MacArthur Causeway Terminal), on the north side of the main channel about 0.6 mile from the inner end of the land cut, is privately operated. About 800 feet of deepwater berthing space with 32 feet alongside on the channel face and about 560 feet with the same depth on the east side in the slip are provided at the triangular-shaped wharf. A transit shed provides 50,000 square feet of storage space. Mechanical cargo- and fruit-handling equipment is available. Fresh water is piped to the wharf. About 400 feet of berthing space with depths of 20 to 30 feet alongside is available at an oil terminal and powerplant along the bulkhead on the channel side westward of the Albury Causeway Terminal. Pipelines for handling liquid cargoes are on this section.

Other general cargo wharves and wharves for handling seafood products, petroleum products, dry bulk cargoes, and building materials with depths of 5 to 15 feet alongside are on the Miami River and Miami Canal.

Supplies of all kinds, provisions, and marine hardware are obtainable and complete ship chandlery is available at Miami. Fresh water is available at all the wharves. Gasoline, diesel fuel, and fresh water are available at the marinas, yacht basins, boatyards, and service facilities. Bunker C and diesel oil are available from pipelines on Pier 1 of the municipal terminal and at the oil terminal close northward of it; elsewhere by barge. There will be no fueling facilities at the new port terminal on Dodge Island except by barge.

Repairs.—General hull and engine repairs can be made at a shipyard close southward of pier 3. Two 1,000-ton floating drydocks at the yard can lift vessels up to 280 feet in length. One of the docks has 2- and 3-ton cranes. A 65-ton stiff-leg crane and two 25-ton mobile cranes are at the yard. About 400 feet of berthing space is available at the bulkhead wharf. The yard is fully equipped with machine and other shops. Above-water hull, engine, and electronic repairs can be made to any size vessel. The yard builds wood and steel hull vessels of medium size. The nearest large drydocks are at Jacksonville.

The largest repair yard on Miami River has a marine railway that can haul out vessels up to 173 feet in length. There is 13 feet of water at the end. The yard also has a 500-ton marine lift for craft up to 160 feet in length. There are a number of other marine repair plants with marine railways and lifts on the river and on Miami Canal. Hull, engine, and electronic repairs can be made and most services are available at the yards.

Communications.—Miami is the main line terminus for the Florida East Coast Railway and the Seaboard Air Line Railroad. Both lines have freight service farther south to Homestead and Florida City. The city beltline railroad connects them with the port. Considerable ocean shipping calls at the port and a number of cruise ships operate from the port the year-round.

Local and interstate bus and truck lines operate over the excellent highways and freeways to and in the city and numerous domestic and overseas airlines serve the port through the Miami International Airport west of Miami.

City Yacht Basin is at the northeast corner of **Bay Front Park,** which extends from the Dodge Island Causeway southward to Miami River and fronts on the beautiful Biscayne Boulevard. In August 1963, there were 9 to 12 feet at the T-head piers and from 5½ to 12 feet in the slips in the basin. Gasoline, diesel fuel, fresh water, ice, berthing with telephone and electricity, charter-boat hire, and most other services are available. Hotels, motels, and restaurants are nearby. Sightseeing and excursion craft base there. During the winter season, many craft have to anchor off, as berthing space is at a premium. The dockmaster's office is at the shore end of the middle pier; his advice and assistance can be had in obtaining a suitable anchorage berth.

Charts 547, 847–SC.—Small-craft facilities are distributed along the east and west shores of Biscayne Bay from above Bakers Haulover Inlet to Dinner Key, on Miami River, and on Tamiami and Miami Canals. Marine railways, lifts, and launching ramps are available. There are large marinas on the Miami Beach side of the bay, and a boat repair and building yard north of Venetian Causeway has a marine lift that can haul out craft up to 110 feet in length. There are also repair and service facilities at the head of the Causeway Terminal basin opposite the Coast Guard base, at the head of Meloy Channel, at the eastern ends of MacArthur and Venetian Causeways, and at a large municipal marina just north of Bakers Haulover Inlet. The large City Yacht Basin and the Dinner Key Marina are on the Miami side of the bay. There are also numerous small-craft facilities on Miami River and Canal. Gasoline, diesel fuel, fresh water, ice, berthing with electricity, marine hardware, provisions, and telephone serv-

ices are available about the harbor. Hull, engine, and electronic repairs can be made. There are many large hotels, motels, tourist homes, and restaurants. For details on facilities, channel depths, bridges, etc., between Bakers Haulover Inlet and Miami Harbor Channel, see Chapter 12.

During the winter tourist season, when berthing space is at a premium, many craft have to anchor in the bay off the facilities. There are dockmasters at most of them to advise and assist in finding a secure berth. Many of the large hotels at Miami Beach have their own docks.

Miami River trends westward then northwestward through the heart of the city of Miami for about 2.8 miles, where the **South Fork** of the river flows into it from the westward. The river continues on northwestward for another 1.1 miles to a junction with the Tamiami and Miami Canals. The **Miami Canal** continues northwestward to Lake Okeechobee and the **Tamiami Canal** westward to **Sweetwater** in the Everglades. Miami River and Miami Canal are navigable for about 5 miles to a dam just below the NW. 36th Street highway bridge.

In August 1963, the controlling depth was 11 feet to the Tamiami Canal, thence 9 feet in Miami Canal to the dam. The South Fork had depths of 10 feet at the entrance to 4 feet at a fixed bridge about 0.3 mile above the mouth. Currents in Miami River are strong on the ebb and cause swirls at the bends.

The river and canals are important parts of the Miami waterfront, for both commercial and pleasure craft. There are commercial wharves, yacht basins, marine repair plants, and oil-terminal wharves on the banks of Miami River and Miami Canal to just above the Seaboard Air Line Railroad bridge about 0.2 mile below the dam. The principal wharves can accommodate any vessel able to enter the river.

The minimum clearance of the more than 10 drawbridges crossing Miami River and Miami Canal from the mouth to the head of navigation at the dam about 5 miles above the mouth is 6 feet; drawspan regulations are given in **203.448** and **203.449**, Chapter 2.

The Miami Canal is reported to be navigable for small boats for about 10 miles above the dam. A crane at the dam will lift them over.

The Intracoastal Waterway passes through Biscayne Bay just eastward of Miami. Clearances of the bridges over the waterway are given in Chapter 12.

11. MIAMI TO KEY WEST

Chart 1112.—The **Florida Keys** consist of a remarkable chain of low islands, beginning with Virginia Key and extending in a circular sweep to Loggerhead Key, a distance of about 192 miles. For some 100 miles of that distance they skirt the southeast coast of the Florida Peninsula, from which they are separated by shallow bodies of water known as Biscayne Bay, Card Sound, Barnes Sound, Blackwater Sound, and Florida Bay. Biscayne Bay has depths of 9 to 10 feet for most of its length, and the other bodies of water are shallow, containing small keys and shoals, and of no commercial importance except as a cruising ground for small boats. Westward of Florida Bay the Florida Keys separate the **Straits of Florida** from the Gulf of Mexico.

The keys are mostly of coral formation, low, and generally covered with dense mangrove growth, though some are wooded with pine, and on a few are groves of coconut trees. Most of the keys that are connected by U.S. Highway 1 to Key West are inhabited. Key West is the most important of the keys.

The openings under the viaduct and bridges are indicated on the charts. Drawbridges are over Indian Key Channel, Channel Five, over Jewfish Creek, and Moser Channel. Small craft with local knowledge use these channels to go from the Straits of Florida to Florida Bay and the Gulf of Mexico. Strangers should not attempt passage without a pilot.

The tidal currents are strong through the openings between the keys. Wind effects may at times be expected to modify the velocities shown in the tidal current tables.

The Florida Keys are skirted on the side next to the straits throughout their extent by the **Florida Reefs,** a chain of dangerous reefs and shoals lying at an average distance of about 5 miles from the line of keys. The reefs are hazardous because they are not marked by breakers in smooth weather and only a few show above the water. On the outer edge of and between the reefs the water shoals abruptly.

In approaching the reefs from seaward, warning of their proximity usually will be given by the difference in color of the water, from deep blue to light green, or by the **Bank Blink,** described in Chapter 3. Too much reliance in these warnings, however, may lead to trouble. In clear weather the lights and daybeacons make navigation along the reefs easy, but in thick weather soundings should be relied upon for safety. Fifty-fathom soundings indicate a distance of 2 to 3 miles from the reefs, and great caution should be used in approaching them closer. Fog is not frequent in this locality.

The water always becomes milky following windy weather. The usual color of the water on the reefs is bluish green and the shoal patches show dark, shading through brown to yellow as they approach the surface. The shoal sand patches show as a bright green. At depths of 10 to 15 feet grass patches on the bottom show quite similar to rocks. When piloting in this area a time should be chosen so that the sun will be astern, conning the vessel from aloft or from an elevated position forward, for then the line of demarcation between deep water and edges of the shoal will be indicated with surprising clarity.

Prominent features.—The outer part of the Florida Reefs is marked by lights from Miami to Key West. Several lights marking the Hawk Channel are also visible from seaward. In addition, several lighted radio towers along the keys and the aviation light on Boca Chica Key near Key West are prominent.

Boundary lines of inland waters.—The line established along the Florida Reefs and Keys from Miami to Marquesas Keys is described in **82.55,** Chapter 2.

Dangers.—Vessels proceeding through the channels inside the Florida Reefs should exercise extreme caution because of the numerous rocks, shoals, wrecks, and pile structures which exist. The chart should be examined carefully to determine the position of these dangerous obstructions so they may be avoided.

Hawk Channel is the navigable passage inside Florida Reefs and outside the keys from Cape Florida to Key West, a distance of about 127 miles. It varies in depth from 9 to 34 feet, and is 0.25 mile wide at its narrowest part. Light-draft vessels, bound southward and westward, may use this channel with great advantage, avoiding entirely the adverse current of the Gulf Stream and finding comparatively smooth water in all winds, except when passing the large openings between the reefs in southerly winds. These openings are principally between Alligator Reef Light and American Shoal Light. Steamers or sailing vessels with a leading wind may run the courses through this channel without difficulty. Sailing vessels drawing more than 7 feet are advised not to try to beat through without a pilot.

Reports indicate that the current in Hawk Channel usually sets fair with the channel, except alongside the open area between Hawk Channel and Biscayne Bay where a fairly strong cross current exists, particularly on an ebb tide. Possible cross currents should be guarded against, especially in the vicinity of the openings between the keys.

Pilots are generally available at Miami or Key West. The channel is marked with lights, lighted buoys, daybeacons, and buoys. However, strangers should not attempt passage at night without local knowledge. Vessels

may anchor at night where the bottom is soft. Anchorages are discussed in a later section. The holding ground is poor where the bottom is hard. Tows use the channel.

The **Intracoastal Waterway** between Miami and Key West is described in Chapter 12. This waterway on the western and northern side of the keys passes southward through Biscayne Bay, Card, Barnes, and Blackwater Sounds and connecting waterways in Florida Bay to Moser Channel. From there it is necessary to pass either through Moser Channel and proceed to Key West via Hawk Channel, a distance of 40 miles, or to remain on the northern side of the keys and proceed to Key West via Big Spanish Channel and the Gulf of Mexico, a distance of 54 miles. The waterway route is through smooth waters, except in Hawk Channel and the Gulf of Mexico.

Florida Bay, northward of the Florida Keys and southward of the mainland of Florida, is a triangular-shaped body of water extending in a general east-and-west direction from Barnes Sound to Cape Sable. The depths are shallow and irregular, and 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 the water is frequently milky and the shoals indistinguishable.

In the eastern part of the bay are numerous ridges and reefs which show bare or nearly bare. Numerous small wooded keys dot the area. Only small craft can navigate this part of the bay which is frequented by small motor yachts, spongers, fishing craft, and the flatbottomed shoal-draft boats of the inhabitants of the keys. The western part of the bay is comparatively clear, with depths ranging from 7 to 13 feet. The bottom is covered with loggerhead sponges and small coral heads.

Charts 1248, 848.—Norris Cut is a shallow inlet just south of the Main Channel to Miami Harbor between Fisher Island and **Virginia Key.**

Key Biscayne is connected to the mainland by a causeway which crosses Bear Cut, Virginia Key, and Biscayne Bay. The red tower of an abandoned lighthouse is on **Cape Florida** on the south end of Key Biscayne.

Biscayne Channel leads through the shoals south of Cape Florida into Biscayne Bay. It is partially dredged but the channel has shoaled. In July 1963, the reported controlling depth was 7 feet. The channel is marked by lights, lighted buoys, and daybeacons. Craft whose draft is close to the limiting depth of the channel should exercise extreme caution in navigating it. Several channels leading through the shoals between Biscayne Channel and Key Biscayne are used by local boats.

Cape Florida Anchorage, with depths of 12 to 20 feet, is about 300 yards westward of the south end of Cape Florida with the abandoned lighthouse tower bearing northward of 069°.

Miami South Channel is a dredged cut leading from Biscayne Bay, westward of Virginia Key, to the Miami waterfront. One branch of it leads into the Miami River and the other leads directly to the basin off **Bay Front Park.** The Intracoastal Waterway southward to Key West passes through Miami South Channel. Clearance of the Rickenbacker Causeway bridge is given in Chapter 12.

Fowey Rocks Light (25°35.4′ N., 80°05.8′ W.), 110 feet above the water, is shown from a brown, octagonal, pyramidal skeleton tower on pile foundation enclosing a white dwelling and stair cylinder. A radiobeacon is at the light. See Appendix for **storm warning display.**

Fowey Rocks Anchorage, 1.3 miles westward of Fowey Rocks Light, is fairly well sheltered, and can be used by vessels with a 14-foot draft or less.

Charts 1249, 848, 849, 850.—Bowles Bank Anchorage, 6.5 miles south-southwestward of Fowey Rocks Light, is good in all winds. It has depths of 14 to 16 feet, soft bottom in places, and lies about 0.5 mile north of the light on Bache Shoal and eastward of the north end of **Elliott Key.**

Legare Anchorage, 7 miles southward of Fowey Rocks Light, lies between the reefs westward of **Triumph Reef.** The bottom is mostly hard, but there are some soft spots on which vessels may anchor and ride out a gale. The entrances are not marked and the anchorage is not generally used.

Caesar Creek Bank Anchorage, 12 miles south-southwestward of Fowey Rocks Light, is good in all winds. It lies on the west side of Hawk Channel between **Margot Fish Shoal** and **Caesar Creek Bank,** with depths of 10 to 12 feet, soft bottom.

Excellent anchorage for small craft will be found in **Caesar Creek,** just north of Caesar Creek Bank. The entrance is marked by a lighted buoy and privately maintained stakes mark the channel. There was a depth of 4 feet on the bar in July 1963.

There is also a secure anchorage between **Adams Key, Meigs Key,** and **Elliott Key.** A draft of 4 feet, in 1963, could be carried into Biscayne Bay through a privately marked channel which leads along the northwest side of Adams Key. It is reported, however, that this passage is seldom used.

Pacific Reef, 13.4 miles southward of Fowey Rocks Light, is marked by a light. A channel marked by daybeacons and a buoy leads from the ocean north of the light to Caesar Creek; the controlling depth was 8 feet in July 1963.

Angelfish Creek, 17.5 miles southwestward of Fowey Rocks Light, is used by vessels proceeding to Card Sound. The controlling depth through the creek was 4 feet in July 1963. The channel is marked by lights and daybeacons. The outer end of the creek offers good protection, but the bottom is rock ledge and the anchor should be buoyed.

Ocean Reef (Key Largo) Harbor is on the east side of **Key Largo,** 19.5 miles southwestward of Fowey Rocks Light. In July 1963, the controlling depth was 6 feet in the dredged channel leading to the harbor. A light is off the end of the entrance channel which is marked by privately maintained stakes. The harbor has good anchorage and wharf facilities. Good hotel accommodations, gaso-

line, diesel fuel, water, ice, restrooms, showers, restaurant, launching ramp, berthage with electricity with 6 to 12 feet alongside, and limited provisions are available.

Key Largo Anchorage, 20 miles southwestward of Fowey Rocks Light, is good in all winds. It has a depth of 14 feet, soft bottom, 4.5 miles northwestward of Carysfort Reef Light.

Turtle Harbor, a well-sheltered anchorage between the reefs lying northwestward of Carysfort Reef Light, is entered from the Straits of Florida by a marked passage 5 miles northeastward of the light. Vessels of 15-foot draft can use this passage in smooth water. Depths in the approach range from 27 to 38 feet, and at the anchorage from 25 to 28 feet. A buoy, 2.5 miles northwestward of Carysfort Reef Light, marks the center of the anchorage area. Vessels can enter Hawk Channel from this harbor by proceeding about 0.4 mile south of the anchorage buoy and then taking a westerly course.

Carysfort Reef Light (25°13.3′ N., 80°12.7′ W.), 100 feet above the water, is shown from a brown, octagonal, pyramidal skeleton tower on pile foundation, enclosing a conical dwelling and stair cylinder.

The Elbow is a reef, 5.3 miles southwestward of Carysfort Reef Light, on which several wrecks have occurred. It is marked on its seaward edge by a light.

Molasses Reef, 15.5 miles southwestward of Carysfort Reef Light, is marked by a light. The entrance to **Molasses Reef Channel,** which has a controlling depth of about 8 feet, is just south of the light. The shoalest part of the channel is marked by a buoy and daybeacons.

Rock Harbor, 5.7 miles northwestward of the light on Molasses Reef, has limited services for small craft at several facilities.

Tavernier, 20 miles southwestward of Carysfort Reef Light, is one of the larger settlements on the keys. Gasoline, supplies, motels, and chartered party fishing are available.

Tavernier Key Anchorage is 2 miles eastward of Tavernier. Anchor according to draft from northward to eastward of **Tavernier Key,** soft bottom.

See Appendix for **storm warning displays.**

Charts 1250, 851, 852.—Alligator Reef Light (24°51.1′ N., 80°37.1′ W.), 136 feet above the water, is shown from a white, octagonal pyramidal skeleton tower on pile foundation, enclosing a white dwelling and a stair cylinder.

Indian Key Channel, northwestward of Alligator Reef Light, is about 200 yards wide and had a controlling depth of 8 feet from the Straits of Florida to Florida Bay in August 1963, via the unnamed channel east of **Lignumvitae Key.** It is well defined, but marked only by private temporary stakes. The highway viaduct across the channel has a 40-foot bascule span with a clearance of 8 feet.

See Appendix for **storm warning display.**

Channel Five, 8.4 miles westward of Alligator Reef Light, is a natural channel with a controlling depth of 7 feet on the ocean side and 7½ feet on the bay side in August 1963. However, a draft of 9 feet may be taken from the ocean with local knowledge. At times a strong current sets through the channel. The highway viaduct across the channel has a bascule span with a clearance of 8 feet. Vessels drawing up to 6 feet can follow the marked route leading westward and northwestward in Florida Bay to Cape Sable and Flamingo.

Flamingo is a visitor's center in **Everglades National Park,** about 9 miles east of East Cape (see Chart 598). A dredged channel leads from the bay to the entrance to **Buttonwood Canal.** The controlling depth was 5 feet in August 1963. A marina at the visitor's center, on the west side of the entrance to the canal, has berthing with electricity at piers with 5 feet alongside. Gasoline, diesel fuel, fresh water, ice, provisions, bait and tackle, showers, restrooms, restaurant, motel, boat rental, a 2½-ton hoist, and limited marine hardware and provisions are available. There is a marine lift that can handle craft up to 40 feet in length in an emergency with permission of the park authorities. A highway bridge about 0.5 mile above the entrance to the creek has a 45-foot fixed span with a clearance of 10 feet.

See Appendix for **storm warning displays.**

Tennessee Reef, 9 miles southwestward of Alligator Reef Light, is marked by a daybeacon on its eastern side and by a light on the southwestern end.

Long Key Anchorage, 3 miles north-northwestward of Tennessee Reef Light, has soft bottom in depths of 15 to 18 feet, but it is exposed to southerly winds.

Turtle Shoal Anchorage, 20 miles southwestward of Alligator Reef Light and 1 mile westward of **East Turtle Shoal Light,** has soft bottom in a depth of 27 feet. It is a fair anchorage in fine weather. Another anchorage area is 1 mile westward of **West Turtle Shoal** in depths of 24 to 36 feet.

Valhalla on **Crawl Key,** about 3 miles northwestward of the light on East Turtle Shoal, has a marina where gasoline, diesel fuel, fresh water, ice, berthing with electricity, restrooms, showers, lodging, and provisions are available. There is a 4-ton marine hoist and a launching ramp. The controlling depth was 4 feet in the entrance channel and 10 feet alongside the pier in August 1963.

Key Colony Beach is a protected harbor westward of **Fat Deer Key.** The controlling depth was 8 feet, in August 1963, in the privately marked entrance channel. During the winter season, fuel, water, berthing with electricity, and most services are available; engine and electronic repairs can be made. There is a small-boat ramp.

See Appendix for **storm warning displays.**

Sister Creek, 4 miles northeastward of Sombrero Key Light, is a narrow passage between **Boot Key** and **Vaca Key.** It has several arms which provide secure refuge during a tropical hurricane. Vessels tie to the mangroves. The entrance to the creek between **West Sister** and **East Sister Rocks** is marked by a light and daybeacons. In 1963, rocks awash extended well into the channel from the east side. A channel with a controlling depth of 4 feet, in August 1963, connects the creek with the eastern end of Boot Key Harbor.

Knight Key Anchorage, northward of Sombrero Key

Light, is good but is exposed to southwesterly winds. The westerly edge of a red sector of Sombrero Key Light leads to the anchorage.

Boot Key Harbor is 4.5 miles northward of Sombrero Key Light. The entrance channel to the harbor, south of Knight Key, is marked by a light and daybeacons. The controlling depth was 7 feet, in August 1963. The color of the banks is also a good guide in the narrow channel. The harbor is a secure refuge for launches and small craft. A highway bridge over the channel has a 48-foot bascule span with a clearance of 26 feet at the center. An overhead power cable on the west side of the bridge has a clearance of 65 feet. Facilities at the harbor include a marina and a boatyard at which a marine lift can haul out craft up to 115 feet in length for hull, engine, and electronic repairs. Gasoline, diesel fuel, water, ice, berthing with electricity with 5 to 9 feet alongside, provisions, restaurants, motels, restrooms, showers, laundry facilities, and some marine hardware are available at the harbor. There are several fish wharves, where fuel and some service are available.

Charts 1251, 852, 853, 854.—Sombrero Key Light (24°37.6′ N., 81°06.6′ W.), 142 feet above the water, is shown from a brown, octagonal, pyramidal skeleton tower on pile foundation, enclosing a square dwelling and stair cylinder.

Moser Channel is northwestward of Sombrero Key Light and 95 miles southwestward of Miami. It affords a passage for vessels of 7 to 8 feet in draft between the Florida Keys from the Straits of Florida to Florida Bay. The highway bridge across the channel has a swing span with a clearance of 23 feet.

The tidal current at the bridge has a velocity of about 2 knots. Wind effects modify the current velocity considerably at times; easterly winds tend to increase the northward flow and westerly winds the southward flow. Overfalls that may swamp a small boat are said to occur near the bridge at times of large tides. For predictions, see the Tidal Current Tables.

Route.—A route with a controlling depth of 8 feet, in August 1963, from the Straits of Florida via the Moser Channel to the Gulf of Mexico is as follows: From a point 0.5 mile 156° from the center of the bridge, pass 200 yards west of the daybeacon at Red Bay Bank, thence 0.4 mile east of the light on Bullard Bank, thence to a position 3 miles west of Northwest Cape of Cape Sable, thence to destination.

The **danger zone** of a naval aircraft live ammunition strafing area is about 5.5 miles westward of the light on Bullard Bank; see **204.86,** Chapter 2, for limits and regulations.

Bahia Honda, 10 miles northwestward of Sombrero Key, is the deepest channel between the Straits of Florida and Florida Bay. In August 1963, the controlling depth was 8 feet from Hawk Channel to Little Pine Key. The center fixed span of the highway bridge across the passage has a clearance of 20 feet. The direction of the current should be carefully watched when turning northwestward after passing under the bridge in order to avoid being grounded on the banks on either side of the channel. These banks are usually visible. Currents through the bridge have a velocity of about 2 knots. For predictions at the bridge, see the Tidal Current Tables. From Bahia Honda, vessels may proceed via Big Spanish Channel to the Gulf of Mexico as described in Chapter 12.

Newfound Harbor Keys Anchorage, 16 miles westward of Sombrero Key Light, is in depths of 19 to 22 feet in the channel northeastward of the light at the west end of the keys. **Newfound Harbor Channel** to the northward is clearly defined by the appearance of the water. A strong current sets fair with the channel. In August 1963, the controlling depth was 7 feet to the western of two bridges at the head, 3.4 miles above the entrance. Both bridges have 25-foot fixed spans with a clearance of 8 feet.

Niles Channel, 18 miles westward of Sombrero Key Light, is the best channel from the Straits of Florida to the Gulf of Mexico between Bahia Honda and Key West. The controlling depth, in August 1963, was 4 feet from Hawk Channel through Niles Channel and **Cudjoe Channel** to the Gulf. The south entrance to Niles Channel is marked by daybeacons and the narrowest parts of the two channels are marked by private stakes. The highway bridge crossing Niles Channel has a 25-foot fixed span with a clearance of 8 feet. Caution should be exercised to avoid piling on the north side of the bridge.

Loggerhead Key Anchorage, 19 miles westward of Sombrero Key Light, is in a depth of 15 feet, soft bottom, about 0.8 mile eastward of Loggerhead Key. This is a fair anchorage in all but easterly to southerly winds. When going to the anchorage pass at least 0.3 eastward of the daybeacon 1 mile southeastward of the key.

Sugarloaf Channel, northward of American Shoal Light, is marked by daybeacons from Hawk Channel to the highway bridge. The highway bridge across the channel has a 20-foot fixed span with a clearance of 6 feet. An overhead power cable about 700 yards south of the bridge has a clearance of 31 feet. Currents are strong and set fair with the channel, north with the flood, and south with the ebb. The channel is not recommended for a draft of over 2 feet without a pilot. The controlling depths, in August 1963, were 4 feet from Hawk Channel to the highway bridge, thence 3 feet to the Gulf of Mexico via Johnston Key Channel. Cudjoe Bay, eastward of the channel, offers fair holding ground for fishing boats.

American Shoal Light (24°31.5′ N., 81°31.2′ W.), 109 feet above the water, is shown from a brown, octagonal pyramidal skeleton tower on pile foundation, enclosing a brown dwelling and white stair cylinder.

West Washerwoman Anchorage, 4.3 miles northwestward of American Shoal Light, has a depth of 23 feet, soft bottom. Another anchorage in a depth of 24 feet, soft bottom, is 5 miles westward of **Ninefoot Shoal Light.**

Saddlebunch Harbor, 10.5 miles eastward of Key West, is a good hurricane anchorage for small craft. The northwest end of the harbor is obstructed by the ruins of a bridge.

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Boca Chica Key, 5 miles eastward of Key West, is the site of a Naval Air Station. **Boca Chica Channel,** with a centerline controlling depth of 13 feet, in August 1963, from Hawk Channel to the Naval Air Station Basin on the west side of the key, is marked by lighted and unlighted buoys and daybeacons. An overhead power cable has a clearance of 60 feet across the channel. The basin provides a good hurricane anchorage for small vessels.

Safe Harbor, 4 miles eastward of Key West, is on the south side of **Stock Island.** The entrance channel had a controlling centerline depth of 17 feet, in August 1963, and depths of 20 to 30 feet in the harbor. Broken piling of former daybeacons constitute obstructions at the channel entrance. There are shrimp-packing facilities in the harbor and a marina with two launching ramps where hull and engine repairs can be made. Gasoline, diesel fuel, fresh water, ice, provisions, restrooms and showers, and berthing with electricity with 17 to 26 feet alongside are available. Pilotage, customs, and other services are the same as for Key West.

Cow Key Channel, between Stock Island and Key West, was marked by bush stakes and had a controlling midchannel depth of 2 feet in August 1963. The channel is narrow. Shallow-draft craft can pass through the highway bridges between the keys. The bridges have 16-foot spans with a clearance of 8 feet. A small marina just south of the bridge has gasoline, fresh water, ice, restrooms, boat rental, and some marine hardware available. Hull and engine repairs can be made. North of the bridges the channel is unmarked and difficult to follow.

Charts 584, 576.—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 reefs and sand flats. The harbor is entered through breaks in the reef by five principal channels with depths of 13 to 30 feet, and by 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 the U.S. 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 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 a white radar dome on Boca Chica Key and the white dome of the Weather Bureau station at the Key West International Airport.

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.), 109 feet above the water, is shown from a 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.

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

Channels.—Main Ship Channel is the only deep-draft approach to Key West. Federal project depth is 30 feet from the Straits of Florida to and including a turning basin off the Naval Operating Base. The controlling depths are published in the Notice to Mariners. In August 1963, the controlling depth was 28 feet. The channel is well marked by lighted ranges, a light, and buoys.

Northwest Channel is a medium-draft passage between Key West Harbor and the Gulf of Mexico. In August 1963, the controlling centerline depth was 14 feet. Vessels drawing up to 14 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 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 a mile of the front light. A good landmark for the Gulf entrance is the abandoned gray two-story lighthouse standing on piles of 0.3 mile southwest of the west jetty.

Smith Shoal (Chart 1252), **4.5 miles northward of the** northward entrance to Northwest Channel, is covered 11 feet and marked by a light which also marks the northern approach to the channel. In 1961, a coral head covered 11 feet was located about 3.2 miles south-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 been swept to a depth of 23 feet, and is marked by buoys. In April 1961, this depth was confirmed for midchannel. A general course, following the aids 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 at 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 well marked by daybeacons and a light at the northerly end. The controlling midchannel depth was 5 feet in August 1963. The channel should be used only with local knowledge and during good visibility.

Barque Channel, a marked channel with a depth of 8 feet, leads around the north end of Fleming Key. A

channel with a depth of 9 feet then continues southward between the western edge of the seaplane landing area and Fleming Key to a junction with a channel from Man of War Harbor which leads along the north shore of Key West to Garrison Bight. A highway bridge crossing the channel between Key West and Fleming Key has a fixed span with a width of 33 feet and a clearance of 10 feet.

Measured course.—South of Sand Key is a measured course 6,510 feet long on course **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 slatted 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 20 to 26 feet, taking care, however, to avoid the reefs which rise abruptly in some places along the edges of the channels. The outer anchorage, 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.

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. Waters near naval facilities at Key West are **restricted**; limits and regulations are given in **207.173a,** Chapter 2.

A **naval seaplane restricted area,** into which entry is prohibited, is north of Key West, between Fleming Key and Sigsbee Park; for limits and regulations, see **207.174,** Chapter 2.

A **naval operating danger area** is in the Straits of Florida and Gulf of Mexico westward of Key West; limits and regulations are given in **204.95,** Chapter 2.

Caution.—Craft approaching Key West, Boca Chica, and Safe Harbor from the eastward through Hawk Channel should be mindful that submerged rocks and reefs extend up to 0.6 mile off the keys and give little or no indication of their presence under certain conditions.

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

Currents.—In the southern approaches to Key West, within the 10-fathom curve, the currents are weak and variable. In the channel west of Key West the flood (northerly) and the ebb (southerly) currents average 1 and 1.5 knots, respectively. North of Key West in Man of War Harbor the tidal currents average 0.8 knot. 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 the channel west of Key West are published in Tidal Current Tables; daily predictions for several locations in nearby channels can be obtained through the use of table 2 of the same publication. However, both the time and velocity of the current are influenced by winds.

Weather.—See Appendix for **Key West climatological table and storm warning displays.**

Pilotage.—Pilotage is compulsory for all foreign vessels and United States vessels in foreign trade, except those drawing less than 6 feet. Pilotage is optional for coastwise vessels who have on board a pilot licensed by the Federal Government. The usual procedure is to radio ahead for a pilot. Vessels are taken in day or night. Fast boats carry pilots out to waiting ships in 20 minutes. 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 tug 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 permit. Larger vessels anchor in the outer harbor.

The Public Health Service maintains an outpatient office at Key West. In addition to the municipal 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.

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 miles per hour is enforced in the Main Ship Channel between lighted buoy 10 and the inner harbor.

Wharves.—There are nine wharves at Key West, three of which are terminals owned by the Government. The commercial wharves are described in connection with Safe Harbor. The city dock, about 0.7 mile northwestward of Key West Light, has 500 feet of berthing space and a 100-foot small-boat wharf at the south end. There were no facilities on the dock in 1963. The oil wharf, just north of the city dock, has several warehouses and two transit sheds for petroleum products. The only two suitable places for pleasure boats to dock are at the west end of **Key West Bight** and in **Garrison Bight.** In August 1963, the depth into the basin west of Key West Bight was 19 feet, with 7 feet at the fuel pumps. Garrison Bight had 4½ feet in the entrance and 3 to 7 feet within the basin. The Key West Yacht Club is in Garrison

Bight. An overhead power cable across the entrance to Garrison Bight has a clearance of 34 feet.

Supplies.—Fuel oil, diesel fuel, gasoline, fresh water, marine hardware, and good hotel accomodations can be obtained. Telephones and restrooms are available at the marine service facilities, and at the yacht club showers are also available. Since Key West 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 fuel and provisions. Local arrangements can be made for delivery of supplies and provisions to vessels in the Gulf Stream (see Pilotage).

Repairs.—Three repair yards are located in Key West Bight. The largest can handle general repairs on craft up to 165 feet in length. General hull and engine repairs can be made, but no major hull repairs.

Salvage and wrecking gear consists of a salvage tug and general equipment for heavy salvage work.

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.

Information about the Florida Reefs west of Key West and the Gulf of Mexico is contained in United States Coast Pilot 5, Atlantic Coast—Gulf of Mexico, Puerto Rico, and Virgin Islands.

12. INTRACOASTAL WATERWAY, ATLANTIC SECTION

The part of the **Intracoastal Waterway** described here is the toll-free **"canal"** which affords continuous protected passage behind the Atlantic Coast and the Florida Keys for the more than 1,080 nautical miles between Norfolk, Va., and Key West, Fla. The basic route follows Albemarle and Chesapeake Canal (Virginia Cut) to Albemarle Sound; the alternate route is through Dismal Swamp Canal to the sound.

The waterway is used by commercial light-draft vessels and tows unable to navigate long stretches in the open ocean, and by pleasure craft. Small-boat and recreation facilities are found along the waterway. Supervision of the waterway's construction, maintenance, and operation is divided among five United States Army Engineer Districts (Norfolk, Wilmington, Charleston, Savannah, and Jacksonville) whose district-office addresses are listed in the Appendix.

Mileage.—The Intracoastal Waterway (I.W.) mileage is zeroed in 36°50.9′ N., 76°17.9′ W., off the foot of West Main Street, Norfolk, Va., and progresses southward to I.W. Mile 1080.7 at Key West, Fla., in 24°33.7′ N., 81°48.5′ W. **All Coast Pilot distances are in nautical miles;** tables for converting nautical miles to statute miles, used by the Corps of Engineers, are on the last page of this volume.

Channels.—The Corps of Engineers project for the Intracoastal Waterway provides for a least depth of 12 feet from Norfolk, Va. (I.W. Mile 0.0) to Fort Pierce, Fla. (I.W. Mile 839.2), thence 10 feet to Miami, Fla. (I.W. Mile 946.3), and thence 7 feet to Key West, Fla. (I.W. Mile 1080.7). The Miami to Key West section of the waterway has been completed only as far as Cross Bank (I.W. Mile 1001.4), the remainder having been deferred for restudy.

The controlling depths are published in Part I of the Weekly Notice to Mariners.

Summary of depths tabulated in Notice to Mariners 7 of February 15, 1964.—Route 1, Norfolk to Virginia-North Carolina State line (Mile 29.5), via Great Bridge—10 feet.

Virginia-North Carolina State line to Albemarle Sound (Mile 58.2)—12 feet.

Albemarle Sound to Morehead City (Mile 177.5)—11 feet.

Morehead City to Cape Fear River (Mile 259.7)—12 feet.

Cape Fear River to Little River (Mile 297.2)—10 feet.

Little River to Winyah Bay (Mile 350.8)— 9 feet.

Winyah Bay to Charleston (Mile 406.2)—10 feet.

Charleston to North Edisto River (Mile 431.4)—10 feet.

North Edisto River to Beaufort, S.C. (Mile 465.8)— 10 feet.

Beaufort to Savannah River (Mile 500.0)—8 feet.

Savannah River to Sapelo Sound (Mile 549.0)—9 feet.

Sapelo Sound to St. Simon Sound (Mile 588.4)—10 feet.

St. Simon Sound to Fernandina Beach (Mile 622.8)—9 feet.

Fernandina Beach to St. Johns River (Mile 642.9)—12 feet.

St. Johns River to St. Augustine (Mile 676.0)—9 feet.

St. Augustine to Haulover Canal (Mile 754.8)— 12 feet.

Haulover Canal to Wabasso (Mile 819.7)—12 feet.

Wabasso to Fort Pierce (Mile 839.2)—12 feet.

Fort Pierce to Lake Worth Inlet (Mile 884.9)—10 feet.

Lake Worth Inlet to Port Everglades (Mile 926.6)—5 to 8 feet.

Port Everglades to Miami (Mile 946.3)—8 feet.

Miami to Cross Bank (Mile 1001.4)—6 feet.

Cross Bank to Key West (Mile 1080.7), via Hawk Channel—5 feet.

Bridges.—The minimum overhead clearance of fixed bridges crossing the Intracoastal Waterway (basic route) between Norfolk, Va., and Miami, Fla., is 56 feet at the fixed channel span over the waterway at 36th Street Causeway (Mile 944.7), at Miami. There are other fixed bridges with clearances of 65 feet at Miles 177.1, 256.8, 317.5, 349.3, and 777.2. The minimum width of bridge openings (basic route) is 55 feet at the swing bridges at Miles 755.3 and 872.5; several others have clearances of 58 and 59 feet. See **203.240** and **203.241**, Chapter 2, for regulations governing operation of waterway drawspans on the basic route.

Cables.—The minimum clearance of overhead power cables crossing the Intracoastal Waterway is 72 feet at Mile 246.0 at Wrightsville, N.C., bridge; several others have clearances of 80 and 85 feet.

Locks.—Great Bridge Lock (Mile 10.4) is the only lock on the Intracoastal Waterway (basic route) between Norfolk and Key West. It is 600 feet long and 75 feet wide. See **207.160**, Chapter 2, for regulations governing use, administration, and navigation of locks and floodgates.

Ferries.—A cable ferry crosses the Intracoastal Waterway at Mile 357.6. The cable is suspended during crossings and is dropped when the ferry docks. **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 small-craft series which the Coast and Geodetic Survey publishes especially for that purpose.

Tides.—Under ordinary conditions the mean range of tide in the waterway is from nontidal to about 7 feet. In many sections, the tide is largely dependent on the force and direction of the wind. 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 829–SC.—Norfolk, on the east bank of the Elizabeth River in Norfolk Harbor 26 miles inside the entrance to Chesapeake Bay, is one of the major ports of the United States. Supply and repair facilities are available at the marinas and yacht basins located in Norfolk Harbor. A detailed description of the port is contained in **United States Coast Pilot 3, Atlantic Coast, Sandy Hook to Cape Henry.**

From the City Wharf at the foot of West Main Street in Norfolk, **Mile 0.0,** the Intracoastal Waterway follows the Southern Branch of Elizabeth River to its junction with Deep Creek where the waterway divides into two routes. The mean range of tide in Southern Branch and Deep Creek is about 2.5 to 3 feet. **Naval restricted areas** are on both sides of the river; limits and regulations are given in **207.153,** Chapter 2.

The **speed limit** is 6 knots from Eastern Branch to the Norfolk and Portsmouth Belt Line Railroad bridge, **Mile 2.2**; see **207.154,** Chapter 2. This bridge has a lift span with a clearance of 6 feet down and 142 feet up. At **Mile 2.5,** Jordan (State Route 337) highway bridge has a lift span with a clearance of 15 feet down and 145 feet up. The Virginian Railway bridge at **Mile 3.2,** has a swing span with a clearance of 9 feet. U.S. Routes 460 and 13 highway bridge and the Norfolk and Western Railway bridge at **Mile 5.5** have bascule spans with a clearance of 7 feet; large vessels must exercise caution when making the turns to these bridges because of the current. The overhead power cables at **Miles 6.1** and **6.4** have clearances of 145 feet and 127 feet, respectively.

Route 1.—Via Albemarle and Chesapeake Canal to North River.—From **Mile 6.6** at the entrance to Deep Creek, the basic route continuing through Southern Branch to North River is well marked and easily followed in daylight; strangers are advised against running at night.

At **Mile 7.3,** the Norfolk and Portsmouth Belt Line Railroad bridge across Southern Branch has a hand-operated swing span with a clearance of 7 feet; span usually kept in the open position. Virginia Highway 166 bridge at **Mile 8.0** has a bascule span with a clearance of 12 feet. At the entrance of **Sykes Creek, Mile 8.5,** there is a small-boat basin where gasoline, water, and a launching ramp are available; only shallow-draft boats, drawing 3 feet or less, should attempt to enter.

Great Bridge Lock, at the beginning of **Virginia Cut** at **Mile 10.4,** is a tidal guard-lock 600 feet long, 75 feet wide, 16 feet over sills, and has a lift of 2.7 feet. Vessels and tows wider than 45 feet will not be permitted to pass through the lock without prior permission of the District Engineer. Tie-up dolphins are available at Great Bridge for temporary mooring when passage through the lock is delayed. There is no periodic tide southward of the lock, the water level depending on the force and direction of the winds. All vessels passing through the lock are required to list their registry, tonnage, and passengers. The **speed limit** is 3 knots from Great Bridge Lock for 1 mile eastward, thence 8 knots for 6 miles to North Landing Bridge.

Great Bridge, a town on the south side of Virginia Cut at **Mile 10.9,** has telephone and bus connections with Norfolk. State Highway 190 bridge across the cut at the town has a swing span with a clearance of 6 feet.

On the south side of the cut a short distance eastward of Great Bridge, a privately owned marine basin is available for mooring, docking, covered storage, and general hull and engine repairs. Depths from 5 to 12 feet are available alongside the bulkhead outside the basin and 7 to 14 feet alongside the piers in the basin and in the entrance of the basin. The larger of two marine railways can haul out vessels up to 110 feet in length. Other repair facilities consist of a 40-ton crane and a well-equipped machine shop. Covered wet storage space can accommodate 75 pleasure craft and there are 75 open storage spaces. Gasoline, diesel fuel, water, ice, lounge, showers, provisions, and marine supplies are available.

From Great Bridge, Virginia Cut continues almost in a straight line eastward for a distance of about 6 miles. The Norfolk Southern Railway bridge at **Mile 12.3** has a bascule span with a clearance of 7 feet. Virginia Highway 165 bridge at **Mile 13.5** has a swing span with a clearance of 4 feet.

North Landing, Mile 17.4, is a small town at the junction of Virginia Cut and North Landing River. State Route 165 highway bridge over North Landing River at **Mile 17.5** has a swing span with a clearance of 6 feet.

North Landing River is narrow and crooked for a distance of about 9 miles below Virginia Cut. The worst bends have been bypassed by dredging through the marshy points; the remaining bends are usually easy. At Pungo Ferry, **Mile 24.3,** State Route 726 highway bridge across the river has a swing span with a clearance of 7 feet.

From **Mile 26.0,** the route is through a dredge cut in the open waters of North Landing River and **Currituck Sound,** thence into **Coinjock Bay** and through North Carolina Cut to the head of North River. **Munden** is a town on the east side of North Landing River at Mile 27.8; the wharf is in ruins. **Currituck** is a town on the west side of the mouth of North Landing River opposite **Mile 35.0.** A toll-free passenger-auto ferry, operated by the State Highway Commission, runs from Currituck to Knotts Island, N.C.

Coinjock, Mile 43.4, is a town on the Norfolk-Hatteras

Highway, midway along **North Carolina Cut.** State Route 34 highway bridge across the cut here, has a swing span with a clearance of 4 feet. Gasoline, diesel fuel, water, berthage, electricity, and some supplies may be obtained at the wharves, northward and southward of the bridge, with depths of 6 to 9 feet alongside. Northward of the bridge there is a marine railway that can haul boats up to 50 feet in length for hull and engine repairs. A small boat launching ramp is southward of the bridge. See Appendix for **storm warning display.**

A canal 22 feet wide and 1 foot deep branches northeastward from North Carolina Cut about 1 mile northward of the Coinjock Bridge, and connects with Currituck Sound through **Parker Creek.** The canal is crossed by a highway bridge with a 16-foot fixed span and a clearance of 6 feet.

North River is about 12 miles long from North Carolina Cut to the entrance from Albemarle Sound, and has a general depth of about 9 feet outside the dredged cut of the Intracoastal Waterway. The channel is marked by lights and daybeacons, and a 4° lighted range marks the section through the bar at the mouth of the river. On the east side of the river, near the mouth, is the town **Jarvisburg, Mile 55.9**; the dock is in ruins.

Route 2.—Via Dismal Swamp Canal to Albemarle Sound.—This alternate route from the entrance to **Deep Creek, Mile 6.6,** leads westward from the Southern Branch to Dismal Swamp Canal, thence through Pasquotank River to Albemarle Sound.

Vessels that proceed with care and follow the chart can navigate this route without difficulty. Extra caution is required in Deep Creek, Turners Cut, and the numerous sharp bends in the upper reaches of the Pasquotank River. Winds sometimes cause a variation of 1 to 2 feet in water level.

Dismal Swamp Canal, a 19-mile long nontidal summit-level section, is controlled by a lock at each end; turnouts are provided at 3-mile intervals where vessels can pass.

Channels.—Federal project depths are 10 feet in Deep Creek, 9 feet in Dismal Swamp Canal, and 10 feet in Pasquotank River. Controlling depths are published in Part I of the weekly Notice to Mariners.

Summary of controlling depths tabulated in Notice to Mariners 7 of February 15, 1964.

Route 2.—Norfolk (I.W. Mile 0.0) to Albemarle Sound—8 feet.

Bridges.—There are no fixed bridges on the alternate route. The minimum width of bridge opening is 42 feet at the Norfolk Southern Railway swing bridge at **Mile 41.1**; for drawspan regulations, see **203.240,** Chapter 2.

Cables.—The minimum clearance of the overhead power cables crossing the alternate route is 85 feet at **Mile 41.1.**

Locks. There are two locks on the alternate route at the upper and lower ends of the Dismal Swamp Canal. **Deep Creek Lock** (Mile 9.2) and **South Mills Lock** (Mile 28.5) have the same dimensions: 300 feet long, 52 feet wide, 12 feet over sills, and lift of 12 feet. Vessels and tows wider than 35 feet will not be permitted to pass through the locks without prior permission of the District Engineer. Regulations governing use, administration, and navigation of locks and floodgates are given in **207.160,** Chapter 2.

The established **speed limit** between the locks is 5 knots. At times, due to low water, navigation may be restricted or the canal closed. During restricted operations at Deep Creek Lock, boats up to 20 feet in length can be moved from one level to the other by a marine railway. Locks and bridges are operated only between the hours of 6:00 a.m. and 10:00 p.m. daily.

At Deep Creek Lock, **Mile 9.2,** vessels are required to list their registry, tonnage, and passengers. A dock about 100 feet long is at the lock. The town of **Deep Creek** is at **Mile 9.6,** and U.S. Route 17 highway bridge across the canal here has a bascule span with a clearance of 4 feet. Just south of the bridge there is a bulkhead with 4 to 8 feet alongside where gasoline and some supplies may be obtained; there is a small-boat launching ramp.

At **Mile 18.7,** a 30-foot-wide feeder ditch runs in a straight line westward from the Dismal Swamp Canal for about 3 miles to **Lake Drummond**; the ditch has a controlling depth of 4 to 5 feet and the lake has depths of 3 to 5 feet. Lake Drummond is about 2.2 miles in diameter and the water level is about 6 feet higher than the canal. Flow of water from the lake is regulated by a series of gates or wickets in the feeder ditch at the Corps of Engineers reservation 0.5 mile from the lake. Boats up to 18 feet in length are moved overland past the gates by a small railway. All persons entering or leaving Lake Drummond through the feeder ditch are required at the gates to register their name, address, and purpose of visit. Visitors are warned of the dangers of being lost in the swamps and the menace of poisonous snakes, and are cautioned to take precautions to prevent forest fires.

Gasoline is available at a small wharf on the east side of the canal near **Mile 27.0.** Supplies are available at **South Mills, Mile 28.1.**

U.S. Highway 17 bridge across the canal at **Mile 28.1,** has a bascule span with a clearance of 4 feet. The **South Mills Lock** of the Dismal Swamp Canal is at **Mile 28.5.** Tieup dolphins are available for temporary mooring when passage through the lock is delayed.

Turners Cut is a canal which extends in nearly a straight line from the south end of Dismal Swamp Canal to the Pasquotank River at **Mile 32.1.**

Pasquotank River has a length of 12 miles from the south end of Turners Cut to Elizabeth city, and thence 15 miles to Wade Point Light at the entrance from Albemarle Sound. The narrow upper part of the river has been improved by dredging, where necessary, to attain the project depth of the waterway. From Elizabeth City to the mouth, the river varies in width from 0.5 to 3 miles, has general depths of 8 to 12 feet, and is well marked by lights.

The Norfolk Southern Railway bridge across Pasquotank River at **Mile 41.1** has a hand-operated swing span with a channel width of 42 feet and a clearance of 3 feet; see **203.245,** Chapter 2, for drawspan regulations. The overhead power cable along the south side of the bridge has a clearance of 85 feet.

Knobb Creek is a nontidal fresh water stream on the

north side of Elizabeth City and enters Pasquotank River at **Mile 43.2.** A State highway bridge and the Norfolk Southern railroad bridge are about 0.1 mile above the mouth of Knobb Creek. Both bridges have swing spans; minimum clearances are at the railroad bridge, which has a channel width of 35 feet and a clearance of 3 feet.

The Federal project for the improvement of Knobb Creek provides for a channel 10 feet deep from that depth in Pasquotank River to the Norfolk Southern Railway bridge at the head of navigation about 1 mile above the mouth of the creek. In June 1959, the controlling depth to the head of navigation was 5½ feet.

Elizabeth City, Mile 43.7, on the west bank of Pasquotank River, is one of the most important towns on the inland waters of North Carolina, and has rail, airline, and highway connections with Norfolk. Waterfront bulkheads have 20 to 27 feet alongside, and a vessel can usually find a berth. Anchorage can be had in depths of 7 to 12 feet on the north side of the channel just below the city. U.S. Route 158 highway bridge across the river at Mile 43.7 has a bascule span with a clearance of 12 feet.

Complete supply and repair facilities, and hotel accommodations are available at Elizabeth City. The larger of two shipyards, about 0.5 mile below the highway bridge, can accommodate any size yacht or commercial vessel navigating these waters. Repair facilities include two marine railways capable of hauling out vessels up to 200 feet in length and a machine shop. Finger piers have about 3,600 feet of dockage and covered storage space for eight 50-foot boats. The river water is practically fresh.

On the north side of the river opposite the shipyard there is a marina with 6 feet of water alongside the pier, where gasoline, diesel fuel, water, ice, and some supplies are available. There is a restaurant and a small boat launching ramp, and outboard repairs and parts may be obtained.

Elizabeth City is a customs port of entry, issues marine documents, and has an outpatient office of the Public Health Service. See Appendix for **storm warning display.**

About 1.5 miles below U.S. Route 158 highway bridge at Elizabeth City is the beginning of a Coast Guard seaplane **restricted area** extending for about 3.5 miles southward; limits and regulations are given in **207.162,** Chapter 2.

Newbegun Creek enters Pasquotank River about 7.5 miles below Elizabeth City. **Weeksville,** the principal town on the creek, is 3 miles from the mouth. A Federal project for the improvement of the creek provides for a depth of 5 feet across the bar at the mouth of the stream. The controlling depth over the bar and in the main part of the creek was about 4 feet in May 1963.

Route 2 continues down the Pasquotank River, passing northward of Wade Point Light, then turning southward across Albemarle Sound to join with Route 1 at the light at the entrance to Alligator River.

Chart 831-SC.—From the vicinity of the light at the entrance to North River, Route 1 continues across Albemarle Sound for 10.5 miles to the light at the entrance to Alligator River, where alternate Route 2, via the Dismal Swamp Canal, rejoins the basic route. In heavy weather the passage is uncomfortable and even dangerous for open boats. The rise and fall of the water level in Albemarle Sound depends on the wind.

Alligator River extends in a southerly direction for about 18 miles, then turns west and narrows. The channel of the Intracoastal Waterway has been dredged the entire length of the wider part of the river and for about 4 miles through its western reach to the land cut connecting with Pungo River. The channel is well marked by lights and daybeacons. U.S. Route 64 highway swing bridge with a clearance of 13 feet crosses the waterway at Mile 73.6, opposite **East Lake** on the eastern shore.

Alligator River and Little Alligator River are discussed in more detail in Chapter 4. **Whipping Creek** empties into Alligator River from eastward near the south end of the wide reach near Mile 86.2. A small-boat passage is reported to lead from the creek for 14 miles to Long Shoal River and Pamlico Sound.

The route of the waterway passes from Alligator River to the **Alligator River-Pungo River Canal** at **Mile 91.2,** a land cut extending about 19 miles in a southwesterly direction. At Mile 98.9, State Route 94 highway bridge over the canal has a swing span with a clearance of 7 feet. The channel is through the south draw. Just east of the bridge the **Fairfield Canal,** privately owned, makes off from the main canal in a southerly direction through the town of Fairfield to the north shore of **Lake Mattamuskeet.**

All vessels are advised to exercise caution when passing through this land cut. Continuous bank erosion is caused by passing boats, floats, snags, and debris. An overhead power cable just west of the bridge has a clearance of 100 feet.

At **Mile 109.4** Wilkerson (U.S. Route 264) highway bridge over the Alligator River-Pungo River Canal has a swing span with a clearance of 8 feet. The channel is through the south draw. An overhead power cable just east of the bridge has a clearance of 100 feet. The canal enters **Wilkerson Creek** at the bridge. The route is then through the dredged cut in the creek to **Pungo River,** southwestward and westward to abeam of Belhaven, then southward in Pungo River to Pamlico River.

Belhaven, 1.5 miles westward of **Mile 118.0,** is on the northeastern side of the entrance to **Pantego Creek.** The harbor is protected by breakwaters at the creek entrance and is excellent shelter for small craft. Fuel, supplies, repair facilities, and guest rooms are available at Belhaven. The town and the channel into the harbor are discussed in Chapter 4.

From abeam of the light off **Grassy Point** at **Mile 123.7** in the lower part of Pungo River, the route leads for 3.7 miles until 0.6 mile past the light off **Wades Point** on the west side at the mouth of Pungo River; thence across Pamlico River for 2.9 miles to the light at the entrance to Goose Creek.

Pamlico River, discussed at length in Chapter 4, is the approach to the important town of Washington.

The route of the Intracoastal Waterway follows the dredged channel through **Goose Creek** and its tributary, **Upper Spring Creek,** to the land cut which connects with **Gale Creek** and Bay River.

The Hobucken (State Routes 33 and 304) highway bridge, crossing the land cut at **Mile 136.6,** has a swing span with a clearance of 6 feet. There is a small machine shop at the bridge where engine repairs may be made. Gasoline, diesel fuel, water, and electricity are available on the pier. Some provisions and miscellaneous small-boat supplies can also be obtained at the pier which had depths of 10 to 16 feet alongside, in April 1963. A Coast Guard buoy depot is just north of bridge.

The town of **Hobucken,** about 1 mile east of the bridge, has a landing on **Jones Bay,** which is discussed in Chapter 4.

From Gale Creek, the route of the Intracoastal Waterway is down **Bay River** to the light off **Maw Point Shoal** at **Mile 144.8,** then up the Neuse River. Bay River is the approach to Bayboro and other small towns; Neuse River is the approach to the important city of New Bern. Both rivers are discussed in Chapter 4.

Chart 833–SC.—The town of **Oriental** is west of **Mile 157.5** on the north side of Neuse River opposite **Garbacon Shoal.** Fuel, supplies, repair facilities, and guest rooms are available here. The town and its waterfront are discussed in Chapter 4.

The Intracoastal Waterway leaves Neuse River about 13 miles above the mouth and follows a dredged channel through Adams Creek to **Adams Creek Canal,** a land cut about 5 miles long which connects with the head of **Core Creek.** State Route 101 highway bridge over Adams Creek Canal at **Mile 170.1** has a swing span with a clearance of 16 feet. Overhead power cables on both sides of the bridge have clearance of 85 feet.

From Core Creek the route of the Intracoastal Waterway is through **Newport River** to Morehead City. At **Mile 175.6, Gallant Channel** branches off from the through route of the waterway and leads to Beaufort, which is described in Chapter 5.

Calico Creek extends westward from **Mile 176.8** through a new channel reported dredged to 12 feet in 1963. The channel is marked by daybeacons. A yacht basin is at the head of the channel about 0.6 mile from the waterway. The yacht basin has berthage for 34 boats and covered wet storage for 14 boats. Gasoline, diesel fuel, water, electricity, ice, restrooms, showers, and some marine supplies are available, and there is a small-boat launching ramp. Depths of 8 to 5 feet are available alongside the pier and finger piers.

At **Mile 177.1,** the adjacent Beaufort and Morehead railroad bridge and U.S. Route 70 highway bridge cross the channel. The bascule spans have a minimum clearance of 4 feet. A new highway bridge under construction in 1963, close northward of the bridges, will have a fixed span with design clearance of 65 feet over the waterway. An overhead power cable close southward of the highway bridge has a clearance of 25 feet except at the draw, where it is submerged. Caution is advised when running with a fair current or approaching the bridges in windy weather. See the Tidal Current Tables for predictions.

Morehead City, Mile 177.5, and its deepwater port are discussed at length in Chapter 5. On the south side of the city there is a marine railway that can haul boats up to 85 feet in length. Complete hull and engine repairs may be obtained. Gasoline, diesel fuel, water, and electricity are available and there is a machine shop on the premises. In April 1963, depths were 11 feet at the piers and 14 feet at the end of the railway. Supplies and hotel accommodations are available in the city.

From Morehead City the waterway follows a dredged channel through **Bogue Sound.** The Atlantic Beach highway bridge over Bogue Sound at **Mile 179.6** has a swing span with a clearance of 13 feet; see **203.355,** Chapter 2, for drawspan regulations. A power cable 20 yards west of the bridge has a clearance of 28 feet along the causeway, but is submerged where it crosses the channel. Caution is advised when running with a fair tide or approaching the bridge in windy weather.

The summer resort of **Atlantic Beach (Mile 179.6)** is at the south end of the bridge, 3 miles west of Fort Macon. The buildings are conspicuous, the most prominent being a building with twin cupolas. Boats reach the beach from the sound side by following the east side of the bridge in the channel along the causeway. There are several piers where gasoline and water may be obtained. The controlling depth at the entrance to the channel along the causeway was 3 feet in April 1963, thence 10 feet to the piers. There are small-boat launching ramps.

At **Mile 181.8,** a dredged channel with a depth of 4 feet, in April 1963, leads northward from the waterway in **Peltier Creek.** The channel is marked by daybeacons. Two shipyards are on the creek. Berthage, gasoline, diesel fuel, water, ice, electricity, and some ship chandlery are available. The largest of three marine railways can haul out vessels up to 85 feet in length. Major repairs can be made to hulls and engines. There are also 15- and 20-ton Travelifts.

In **Spooner Creek, Mile 183.0,** on the north side of Bogue Sound, 3.3 miles west of Atlantic Beach highway bridge, there is a marina with berthing space for 35 boats with 5 feet of water at the piers. Gasoline, diesel fuel, water, electricity, restrooms, showers, restaurants, motel, provisions, and marine supplies are available. In April 1963, the controlling depth was 6 feet in the marked entrance channel.

At **Bogue Inlet,** the waterway passes around the head of the marshes to **Swansboro, Mile 199.8.** A shipyard in a small cut near the east end of the highway bridge has several marine railways that can haul out boats up to 50 feet in length. Major hull and engine repairs can be made. A pier with 4 feet of water alongside has gasoline, diesel fuel, water, and electricity available. About 0.2 mile southwestward of the Swansboro end of State Route 24 highway bridge, there is a T-shaped yacht basin pier about 400 feet long with 8 feet of water alongside where gasoline, diesel fuel, water, ice, electricity, bottled gas,

provisions, and some ship chandlery are available. A 30-ton Travelift can haul out vessels up to 55 feet in length. Repairs to hulls and engines can be made.

From Swansboro, the route of the waterway follows cuts through the marshes to New River. State Route 210 highway bridge at **Mile 209.8** has a swing span with a clearance of 12 feet; the northwest draw only is used.

At **Mile 213.0**, a channel marked by lights and daybeacons leads to a turning basin at the Marine Corps facility at the head of **Mile Hammock Bay.** The controlling depth was 11 feet in April 1963.

At **New River Inlet** the waterway passes around the head of the marshes in New River to the land cuts southward. **New River** is the approach to the town of Jacksonville, described in Chapter 5. Except at slack water, dangerous cross currents may be encountered in crossing the inlet.

At **Swan Point, Mile 215.1,** just south of New River Inlet, there is a small-boat launching ramp and a pier where outboard motor boats may obtain gasoline.

The route continues through **Alligator Bay** and **Stump Sound.** State Routes 50–210 highway bridge at **Mile 226.7** has a swing span with a clearance of 12 feet. The overhead power cable at the bridge has a clearance of 105 feet.

Just north of and on the east side of the bridge there is a bulkhead for berthing with 5 feet alongside. Gasoline, diesel fuel, water, electricity, and some supplies may be obtained; a small-boat launching ramp is available.

From Stump Sound the channel is through **Topsail Sound** and **Middle Sound. Page Creek,** on the north side of the waterway at **Mile 242.1,** has a yacht basin with an t-head wharf about 250 feet long that has a depth of about 4 feet alongside. Berthage, gasoline, water, and electricity are available. A marine railway can haul out boats up to 40 feet in length. Minor repairs to hull and gasoline engines can be made. Opposite **Mile 243.0,** on the north side of the waterway, there is a yacht basin where berthage is available, and a marine railway that can haul out vessels up to 65 feet in length. Gasoline and water are available and hull repairs can be made.

State Route 74 highway bridge over the waterway at **Wrightsville, Mile 246.0,** has a bascule span with a clearance of 20 feet. An overhead power cable at the bridge has a clearance of 72 feet. Gasoline, diesel fuel, water, ice, and provisions are available on the piers at Wrightsville. A shipyard just southward of the highway bridge has a marine railway that can haul out vessels up to 60 feet in length. There is a machine shop and hull and engine repairs can be made. See Appendix for **storm warning display. Wrightsville Beach,** on the outer coast, and **Masonboro Inlet** are discussed in Chapter 5.

From Wrightsville the waterway continues south through **Masonboro Sound** and **Myrtle Sound.**

Chart 835–SC.—The Intracoastal Waterway continues down Myrtle Sound to Snows Cut. The shallow channel from the waterway to Carolina Beach, at the south end of Myrtle Sound, is discussed in Chapter 5.

Snows Cut connects Myrtle Sound with **Cape Fear River.** U.S. Route 421 highway bridge over Snows Cut at **Mile 256.8** has a fixed span with a clearance of 65 feet. An overhead power cable 0.1 mile west of the bridge has a clearance of 85 feet. The ebb current is 1.6 knots and the flood current is 1.4 knots. For predictions, see the Tidal Current Tables.

The northerly of two dredged channels at the western end of Snows Cut leads northward about 11.5 miles via **Cape Fear River** to the city of **Wilmington.** The controlling depth was 2 feet in December 1963. The Intracoastal Waterway follows the southerly channel to the main channel of Cape Fear River and thence southward to **Southport** where fuel, supplies, repair facilities, and guest rooms are available. Wilmington and Southport are discussed in Chapter 5.

At Southport, **Mile 268.1,** the route of the Intracoastal Waterway leaves Cape Fear River and proceeds westward through land cuts to Lockwoods Folly River. State Route 133 highway bridge over the waterway at **Mile 270.9** has a swing span with a clearance of 9 feet.

A yacht basin 1.8 miles west of the bridge has gasoline, diesel fuel, water, electricity, showers, restrooms, and restaurant service available. There is a 200-foot pier with 3½ feet of water alongside.

At **Mile 275.1** is an overhead power cable with a clearance of 100 feet.

In **Lockwoods Folly River,** the waterway passes around the head of the marshes just inside Lockwoods Folly Inlet. State Route 130 highway bridge over the waterway at **Holden Beach, Mile 281.3,** has a swing span with a clearance of 13 feet.

The waterway passes around the head of the marshes inside **Shallotte Inlet** and proceeds westward by way of cuts through the marshes and sloughs. **Shallotte River, Mile 286.5,** causes strong cross currents in the waterway.

A shipyard at **Bowen Point, Mile 286.7,** has a marine railway that can haul out boats up to 74 feet in length; hull and engine repairs can be made. Gasoline, diesel fuel, and water are available. There is a motel and restaurant close by, but berthing facilities are limited.

At **Mile 289.9,** State Route 904 highway bridge crosses the waterway. It has a swing span with a clearance of 13 feet. At **Gause Landing, Mile 290.2,** is a small public wharf where some provisions are available. At **Mile 293.7,** a pontoon bridge crosses the waterway.

The North Carolina-South Carolina State line crosses at **Mile 296.3** just before the waterway enters Little River.

The waterway joins **Little River** at **Mile 297.2. Calabash Creek** extends northeastward from Little River just north of the waterway cutoff. In March 1963, the controlling depth was 3 feet to the town of **Calabash,** N.C., 0.6 mile above the entrance.

There is considerable dock space at the town of **Little River,** S.C., **Mile 299.2;** fuel and groceries are available. The mean range of tide at Little River is about 5 feet.

A yacht basin at **Mile 301.2** has a 25-ton Travelift that handles boats up to 65 feet in length. Wet and dry cov-

ered storage are available. Repairs can be made to hulls and engines. Gasoline, diesel fuel, water, ice, berthage, and storage are available at **Mile 301.6.**

U.S. Route 17 highway bridge over the waterway at **Mile 301.8** has a swing span with a clearance of 8 feet. An overhead power cable at the bridge has a clearance of 84 feet.

A yacht basin at **Mile 302.7** has berthage and electricity available only at the bulkhead, which has 4 feet of water alongside. A restaurant is close by.

From Little River, the waterway follows a long land cut southwestward to Socastee Creek and Waccamaw River. Near **Windy Hill, Mile 307.6,** there is a yacht basin where gasoline, diesel fuel, water, ice, provisions, and marine supplies are available. There is 6 feet alongside the pier. Minor hull and engine repairs can be made. The basin is about 10 miles northeastward of Myrtle Beach proper.

At **Mile 317.5,** the Atlantic Coast Line Railroad bridge has a bascule span with a clearance of 18 feet. Close westward, U.S. Route 501 highway bridge to Myrtle Beach has a fixed span with a clearance of 65 feet. Overhead cables at the bridges and for about 0.25 mile southwestward have a minimum clearance of 80 feet.

A yacht basin at **Mile 320.2** has gasoline, diesel fuel, water, and electricity available. In March 1963, there was 9 feet of water at the entrance to basin and 11 feet alongside the pier. Other facilities such as showers, restrooms, restaurant, provisions, and supplies will be available upon completion of the basin.

State Route 544 highway bridge over the waterway at **Socastee, Mile 322.4,** has a swing span with a clearance of 11 feet. Overhead power cables in the vicinity of the bridge have a minimum clearance of 94 feet. A county-owned yacht basin without wharves is on the north side of the waterway just west of the bridge. There is a small-boat launching ramp; gasoline, and some supplies can be obtained at Socastee. In March 1963, there was 9 feet of water alongside the bulkhead.

The route of the waterway enters **Waccamaw River** at **Enterprise Landing, Mile 325.4,** and follows the river to Winyah Bay. The direction of flow of the current in the waterway changes at Enterprise Landing. The mean range of tide at the landing is about 2 feet.

Bucksport, on the west side of Waccamaw River at **Mile 327.6,** has a yacht basin where gasoline, diesel fuel, water, ice, electricity, restrooms, showers, restaurant, and provisions are available. There was plenty of dock space with 10 feet of water alongside in March 1963. The marine railway can haul out vessels up to 45 feet in length for general repairs.

A yacht basin at **Wachesaw Landing, Mile 334.2,** 6.5 miles south of Bucksport, has gasoline, diesel fuel, water, electricity, restrooms, showers, restaurant, and some provisions; supplies may be obtained. Hull and engine repairs and covered wet storage are available. There was a small-boat launching ramp and ample dockage space with a depth of 12 feet alongside in March 1963.

U.S. Route 17 highway bridge over Waccamaw River, at **Mile 349.2,** has a swing span with a clearance of 12 feet. In 1963, a new highway bridge was under construction about 0.1 mile southward. The bridge will have a fixed span with a design clearance of 65 feet.

Georgetown, Mile 350.8, at the head of Winyah Bay and just inside the mouth of **Sampit River,** is about a mile northwestward of the waterway. Supplies, hotel accommodations, and repair facilities are available at Georgetown. The mean range of tide is 3.3 feet. The town is discussed at greater length in Chapter 6.

The Intracoastal Waterway leaves Winyah Bay by way of **Western Channel** at **Mile 354.0,** and proceeds southward through the **Estherville-Minim Creek Canal.** A cable ferry crosses the canal at **Mile 357.6.** An overhead power cable over the canal at **Mile 359.4** has a clearance of 97 feet. Southwest of the canal, the waterway crosses **North** and **South Santee Rivers** and proceeds by way of cuts through the marsh to the vicinity of **Casino Creek (Mile 369.0).**

Chart 837–SC.—From the vicinity of Casino Creek the waterway continues through the marshes and a land cut to **McClellanville (Mile 372.8),** on **Jeremy Creek,** 1 mile north of the waterway. Boats lie alongside the docks on the east side of the dredged channel which leads northwestward from the waterway. In June 1962, the controlling depth was 12 feet in the channel and, in March 1963, there was 8 feet alongside the docks. A marine railway of the National Wildlife Refuge, available for do-it-yourself repairs, is on the east side of Jeremy Creek just north of the waterway. The mean range of tide at McClellanville is 5.1 feet. Gasoline, diesel fuel, water, and provisions are available.

From McClellanville the waterway follows land cuts and sloughs through the marshes back of **Bull Bay;** thence through shoal **Sewee Bay** and along **Price Creek;** through the marshes and along **Capers Creek;** behind **Dewees Island** and across **Dewees Creek** to the land cuts behind **Isle of Palms** and Sullivans Island.

On **Hamlin Creek (Mile 398.4),** east of **Breach Inlet,** there is a marina where gasoline, diesel fuel, water, electricity, and other services are available. On **Conch Creek,** opposite **Mile 400.4** just west of the inlet, there is a marina with a basin reported dredged to 12 feet. Berths for 30 boats with electricity and water are available. The marina has a service pier where gasoline, diesel fuel, and water are available. Water and facilities are also piped to floats. The several outlets to the ocean along this stretch are described in Chapter 6.

State Route 703 highway bridge to **Sullivans Island** over the waterway at **Mile 401.6** has a swing span with a clearance of 31 feet. The bridge which formerly crossed the waterway at **Mile 402.7** has been abandoned and the roadway and channel spans have been removed.

The route of the waterway enters the lower east side of **Charleston Harbor** between Sullivans Island and the town of **Mount Pleasant,** which is about 1 mile north of the waterway and is reached through a well-marked channel that branches off from the waterway at **Mile 403.2.**

Complete supply and repair facilities are available at

Charleston, Mile 406.2. The city is described at length in Chapter 6. The mean range of tide at Charleston is 5.2 feet.

The route of the waterway leaves Charleston Harbor at **Mile 407.9** by way of **Wappoo Creek.** State Route 171 highway bridge over Wappoo Creek at **Mile 409.1** has a bascule span with a clearance of 33 feet. Extreme caution is advised when running through the bridge with a current. Cross currents from the old creek are encountered on the ebb in the west approach, and are noticeable on the flood in the east approach due to the bends in the channel. Vessels should proceed slowly and with caution to avoid washing away of the banks east of the bridge.

From Wappoo Creek, the route of the waterway is through **Elliott Cut** and **Stono River** to Wadmalaw River. At **Mile 410.2** is an overehad power cable with a clearance of 100 feet. The Seaboard Air Line Railroad bridge over Stono River at **Mile 414.5** has a swing span with a clearance of 6 feet. Extreme caution is advised when running through the bridge with a current. Cross currents are noticeable on the flood in the south approach. The mean range of tide at the bridge is 5.5 feet.

The John F. Limehouse Highway Bridge over Stono River at **Mile 416.5** has a swing span with a clearance of 13 feet. The overhead power cable at the bridge has a clearance of 92 feet. Caution is advised when running through the bridge with a current. A slight cross current is noticeable on the flood and ebb at both approaches.

At **Mile 417.3, Rantowles Creek** enters from the north. The Atlantic Coast Line railroad bridge 0.6 mile above the mouth has a 41-foot lift span with clearances of 4 feet down and 28 feet up; drawspan regulations are given in **203.245,** Chapter 2. About 1.3 miles above the mouth. U.S. Route 17 highway bridge has a 37-foot fixed span with a clearance of 9 feet. **Wallace Creek** enters Rantowles Creek from the west 0.1 mile above the railroad bridge. State Route 162 highway bridge, 0.7 mile above the mouth of Wallace Creek, has a 38-foot fixed span with a clearance of 9 feet. Overhead cables between the mouth and the bridge have a minimum clearance of 8 feet.

The Seaboard Air Line Railroad bridge over Stono River at **Mile 419.4** has a swing span with a clearance of 6 feet. Extreme caution is advised when running through the bridge with a current. Cross currents from the old channel are encountered on the ebb in the south approach. The tides meet in the vicinity of this bridge.

The route of the waterway enters **Wadmalaw River** at **Mile 423.0.** The town of **Yonges Island** is at **Mile 426.1.** Two marine railways, owned by the Stevens Lines and used to overhaul its own and Government vessels, can haul lengths up to 90 feet.

From Wadmalaw River, the route of the waterway follows **Dawho River, North Creek,** and **Watts Cut** to South Edisto River. State Route 174 highway bridge over Dawho River at **Mile 435.6** has a swing span with a clearance of 8 feet. An overhead power cable just west of the bridge has a clearance of 100 feet. Extreme caution is advised when running through the bridge with a current. Cross currents from Dawho River are encountered on the ebb in the west approach and are noticeable on the flood in the east approach.

Careful steering is required in the Dawho River between **White Point** and the entrance to the cutoff. The channel is well marked but strong currents are experienced. Strong currents are also found at the crossings of the cutoff with the river. The mean range of tide in Dawho River is 6.3 feet.

The waterway follows **South Edisto River** from Watts Cut to **Fenwick Cut,** thence along the **Ashepoo River** for a short distance to **Ashepoo-Coosaw Cutoff,** thence along the **Coosaw River** to Brickyard Creek.

The entrance to **Brickyard Creek** near **Brickyard Point, Mile 460.0,** is between marshy shores, but the marsh on the south side is narrow and terminates just inside the creek in a red eroded bank leading up to somewhat higher ground; this bank is visible for some distance along the Coosaw River. The mean range of tide at the entrance to Brickyard Creek is 7.3 feet.

On the west side of Brickyard Creek, **Mile 462.4,** and 3.4 miles north of the swing bridge at Beaufort there is an Air Force fuel pier. In November 1963, there were depths of 9 to 11 feet alongside.

Albergottie Creek, Mile 462.8, 3 miles north of the swing bridge at Beaufort, runs in a westerly direction from the junction with Beaufort River and Brickyard Creek. The creek, in November 1963, had a controlling depth of 5½ feet for a distance of 2 miles. An Air Force pier on the north side of the creek had depths of 6 to 10 feet alongside in November 1963.

The waterway continues along Brickyard Creek and into **Beaufort River.** On the west side of the waterway at **Mile 465.8** is the town of **Beaufort,** where fuel, supplies, repair facilities, and hotel accommodations are available. The town is described at length in Chapter 7.

The Ladies Island (U.S. Route 21) highway bridge over Beaufort River at Beaufort has a swing span with a clearance of 30 feet. Extreme caution is advised when running through the bridge with a current; cross currents are encountered in the approach on flood and ebb.

The waterway follows Beaufort River past **Port Royal,** at **Mile 470.0,** and into **Port Royal Sound,** which is described at length in Chapter 7.

Chart 839–SC.—After crossing Port Royal Sound, the route of the waterway enters **Skull Creek** at **Mile 480.0** and follows it to **Calibogue Sound,** thence down the sound to the mouth of Cooper River. **Seabrook Landing,** on the south side of Skull Creek, is at **Mile 480.9.**

At **Hilton Head Harbor, Mile 483.8,** on the south side of Skull Creek, a county dock had 8 feet and a yacht facility had a depth of 12 feet alongside in March 1963; gasoline, diesel fuel, water, some marine supplies, electricity, restrooms, showers, a 2-ton marine lift, berthing, and motels are available. At **Mile 484.5,** State Route 46 highway bridge crosses the waterway. It has a swing span with a clearance of 30 feet. During flood tide, vessels will encounter a strong cross current on the north side of the bridge, and should exercise caution when approach-

ing the bridge from the northward. An overhead power cable at the bridge has a clearance of 91 feet.

The route follows **Cooper River** to Ramshorn Creek at **Mile 493.6.** An overhead power cable with a clearance of 55 feet crosses Cooper River 1.6 miles northward of its junction with Ramshorn Creek. At **Mile 494.1** an overhead power cable crossing **Ramshorn Creek** has a clearance of 105 feet. The tides meet in Ramshorn Creek. Between the creek and Walls Cut the route follows **New River.** Care is required as cross currents may be encountered in New River.

The mean range of tide in **Walls Cut, Mile 497.0,** is 7.1 feet. The route is through the cut and along **Wright River** for a short distance, thence through **Fields Cut** and into Savannah River at **Mile 500.0.** The Savannah River ebbs through the cut and strong cross currents may be experienced at the ends of it; these currents cause a shoal to build up and encroach from westward at the east end of the cut. For predictions, see the Tidal Current Tables.

Savannah River is the approach to the important city of **Savannah,** about 8 miles upstream from the Intracoastal Waterway crossing. Savannah has complete supply and repair facilities, and is described at length in Chapter 7. The municipal wharf at the foot of Bull Street is used by the Coast Guard and the Coast and Geodetic Survey and, when space is available, is suitable for berthing large yachts or transient tugs; there is a charge for berthage. Arrangements for berthing are made through the harbormaster and payment is made to the Savannah District Authority. Wharves in Savannah Harbor are not as suitable for small craft as those at Thunderbolt and Isle of Hope. Berthage of small craft in Savannah Harbor exposes them to pounding against the wharves by the surge of vessels plying Savannah River.

Daily predictions for Savannah River are published in the Tidal Current Tables.

The Intracoastal Waterway leaves the Savannah River at **Mile 500.6** and enters **Elba Island Cut,** which leads into **St. Augustine Creek.** At the junction of St. Augustine Creek and **Wilmington River, Mile 502.6,** the abandoned route from the south channel of the Savannah River joins the Waterway.

A highway bridge crossing Wilmington River at **Mile 504.2** has a bascule span with a clearance of 21 feet at the center.

Victory Drive (U.S. Route 80) highway bridge over Wilmington River at **Mile 506.4** has a bascule span with a clearance of 21 feet.

No cross currents are experienced during either flood or ebb; the currents follow the direction of the channel. Ebb currents flow southward and are very strong. Mooring dolphins for tieing-up or breaking-up tows are on both sides of the bridge. When proceeding against the current, a tow may be taken through without breaking up. When proceeding with the current, a tow should be secured to the dolphin and await a favorable current or be broken up and taken through singly.

Thunderbolt, Mile 506.7, is a small town and pleasure resort on the west bank of Wilmington River. Small boats and yachts prefer Thunderbolt to Savannah for berthing to avoid pounding against the wharves. Bus service is available. There are several marinas and boatyards where gasoline, diesel fuel, water, electricity, restrooms, showers, and some provisions are available at the wharves which have 1 to 19 feet of water alongside. There are boatbuilding and repair shops, and several marine railways, the largest of which can haul out boats 100 feet in length. There is a machine shop, and hull and engine repairs can be made. Dry and wet storage are available.

An **anchorage area** is in Wilmington River near Thunderbolt; limits and regulations are given in **202.178,** Chapter 2.

At **Mile 509.1** the route leaves Wilmington River and enters **Skidaway River.** In Wilmington River about half a mile eastward from the Intracoastal Waterway and the Wilmington River-Skidaway River junction, there are hotel accommodations, yacht club privileges, and good anchorage. Water and electricity are available on the pier. Turners Creek is described in Chapter 8.

Isle of Hope, Mile 512.4, is a pleasure resort on the north bank of Skidaway River with small wharves which had depths from 0 to 17 feet alongside in March 1963. Gasoline, diesel fuel, water, and some provisions are available. There is a 4-ton lift that can haul out craft up to 25 feet. Complete hull and engine repairs can be made. A small machine shop and covered storage are available. There is also an **anchorage area** for small craft; limits and regulations are given in **202.179,** Chapter 2.

Skidaway Narrows, between Skidaway River and Burnside River, is easily navigated by small craft, and by larger vessels when speed is reduced sufficiently to accommodate the sharp turns. The velocity of current in the narrows is about 1 knot. Predictions are given in the Tidal Current Tables.

Vernon View, Mile 518.3, on the north shore of Burnside River, has several small privately owned docks where gasoline may be obtained in an emergency. In March 1963, there were depths of 1 to 7 feet at the docks.

At **Mile 519.1,** the Intracoastal Waterway enters **Vernon River,** proceeding thence to **Hell Gate, Mile 526.5,** and **Ogeechee River.** The ebb currents setting out of the Ogeechee River are particularly strong.

The waterway enters **Florida Passage at Mile 526.3** and joins **Bear River at Mile 528.5.** The current is swift in the lower part of Bear River.

St. Catherines Sound, Mile 536.7, becomes quite rough in moderately bad weather, especially with strong east and northeast winds. Strong cross currents may be encountered during freshets in **Medway River.**

The waterway leaves St. Catherines Sound through **North Newport River** and at **Mile 541.7** joins **Johnson Creek.** An alternate route leaving the waterway at **Mile 536.7** proceeds through **Walburg Creek** and joins the main route at **Mile 541.1.** This alternate route is not marked and is seldom used. Good anchorage can be found in Walburg Creek.

The Intracoastal Waterway leaves Johnson Creek and enters **South Newport River** at **Mile 546.4,** and follows the river to Sapelo Sound at **Mile 549.0. Sapelo Sound**

is somewhat rough when there are strong east or northeast winds. The sound is described in Chapter 8.

The route leaves Sapelo Sound through **Sapelo River** and enters **Front River** at **Mile 554.7.** In March 1963, the controlling depth was 1½ feet for 6 miles up the Sapelo River above this junction to the landing at **Pine Harbor (Fairhope).**

Continuing down Front River, the waterway passes through **Creighton Narrows** and joins **Old Teakettle Creek** at **Mile 558.6. Shellbluff Creek** flows into Old Teakettle Creek at **Mile 559.3.** In an emergency, gasoline may be obtained at **Valona,** 0.7 mile up Shellbluff Creek.

At **Mile 562.9,** the route enters **Doboy Sound,** described in Chapter 8. The waterway leaves Doboy Sound via **North River** at **Mile 564.0** and at **Mile 566.1** the route passes **Darien River.**

Little Mud River connects the waterway with **Altamaha Sound** at **Mile 569.5.** The **Altamaha River** enters Altamaha Sound from westward.

The Intracoastal Waterway enters **Buttermilk Sound** at **Mile 573.8** and continues down **Mackay River.**

Two alternate routes branch off the waterway on the Mackay River. The first, at **Mile 578.8,** proceeds down the **Frederica River** past the ruins of **Fort Frederica (Oglethorpe Barracks),** now a National Monument, and rejoins the waterway at **Mile 585.8.** The controlling depth was 9½ feet in February 1963.

The second alternate route leaves Mackay River at **Mile 582.9** and enters **Back River,** proceeding down through **Plantation Creek** to Brunswick River (see Chart 841–SC). This route bypasses St. Simons Sound and is a more sheltered route in easterly weather. In February 1963, the controlling depth was 4 feet. Although the second alternate route is the shorter to Brunswick, mariners are advised to use Plantation Creek only on the higher stages of the tide. The mean range of tide is about 7 feet. The bridges over Back River are described in Chapter 8.

At **Mile 585.7** the main route joins Frederica River and follows it to St. Simons Sound. A highway bridge over the river at **Mile 587.0** has a lift span with clearances of 9 feet down and 85 feet up. A strong east-to-west ebb current sets across the channel. There are mooring dolphins on each side of the bridge.

During flood tide, the current flows northward in the direction of the channel and is very strong. Vessels should exercise great caution while passing through this bridge, especially with a light tow proceeding south. When proceeding with the tide, tows should stop at the dolphins to await favorable current or be broken up and taken through singly.

About 0.3 mile north of the bridge on the east bank is the St. Simons Boating and Fishing Club. Gasoline, fresh water, electricity, restrooms, showers, and berths for about 80 boats are available. Depths of 10 to 18 feet are at the two piers and floats. Two 2-ton hoists and covered storage are available.

Just south of the bridge is the Sea Island Yacht Club. A T-shaped wharf is 205 feet long with depths of 4 to 12 feet alongside. Fresh water, gasoline, diesel fuel, and electricity are available. A nominal charge is made for overnight mooring.

Opposite the yacht club on **Lanier Island,** a storage and repair yard has a dock 420 feet long and 80 feet wide with a depth of 10 feet alongside. Moorings are provided off the dock. Repair facilities consist of two marine railways that can haul out boats 65 feet in length. There is an 8-ton lift. General hull and engine repairs can be made. Gasoline, diesel fuel, water, ice, electricity, showers, and provisions are available. A small-craft monorail lift and covered and uncovered wet and dry storage are also available.

Chart 841–SC.—From Frederica River, the waterway continues through **St. Simons Sound** and **Brunswick River** to Jekyll Creek. About 4.3 miles up Brunswick River from **Mile 591.0** is the city of **Brunswick,** at which hotel accommodations, fuel, supplies, and repair facilities are available. The city is described at length in Chapter 8.

The Intracoastal Waterway follows **Jekyll Creek** southward from Brunswick River to Jekyll Sound. The entrance is marked by a lighted range and protected by a jetty on its west side, the outer end of which is marked by a light. Jekyll Island Range Front Light is about 25 yards to the westward of this light. The jetty covers at high tide but is marked by daybeacons. To enter, be guided by the range, lights, and daybeacons.

A marina at **Mile 593.9** has a pier 300 feet long with depths of 6 to 12 feet alongside, and a 2-ton small-boat hoist that can launch or pick up boats. Gasoline, diesel fuel, water, ice, electricity, groceries, showers and laundry facilities, and some marine supplies are available.

At **Mile 594.6** State Route 50 highway bridge crossing the waterway has a lift span with clearances of 9 feet down and 85 feet up. From Jekyll Creek the waterway enters **Jekyll Sound** at **Mile 595.9,** and continues across St. Andrew Sound.

St. Andrew Sound, which has the most hazardous exposure along the waterway south of Port Royal Sound, is very rough during periods of strong north, northeast, or east winds. A protected route bypassing St. Andrew Sound leaves the waterway at **Mile 596.1.** This alternate route passes through **Little Satilla River, Umbrella Cut, Umbrella Creek, Dover Cut, Dover Creek, Satilla River, Floyd Creek,** and rejoins the waterway in Cumberland River at **Mile 603.7.**

From St. Andrew Sound the waterway enters **Cumberland River,** passing by **Cumberland Wharf, Mile 602.8,** and **Cabin Bluff, Mile 607.7.** The Cumberland River becomes **Cumberland Dividings** and joins with **Cumberland Sound** at **Mile 611.9.**

The waterway continues down Cumberland Sound past the St. Marys River and into **Amelia River** to **Fernandina Beach, Mile 622.8,** where hotel accommodations, fuel, supplies, and repair facilities are available. Fernandina Beach is described at length in Chapter 8.

At **Mile 625.5** the waterway enters **Kingsley Creek.** Two bridges cross the waterway at **Mile 626.3.** The

first, the Seaboard Air Line Railroad bridge, has a swing span with a clearance of 5 feet; an island is alined with the center fenders of this bridge. The second, State Route 200 highway bridge, has a bascule span with a clearance of 21 feet. An overhead power cable on the south side of the bridge has a clearance of 85 feet. The mean range of tide at the bridge is 6 feet. Flood and ebb currents are normal to the bridge openings and are relatively high; velocities up to 2.5 knots on the flood and 3 knots on the ebb may be expected, especially with favoring winds. Caution is advised. For predictions, see the Tidal Current Tables.

At **Mile 627.9,** the waterway enters **South Amelia River** and for a distance of about 4 miles the channel is narrow and winds through shoals and marsh islets. Although the channel is well marked by daybeacons and lights, it is the most difficult part of this section of the route. At low water, the extensive mud flats and oyster beds on each side of the channel are well defined. **Amelia City** is at **Mile 629.4.** There is a private pier to which water is piped. The waterway enters **Nassau Sound** at **Mile 633.5.** The Sound is described in Chapter 8.

At **Mile 634.0,** the Intracoastal Waterway leaves Nassau Sound through a cut about 0.9 mile long, and then enters **Sawpit Creek.** At **Mile 635.0,** an overhead power cable crossing the route has a clearance of 80 feet. The waterway continues along Sawpit Creek and Gunnison Cut to the junction of Sisters Creek with Fort George River at **Mile 638.7.**

Fort George River is marked by daybeacons and trends southward from the waterway to Fort George River Inlet, described in Chapter 8.

The waterway continues down **Sisters Creek.** For current predictions in the creek see the Tidal Current Tables.

At **Mile 642.3,** near the junction of Sisters Creek and St. Johns River, State Route 105 highway bridge crossing the waterway has a bascule span with a clearance of 24 feet at the center. An overhead power cable about 50 feet west of the bridge has a clearance of 80 feet. Caution is advised at the bridge because cross currents are encountered during both flood and ebb.

A marina and boatyard are on the east bank, south of the bridge. The yard has a vertical lift that can haul out craft up to 100 feet in length. Gasoline, diesel fuel, water, ice, restrooms, showers, and covered and open storage are available. There is 6 feet of water at the bulkhead and 12 feet at the berths. Complete hull and engine repairs can be made.

The **St. Johns River, Mile 642.9,** is the approach to the important city of **Jacksonville,** 16 miles west of the junction with the Intracoastal Waterway, where complete supply and repair facilities are available. It is described in Chapter 9.

The Intracoastal Waterway continues south across St. Johns River and into **Pablo Creek.** At **Mile 647.1** the Atlantic Boulevard (State Route 10) highway bridge across the waterway has a bascule span with a clearance of 7 feet. The mean range of tide at the bridge is 2.9 feet. There are strong tidal currents in the immediate vicinity of the bridge. On the flood the current in the channel flows southward and at right angles to the bridge at a velocity of 3.5 knots at strength. On the ebb the current flows northward and sets about 10° to the right of the axis of the channel at a velocity of 5.5 knots at strength. The currents at a distance of 100 yards either side of the bridge are much weaker with practically no turbulence and give no warning of the strong current at the bridge. Current predictions are given in the Tidal Current Tables. An overhead power cable 25 feet north of the bridge has a clearance of 80 feet.

A small landing is on the east bank just northward of the Atlantic Boulevard (State Route 10) Bridge. Gasoline and a launching ramp are available. On the west side of the waterway, just north of the bridge, a boatyard has a marine railway that can haul out boats up to 30 feet in length for hull and engine repairs. In October 1963, a draft of 7 feet could be taken to the yard and there was 8 feet alongside.

A shipyard south of the western approach to the bridge is reached through a dredged cut which leaves the waterway about 200 yards south of the bridge. In October 1963, there was a controlling depth of 7 feet in the cut and 8 feet in the basin. Gasoline, fuel oil, and fresh water are available. Repairs can be made and steel tugs and barges are built. Two vertical-lift docks, the largest of which can accommodate boats up to 100 feet in length, are available. An overhead power cable at **Mile 648.0** has a clearance of 90 feet.

Beach Boulevard (U.S. Route 90) highway bridge across the waterway at **Mile 649.7** has a bascule span with a clearance of 37 feet at the center. An overhead power cable 35 feet north of the bridge has a clearance of 80 feet.

Just north of the Beach Boulevard Bridge, on the east side of the waterway, is a yacht basin. A 20-ton portable lift can haul out boats up to 48 feet in length. There are machine and woodworking shops, and all types of hull and engine repairs can be made. Gasoline, diesel fuel, water, electricity, ice, restrooms, showers, and marine supplies are available. There are 68 slips for boats up to 50 feet in length, wet and dry covered storage, and a protected anchorage off the waterway. A marked channel leading from the waterway to the basin had a controlling depth of 8 feet in October 1963, and there were depths of 8 to 13 feet alongside the slips.

Overnight docking facilities can be had on the eastern shore just southward of the bridge. The yacht basin has a 300-foot marginal wharf, 22 covered slips for boats up to 65 feet in length, and 12 protected open slips for 24 boats of equal length. Larger vessels can be accommodated at the face of the marginal wharf. Depths are 10 to 17 feet at the wharf and 4 to 7 feet at the finger piers. Gasoline, diesel fuel, fresh water, ice, restrooms, showers, marine hardware, and marine supplies are available. There is a 20-ton portable lift that can handle boats up to 55 feet in length for hull and engine repairs.

Numerous snags and old piling, many covered at high water, are on both sides of the waterway for a distance

of about 5 miles from the vicinity of **Oak Landing, Mile 652.0,** to Palm Valley Landing. Particular care should be taken in this section to stay in the center of the channel.

At **Mile 652.4** the waterway leaves Pablo Creek and enters a long cut.

Palm Valley Landing, Mile 656.8, has two locations with docking facilities for yachts, with depths of 5 to 8 feet alongside. Gasoline, diesel fuel, water, and provisions are available.

The Palm Valley Highway Bridge crossing the waterway at **Mile 659.4** has a bascule span with a clearance of 10 feet at the center. The mean range of tide at the bridge is 2 feet. Two small landings are on the waterway just south of the bridge.

The route continues through the long cut to **Tolomato River** at **Mile 661.1.**

Chart 843–SC.—Guano River enters Tolomato River on the east side opposite **Mile 669.3.** A privately marked channel leads up to a dam at **South Ponte Vedra Beach** (Chart 841–SC). The centerline controlling depth was 4 feet in October 1963.

At **Mile 672.1,** there is a marine railway that can haul out boats up to 65 feet in length, for hull repairs. Emergency gasoline engine repairs can be made, and gasoline and water are available.

The **Vilano Beach** (State Route A1A) highway bridge crossing the Tolomato River at **Mile 674.2** has a lift span with clearances of 5 feet down and 83 feet up. The mean range of tide at the bridge is 4.2 feet. Tidal currents run at angles to the bridge and caution is imperative. Flood currents up to 1 knot and ebb currents up to 1.5 knots may be expected during normal weather. An overhead power cable 70 yards south of the bridge has a clearance of 100 feet.

The waterway continues on beyond St. Augustine Inlet and enters **Matanzas River;** the river separates **Anastasia Island** from the mainland. At **Mile 676.0,** Route A1A highway bridge, known as the **Bridge of Lions,** and which connects Anastasia Island with St. Augustine, has a bascule span with a clearance of 25 feet; drawspan regulations are given in **203.432,** Chapter 2. The range of tide at the bridge is 4.2 feet. Caution is advised because the tidal currents, particularly ebb, run at right angles to the bridge. It is advisable to drift large tows through this opening with favorable currents. Normal flood currents of 1 knot and ebb currents of 1.5 knots may be expected.

St. Augustine Inlet and **St. Augustine** are described in Chapter 10.

In the broader sections of the river above St. Augustine, the channel is very narrow and contorted, extending between shoals visible at low water.

San Sebastian River flows into Matanzas River at **Mile 677.4** and is described in Chapter 10.

At **Mile 685.3, Crescent Beach** (State Route 206) highway bridge over Matanzas River has a bascule span with a clearance of 9 feet at the center. Gasoline may be obtained at a fishing camp just south of the bridge on the east side of the waterway.

About a mile northward of Matanzas Inlet, near **Mile 688.5,** the waterway leaves Matanzas River and enters a land cut.

Matanzas River continues eastward and southward about 1.2 miles to Matanzas Inlet. Route A1A highway bridge crossing the inlet has a 41-foot fixed span with a clearance of 10 feet. The inlet is described in Chapter 10. Route A1A highway bridge crossing Matanzas River about 0.8 mile southward of the inlet has a 29-foot fixed span with a clearance of 12 feet; the one crossing the river 1 mile farther south has a 27-foot fixed span with a clearance of 10 feet. The overhead power cables at these bridges have a minimum clearance of 35 feet.

About 2 miles southward of Matanzas Inlet near **Mile 691.2,** the Intracoastal Waterway re-enters Matanzas River. At **Mile 691.7** is the oceanarium at **Marineland** where many types of marine life are exhibited; an admission fee is charged. A marine depot has 300 feet of dock space and, in October 1963, had a depth of 6 feet along its face; gasoline, diesel fuel, water, and bus and taxi service are available; restaurants and a hotel are within walking distance. There is an overhead power cable with a clearance of 43 feet across the boatslip at Marineland; this cable does not cross the Intracostal Waterway. At a fishing camp and another small pier 3.5 miles south of Marineland gasoline may be obtained.

State Route 11 highway bridge at **Flagler Beach, Mile 704.3,** has a bascule span with a clearance of 14 feet. An overhead power cable 70 feet north of the bridge has a clearance of 82 feet. Just north of the bridge there is a small pier where gasoline, diesel fuel, and water may be obtained. Depths of 5 to 7 feet are alongside.

A highway bridge at **Mile 709.1** has a bascule span with a clearance of 15 feet. An overhead power cable 25 feet north of the bridge has a clearance of 97 feet.

The waterway enters **Halifax River at Mile 711.2** and continues to **Ormond Beach.** A yacht basin at **Mile 714.2** has a marine railway that can haul out boats 60 feet in length, for hull and engine repairs. In October 1963, the controlling depth was 7 feet to the basin and there were depths of 5 to 7 feet alongside. Gasoline, diesel fuel, water, ice, restrooms, limited marine hardware, surfaced launching ramp, and electricity are available. There is a machine shop and carpenter shop on the premises. The Ormond Beach Bridge over the waterway at **Mile 716.8** has a bascule span with a clearance of 21 feet at the center.

Daytona Beach, Mile 721.0, is a large resort with stores, hotels, adequate dock space, and every needed supply for yachtsmen. Repair facilities are excellent. Four bridges with bascule spans cross Halifax River at Daytona Beach. Seabreeze Bridge at **Mile 720.5** has a clearance of 20 feet at the center. Main Street Bridge at **Mile 721.0** has a clearance of 22 feet. Broadway Bridge at **Mile 721.3** has a clearance of 20 feet; an overhead cable on the south side of the bridge has a clearance of 98 feet over the main channel. South Bridge at **Mile 721.8** has a clearance of 21 feet at the center.

Just south of the fourth bridge at **Mile 721.9,** a marked channel that had a controlling depth of 6½ feet, in October 1963, leads to the City Dock in the Municipal

Yacht Basin. The basin can accommodate many yachts. Depths of 8 to 9 feet are available alongside. Gasoline, diesel fuel, water, ice, electricity, restrooms, showers, and laundry service are available. Meals and lodging are nearby. At the Halifax River Yacht Club, which is within the basin, reciprocal courtesies are extended to visiting members of other yacht clubs. There is wet open and covered storage for 20 boats with depths of 7 to 9 feet alongside. Adequate facilities are available. See Appendix for **Daytona Beach climatological table and storm warning display.**

Yacht storage and repair facilities are available at two shipyards. One is 0.3 mile south of Seabreeze Bridge at **Mile 720.8**; boats of 8-foot draft come alongside, and its marine railway can haul out boats 80 feet in length for complete hull and engine repairs. A 20-ton hoist, machine shop, and carpenter shop are also on the premises. Gasoline, water, ice, electricity, and restrooms are available. A draft of 6 feet can be taken to the railway and there are depths of 6 to 8 feet alongside.

The other yard is 0.5 mile south of the yacht club at **Mile 722.3.** In October 1963, the controlling depth was 6 feet in the marked channel leading to an almost landlocked yacht basin with 5,000 feet of dock space. The largest of the three marine railways can haul out vessels 150 feet in length for complete hull and engine repairs. Gasoline, diesel fuel, water, ice, electricity, restrooms, restaurants, and a motel are available. There is also a 30-ton portable lift. Showers, groceries, mail, and laundry service are available at both yards.

State Route A1A bridge across the waterway at **Port Orange, Mile 726.0,** has a bascule span with a clearance of 20 feet at the center. There are two marinas on the east side of the waterway, north of the bridge. The largest is 0.3 mile north of the bridge and the other adjacent to the bridge. Gasoline, diesel fuel, water, ice, electricity, restrooms, showers, marine hardware, and a launching ramp are available. A marine railway can haul boats 55 feet in length, for hull and engine repairs. Machine and carpenter shops are on the premises. A draft of 8 feet can be taken to the marina from the waterway and depths of 7 to 14 feet are available alongside.

The waterway continues down the Halifax River to **Mile 730.0** where it enters **Ponce de Leon Cut.** Strong cross currents may be felt at times in this cut, due to the currents from **Spruce Creek** veering from one side to the other.

Inlet Harbor, 0.5 mile southeast of the waterway at **Mile 729.6,** is a small fishing port. Controlling depth from the waterway to the harbor, in October 1963, was 10 feet, thence 5 feet or more to Ponce Park. The channel is along the north shore and is not marked. The wharf here has a depth of 14 feet at the end with 6 to 8 feet alongside. Gasoline, diesel fuel, some marine supplies, and water are available. A small marine railway hauls out boats up to 45 feet in length, for hull and engine repairs. There is berthage for 25 boats. A draft of 7 feet can be taken to the railway.

At **Ponce Park,** 1 mile below Inlet Harbor inside the north side of Ponce de Leon Inlet, there is a marine railway that can haul out boats up to 50 feet in length, for general repairs. In October 1963, a draft of 2½ feet could be carried from the channel to the railway. Limited berthage and gasoline are available.

Ponce de Leon Inlet is described in Chapter 10.

The waterway leaves Ponce de Leon Cut and enters **Indian River North** at **Mile 732.9,** about a mile southward of Ponce de Leon Inlet, and follows the river southward for about 15.5 miles through the marshes to Mosquito Lagoon. In some places the river is narrow and crooked, requiring careful steering and close attention to the channel daybeacons.

Coronado Beach Highway Bridge at **Mile 734.3** has a bascule span with a clearance of 14 feet at the center.

At **New Smyrna Beach, Mile 735.3,** gasoline, fuel oil, water, ice, electricity, showers, marine hardware, and food are available. Dock space is available in the Municipal Yacht Basin, Mile 735.3, at the City Wharf and at a yacht basin, for members only, operated by the Anglers Club in the protected waters on the west side of the waterway. In October 1963, the controlling depth was 10 feet in the entrance channel and 8 feet in the basin. On the south side of the basin opposite the City Wharf there is a dry storage marina with storage for 40 boats up to 25 feet in length. A 2-ton forklift is available that can handle boats up to 25 feet in length.

New Smyrna Beach Highway Bridge at **Mile 735.6** has a swing span with a clearance of 5 feet. During flood (southerly flow), current from Sheephead Cut makes a cross current in a westerly direction north of the bridge. Boats with tows proceeding southward during a flood current are advised to allow for the cross current. An overhead power cable 50 feet south of the bridge has a clearance of 80 feet.

The Intracoastal Waterway through Mosquito Lagoon and Indian River is through open water making the route rough at times, particularly during strong winds.

Oak Hill, Mile 745.7, has railroad connections and telegraph service. On the south breakwater fill there is a fishing camp where gasoline may be obtained in an emergency.

At **Mile 754.7** the waterway enters **Haulover Canal,** a cut about 1.1 miles long through a strip of land that separates Mosquito Lagoon from Indian River. Jetties extend approximately 0.5 mile out from the mainland at each end of the cut. Storms have washed sand up along the outside of the jetties which are now covered by brush. This gives the channel the appearance of being about 100 feet in width.

Wind tides are quite pronounced at times producing strong currents in the canal. Southerly winds will build up the water level on the Indian River side of the canal and at the same time lower the water on the Mosquito Lagoon side. Northerly winds will cause the reverse effect. At such times the normal water level varies as much as 2 feet, with currents through the channel up to 1.5 knots setting in the direction of the wind.

Near the center of Haulover Canal at **Mile 755.3,** State Route A1A highway bridge has a hand-operated span with

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a clearance of 7 feet; the channel is through the south draw. The overhead power cable 100 feet east of the bridge has a clearance of 80 feet. If a vessel must stop before passing through the bridge and a strong current is running, care should be taken to prevent setting against the rocky sides of the canal. A small marina close southwest of the bridge has berthage for 50 boats with depths of 8 feet alongside. Gasoline, diesel fuel, water, electricity, restrooms, restaurants, and a launching ramp are available. At a small pier on the opposite side of the canal, gasoline may be obtained; depths of 13 to 16 feet are alongside.

At **Mile 755.8** the waterway enters **Indian River,** which extends southward 103 miles from Haulover Canal to St. Lucie Inlet. In general, it is a broad lagoon quite shallow in places. The spoil banks alongside the channel have built up in recent years and now appear as small islets on which are mangrove and other trees.

The river is nontidal except in the vicinity of Fort Pierce and for a short distance above the St. Lucie Inlet where the depth may vary as much as 2 feet under the influence of strong northerly and southerly winds.

At **Mile 761.7,** a causeway and railroad bridge across the waterway has a bascule span with a clearance of 7 feet. The span is automatically operated; it is normally in the open position, but will close on the approach of trains; see **203.435,** Chapter 2, for drawspan regulations.

At **Mile 763.2,** a well-protected municipal yacht basin at Titusville is connected to the waterway by a dredged channel which had a centerline depth of 8 feet in October 1963. Gasoline, diesel fuel, water, ice, electricity, restrooms, showers, restaurants, and berthage for 100 boats with depths of 13 to 7 feet alongside are available at the boatbuilding yard and yacht basin. The yard can haul out boats up to 50 feet in length, for hull and engine repairs. A machine shop is on the premises and there is a launching ramp.

The principal industries at **Titusville, Mile 763.7,** are fishing, and growing flowers and citrus fruits. State Route 402 highway bridge across the waterway here has a swing span with a clearance of 9 feet; drawspan regulations are given in **203.436,** Chapter 2. See Appendix for **storm warning displays.**

In October 1963, a causeway and highway bridge was under construction across the waterway at **Mile 769.6.** The bridge will have a bascule span with a design clearance of 27 feet. An overhead power cable at **Mile 772.6** has a clearance of 85 feet over the main channel and 35 feet elsewhere between **Jones Point** and **Merritt Island.**

At **Mile 774.0,** a channel with a controlling depth of 6 feet, in October 1963, leads to a turning basin with a least depth of 5 feet at **Courtenay,** 1.5 miles east of the waterway.

An overhead power cable at **Mile 776.7** has a clearance of 85 feet over the main channel and 25 feet elsewhere, between **City Point** and Merritt Island.

Canaveral Barge Canal, Mile 776.9, connects the Intracoastal Waterway with a turning basin just west of Canaveral Harbor, described in Chapter 10. It is used by commerical traffic going to the lower reaches of Banana River. In October 1963, there was a controlling depth of 9 feet to the Banana River section and on into the turning basin. Lights, a buoy, and daybeacons mark the cut in the Indian and Banana Rivers. About 0.5 mile eastward of Indian River, the canal is crossed by an overhead cable that has a clearance of 78 feet. Another overhead power cable with a clearance of 65 feet crosses the canal 0.2 mile farther eastward, just westward of State Route A1A highway bridge. The bridge has a bascule span with a clearance of 25 feet; drawspan regulations are given in **203.437,** Chapter 2. Gasoline and water may be obtained at a small pier near the bridge that has 7 to 10 feet alongside; there is a launching ramp.

A toll road causeway and bridges crossing Indian River at **Mile 777.1** have a fixed span with a clearance of 65 feet over the main channel, and a 30-foot fixed span over a relief channel at the west end of the causeway with a clearance of 12 feet.

State Route 520 highway bridge across the Indian River at **Cocoa, Mile 780.2,** has a swing span with a clearance of 5 feet; drawspan regulations are given in **203.436,** Chapter 2. An overhead power cable about 0.1 mile below the bridge has a clearance of 88 feet.

Northward of and parallel with the causeway on the east side of Indian River, a dredged channel, which had a controlling depth of 6 feet in October 1963, leads to a yacht basin and repair yard. Depths of 6 to 8 feet were available alongside the piers. This facility has a marine railway capable of hauling out boats up to 50 feet in length. Gasoline, diesel fuel, water, and dock space with electrical connections are available. General repairs can be made.

At **Mile 783.3,** daybeacons mark a channel leading to a marina on Merritt Island. In October 1963, the controlling depth was 5 feet from the waterway to the marina. There are two marine railways, the largest of which can haul boats up to 65 feet in length for hull and engine repairs. Berthage, gasoline, diesel fuel, water, electricity, restrooms, and showers are available.

Charts 843–SC, 1245, 1246.—The entrance to **Banana River** is at **Mile 794.5** opposite Eau Gallie and about 0.1 mile north of the highway bridge. The river is used by small boats as a harbor of refuge during hurricanes and storms. In October 1963, the controlling depth was 6 feet from the entrance of the river for 16 miles to the barge canal leading eastward to the turning basin at Canaveral Harbor. The Eau Gallie Yacht Club and basin are on the east side of the entrance.

A highway bridge across the Banana River about 0.4 mile above the entrance has a swing span with a clearance of 8 feet.

An Air Force seaplane **restricted area** is in Banana River, 7 miles above the entrance; limits and regulations are given in **207.171c,** Chapter 2.

Newfound Harbor is at the southeastern end of Merritt Island, 10 miles above the entrance to Banana River. The harbor is shoal and about 4 miles long in a north-south

direction. About 3.7 miles above the entrance, State Routes A1A and 530 highway bridge has a 36-foot fixed span with a clarance of 8 feet.

Across the entrance to **Sykes Creek** at the north end of Newfound Harbor there is a highway bridge that has an 11-foot fixed span with a clearance of 8 feet. Another highway bridge crossing the creek 2.2 miles above the entrance, has a 30-foot fixed span with a clearance of 14 feet.

A marina and repair yard is on the west side of Banana River about 11.8 miles above the entrance. The yard makes general repairs and has a railway that can haul out boats up to 65 feet in length. Gasoline, diesel fuel, water, electricity, ice, bottle gas, restrooms, showers, and marine supplies are available and electronic repairs may be obtained. There is berthage for 20 boats. In October 1963, the controlling depth was 5 feet to the yard, and there were depths of 5 to 7 feet alongside.

Cocoa Beach causeway, crossing Banana River about 13.2 miles above the entrance, has a swing span with a clearance of 5 feet. An overhead power cable on the north side of the bridge has a clearance of 82 feet. See Appendix for **storm warning displays.**

About 16 miles above the entrance, Banana River is crossed by a toll-road causeway and bridges. The fixed span over the main river channel has a clearance of 36 feet; the 30-foot fixed span over the relief channel at the west end of the causeway has a clearance of 14 feet.

About 16.3 miles above the entrance, the barge canal crosses the river channel to a basin at Canaveral Harbor. About 0.6 mile northward of the canal crossing there is an overhead power cable with a clearance of 65 feet. The dredged channel extending northward from the barge canal for about 5 miles then eastward to the cape, had a controlling depth of 8 feet, in October 1963. In 1963, this channel was further extended for about 6 miles northward to the head of Banana River to two side channels in Banana Creek leading eastward and westward to turning basins at missile-test installations. This section had a controlling depth of 10 feet in October 1963. The channel is marked by lights and daybeacons.

A **prohibited area** in upper Banana River, about 3 miles above the barge canal, is adjacent to a missile-test annex; limits and regulations are given in **207.171a,** Chapter 2.

A highway causeway and bridge were under construction across Banana River about 6.5 miles above the barge canal in 1963. The bascule span over the new channel will have a design clearance of 24 feet.

Chart 845–SC.—The Intracoastal Waterway continues through Indian River southward for 64 miles to St. Lucie Inlet.

At **Mile 794.5,** a marina on the east side of the river and just north of the highway bridge has berthage for 50 boats. There is a 30-ton portable lift that can handle boats up to 40 feet in length for hull and engine repairs. Gasoline, diesel fuel, water, ice, electricity, bottle gas, restrooms, showers, restaurant, and limited hardware are available. In October 1963, the controlling depth was 10 feet from the waterway to the basin and there was 8 to 9 feet alongside the piers.

At **Mile 794.6,** State Route A1A highway bridge across the Intracoastal Waterway has a swing span with a clearance of 9 feet; drawspan regulations are given in **203.436,** Chapter 2. About 150 yards below the bridge, an overhead power cable crossing the waterway has a clearance of 95 feet.

At **Mile 795.1,** a channel which had a controlling depth of 7 feet, in October 1963, leads to a yacht basin inside the mouth of **Eau Gallie River** just south of **Eau Gallie.** The basin offers good protection from storms. A city ordinance limits speed to no wake in Eau Gallie River. Gasoline, diesel fuel, water, showers, restrooms, ice, electricity, bottled gas, and laundry service are available. Provisions can be obtained in town. A machine shop and two marine railways are in the basin; the larger railway can haul out boats up to 85 feet in length. Berthage and storage are available, and general repairs can be made.

Eau Gallie has a harbormaster. See Appendix for **storm warning display.**

About 0.1 mile above the yacht basin and 0.5 mile above the mouth of the river, U.S. Route 1 highway bridge has a fixed span with a clearance of 11 feet. About 0.1 mile above the highway bridge, the Florida East Coast railroad bridge has a 44-foot fixed span and a clearance of 12 feet.

Melbourne is a winter resort at **Mile 797.9.** Gasoline, diesel fuel, water, ice, groceries, marine supplies, and laundry service are available. The highway bridge over the waterway here has a swing span with a clearance of 6 feet; drawspan regulations are given in **203.436,** Chapter 2. The overhead power cable at the bridge has a clearance of 79 feet.

See Appendix for **storm warning display.**

At **Mile 798.3,** about 0.4 mile south of Melbourne Bridge, a marked channel that had a controlling depth of 7 feet, in October 1963, leads westward from Indian River to two yacht basins and a fishing camp with docking facilities for 80 boats up to 50 feet in length in **Crane Creek.** There are a 2½-ton lift capable of handling boats up to 25 feet in length and a launching ramp. Storage facilities, gasoline, diesel fuel, water, ice, electricity, laundry service, restaurant, motel, restrooms, showers, provisions, and marine supplies are available. On the east side of the basin a marine repair and storage plant has a railway that can haul out boats up to 50 feet in length for hull and engine repairs. A machine shop is at the yard. Gasoline, diesel fuel, water, electricity, and restrooms are available.

About 0.2 mile above the entrance to Crane Creek, U.S. Route 1 highway bridge has a 36-foot fixed span and a clearance of 15 feet. About 175 yards westward of the highway bridge, the Florida East Coast railroad bridge has a 40-foot fixed span and a clearance of 14 feet. About 500 yards westward of the railroad bridge, an overhead telephone cable has a clearance of 40 feet.

Turkey Creek is on the west side of Indian River op-

posite **Mile 800.7.** About 0.4 mile above the entrance, U.S. Route 1 highway bridge has a 34-foot fixed span with a clearance of 10 feet. About 300 yards above the highway bridge, the Florida East Coast railroad bridge has a fixed span with a clearance of 10 feet. Between the two bridges there is a marina on the south side of the creek, at which there is berthage for 32 boats. Gasoline, water, ice, electricity, restrooms, and some marine supplies are available, and there is a surfaced launching ramp. In October 1963, the controlling depth was 4 feet from the waterway to the marina and there was 4½ feet alongside. At a marine railway on the north side of the creek, boats up to 50 feet in length can be hauled out for hull and engine repairs; water and electricity are available.

Grant, on the west side of Indian River opposite **Mile 807.5,** has railroad service.

Sebastian Creek, Mile 812.8, is used by local fishing and kelp-gathering boats going to **Roseland,** 1.1 miles above the mouth. U.S. Route 1 highway bridge across the entrance to the creek has a 40-foot fixed span with a clearance of 13 feet; avoid the piles of the old bridge 0.3 mile upstream. About 1 mile above the highway bridge, the Florida East Coast railroad bridge has a 46-foot fixed span with a clearance of 12 feet. About 300 yards above the railroad bridge an overhead power cable has a clearance of 23 feet.

Sebastian is a fishing town at **Mile 815.5.** No docks or marine service are available to passing vessels.

A highway bridge across the waterway at **Mile 819.7** near **Wabasso** has a hand-operated swing span with a clearance of 9 feet.

The waterway is crooked and subject to strong currents in narrow places from about 1 mile north of the Wabasso Bridge to about 4 miles south of it. Caution must be observed at the bends where vision is limited.

At **Mile 827.0,** a marked channel with a controlling depth of 10 feet, in October 1963, leads eastward for 0.4 mile to the piers of Vero Beach Yacht Club with depths of 6 to 14 feet alongside. Gasoline, diesel fuel, water, electricity, ice, restrooms, showers, restaurant, motel and limited marine hardware, and overnight dockage are available. There is a 15-ton fixed lift capable of handling boats up to 30 feet in length, for minor hull and engine repairs.

State Route 60 highway bridge at **Mile 827.2** over the waterway at Vero Beach has a bascule span with a clearance of 22 feet. On the north side at the west end of the causeway there is a marina with berthage for 35 boats with 7 to 10 feet alongside. The controlling depth was 7 feet from the waterway to the marina in October 1963. Gasoline, water, ice, electricity, restrooms, and showers are available; there is a 5-ton fixed marine lift. Hull and engine repairs may be obtained. Just south of the bridge on the west bank is a marina where gasoline, diesel fuel, water, ice, and marine supplies are available. A restaurant and a motel are on the premises. Also there is berthage for 20 boats, and a 1½-ton fixed lift can haul boats up to 18 feet in length. There is 6 feet of water at the wharf. The controlling depth was 10 feet from the waterway to the wharf, in October 1963. The town of **Vero Beach** is off the waterfront.

From Vero Beach to the St. Lucie Inlet the Indian River is broad and quite shallow, but the Intracoastal Waterway route is well marked and easy to follow. Spoil banks parallel the channel at a distance of several hundred yards and are mostly covered with mangrove and a few Australian pines.

An overhead power cable at **Mile 828.3** has a clearance of 80 feet.

State Route A1A highway bridge north of Fort Pierce at **Mile 838.4** has a swing span with a clearance of 9 feet. The east draw has been closed. A partially submerged wreck lies in the bight northwestward of the bridge.

In 1963, a highway bridge was under construction just southward of the existing highway bridge. The bridge will have a bascule span with a design clearance of 25 feet.

Fort Pierce, Mile 839.2, has supply and repair facilities. The town and Fort Pierce Inlet are described in Chapter 10.

At **Mile 839.3,** State Route A1A highway bridge crossing the waterway at Fort Pierce has a swing span with a clearance of 6 feet. A strong cross current exists at this bridge. Vessels proceeding north or south should not approach the bridge until it is fully opened for passage. At all times maintain sufficient headway to avoid being carried against the fender system. An overhead power cable with a clearance of 80 feet over the main channel is about 130 yards south of the bridge.

Jensen Beach, Mile 852.7, is a winter resort on the west bank of Indian River. Fishing in Indian River is the principal industry. Dock space is limited to shallow-draft craft. State Route A1A highway bridge crossing the waterway here has a swing span with a clearance of 9 feet. An overhead power cable 125 yards south of the bridge has a clearance of 25 feet but is submerged at the channel.

At **Mile 853.9,** a marked dredged channel leads from the Intracoastal Waterway to a boat harbor and repair yard on the west side of Indian River. In October 1963, the controlling depth from the Intracoastal Waterway to the harbor was 5 feet; depths alongside were 5 to 6 feet. A marine railway can haul out vessels up to 45 feet in length, for minor hull and engine repairs, and a 2-ton crane is available for handling boats up to 20 feet in length. Wet and dry storage are available for small boats. Gasoline, water, marine hardware, and a surfaced launching ramp are available.

At **Mile 854.5,** a dredged channel marked by daybeacons leads from the Intracoastal Waterway to a marina on the west side of Indian River. In October 1963, the controlling depth in the channel was 7 feet and in the basin there were depths of 5½ to 9½ feet. There is dockage for 23 boats and a 3-ton marine lift capable of handling boats up to 21 feet in length. Gasoline, diesel fuel, water, ice, electricity, restrooms, showers, restaurant, and motel are available.

The State highway bridge across the waterway at **Mile 855.8** has a bascule span with a clearance of 28 feet at the center.

The junction of the Intracoastal Waterway and Okeechobee Waterway is at **St. Lucie Inlet, Mile 858.4.** St. Lucie Inlet and River, Port Salerno, Port Sewall, and Stuart are described in Chapter 10.

Extreme caution is advised when crossing St. Lucie River. Cross currents will give a vessel an east or west set, depending on the direction and velocity of the current in the river. Vessels should be able to stay in the channel by using the ranges on each side of the intersection. To make a turn from the Intracoastal Waterway into St. Lucie River or vice versa, allowance must be made for the cross currents to prevent swinging too wide or too short.

Chart 855–SC.—Okeechobee Waterway.—From its junction with the Intracoastal Waterway in St. Lucie Inlet, Okeechobee Waterway follows St. Lucie River westward to South Fork, through South Fork and St. Lucie Canal, and enters Okeechobee Lake at Port Mayaca. It crosses the southern part of the lake, and exits at Moore Haven into Caloosahatchee Canal and thence into Caloosahatchee River, San Carlos Bay, and the Gulf of Mexico. The Gulf section of the Intracoastal Waterway follows the Gulf Coast from Apalachee Bay, Florida, to the Mexican border at Brownsville, Texas, and is described in **United States Coast Pilot 5, Atlantic Coast—Gulf of Mexico, Puerto Rico, and Virgin Islands.**

Channels.—The Federal project for the Okeechobee Waterway provides for a channel with a depth of 8 feet from the Intracoastal Waterway near Stuart via Okeechobee Lake Routes 1 and 1B to Fort Myers; thence 10 feet to Punta Rassa, thence 12 feet to the Gulf of Mexico; a channel 6 feet deep in Taylor Creek from the town of Okeechobee to the lake, and a depth of 6 feet for Route 2 along the south shore of Lake Okeechobee from Port Mayaca westward to Clewiston. Controlling depths are published in Notices to Mariners.

Summary of depths tabulated in Notice to Mariners 7 of February 15, 1964.

St. Lucie River **(Mile 0.0)** to Lake Okeechobee **(Mile 33.8)**—8 feet.

Lake Okeechobee to Moore Haven **(Mile 68.3)** via Route 1A—4 feet.

Lake Okeechobee to Moore Haven, via Route 1B—8 feet.

Lake Okeechobee to Moore Haven, via Route 2—8 feet.

Moore Haven to the Gulf of Mexico **(Mile 135.0)**—8 feet.

Water levels.—Depths charted in Caloosahatchee River and St. Lucie River are referred to mean low water; in Caloosahatchee Canal, depths are referred to a low-water elevation which is 10 feet above mean sea level; Lake Okeechobee and St. Lucie Canal depths are referred to a low-water elevation which is 12.5 feet above mean sea level. Actual navigation depths show on gages displayed at each lock.

Hurricane gates are in the levee at Taylor Creek, Clewiston Industrial Canal, Miami Drainage Canal, Hillsboro Canal-North New River Drainage Canal, and West Palm Beach Beach Drainage Canal. Pumping stations are at the hurricane gates at Miami Drainage Canal, Hillsboro Canal-North New River Drainage Canal, and West Palm Beach Drainage Canal. The gates are opened or closed only for pumping, and are not opened for boats. Depths of 10 feet may be taken over the sills except at Taylor Creek where the depth over the sill is 7 feet. All gates have a width of 50 feet. These canals are not navigable and have filled with hyacinths and other obstructions.

Tides.—The mean range of tide is 2.6 feet at St. Lucie Inlet; at Fort Myers 0.7 foot, and at Punta Rassa 1.7 feet. At the eastern end of the waterway, tidal influence is perceptible to St. Lucie Lock (Mile 13.1) and at the western end, at low water stage, is perceptible at Ortona Lock (Mile 81.2). Cross **currents** at the junction of St. Lucie River with the Intracostal Waterway make the short turn at that point hazardous.

Bridges.—Minimum overhead clearance of Okeechobee Waterway bridges is 55 feet at the fixed bridges at **Miles 12.6, 117.1,** and **123.1.** Minimum widths of bridge openings are 47 feet at the railroad swing bridge at Mile 24.5, 49 feet at the railroad swing bridge at Mile 112.5, and 50 feet at the highway swing bridge at Mile 52.7. On Taylor Creek the minimum width of bridge opening is 40 feet at the highway bascule bridge 0.3 mile above the mouth.

Cables.—Minimum clearance of overhead power cables is 48 feet at **Mile 33.0.** A number of other cables have clearance of 55 feet. On Taylor Creek the minimum clearance is 40 feet at the highway bridge 0.3 mile above the mouth.

Locks.—Each of the three locks in the waterway has a length of 250 feet, width of 50 feet, and depth over the sill of 10 feet. The old lock at St. Lucie, which is used as an auxiliary, has a length of 130 feet, width of 30 feet, and depth over the sill of 6 feet. In 1963, a new lock was under construction at Olga **(Mile 106.7).**

General regulations governing bridges and locks and the handling of tows are given in **207.160,** Chapter 2. The navigation locks on the Okeechobee Waterway are normally operated on the following schedule (EST): St. Lucie Lock, 8 a.m. to 12 noon, and 1 p.m. to 5 p.m.; Moore Haven, 6 a.m. to 8 p.m.; and Ortona Lock, 8 a.m. to 12 noon, and 1 p.m. to 5 p.m.

Maintenance of the Okeechobee Waterway and operation of the locks are in charge of the Corps of Engineers area office at Clewiston. Before attempting the passage through any portion of this route, the latest information regarding available depths, operation of the locks, and other existing conditions should be obtained from the office of the Corps of Engineers at Clewiston or at 575 Riverside Avenue, Jacksonville.

Public address systems are installed at St. Lucie, Moore Haven, and Ortona Locks as an aid to navigation and safety. At Moore Haven Lock, craft should await instruction from the lock tended through the loudspeaker or by light signal before approaching the lock.

Caution.—The St. Lucie, Moore Haven, and Ortona Locks are used, when conditions require, for discharging water from Lake Okeechobee. All vessels approaching these locks during periods of discharge should exercise caution.

Mileage in the Okeechobee Waterway is measured westward from **Mile 0.0** at the Intracoastal Waterway junction in St. Lucie Inlet. The total length of the Okeechobee Waterway is about 135 miles from the Atlantic Intracoastal Waterway to the Gulf of Mexico.

St. Lucie Inlet and **St. Lucie River** to **Stuart, Mile 6.5** are discussed in Chapter 10. **South Fork** of St. Lucie River begins at **Mile 6.7** and trends southward into St. Lucie Canal.

Palm City, Mile 8.2, is a small town on the west bank of South Fork. A small boatyard for hull and engine repairs on the east bank of the river, just south of the Palm City bridge, has a marine railway that can haul out boats up to 45 feet in length. Gasoline, water, ice, electricity, wet covered storage for 15 boats up to 45 feet, limited marine supplies, restrooms, showers, and cottages are available at the yard and a restaurant is close by. In September 1963, a controlling depth of 4½ feet could be carried from the waterway to the yard and alongside. The highway bridge over the waterway here has a bascule span with a clearance of 10 feet at the center; the overhead power cable just north of the bridge has a clearance of 55 feet. During periods of high water in Lake Okeechobee, shoaling may occur in the vicinity of the bridge.

At **Mile 11.6,** Okeechobee Waterway enters St. Lucie Canal from South Fork which then continues southeastward. South Fork above the junction is deep and winding, affording good protection for small boats during hurricane weather. About 2 miles up this fork is a fixed highway bridge with a clearance of 4 feet. Current was observed to be flowing up the river at this bridge.

St. Lucie Canal is crossed at **Mile 12.6** by the Sunshine State Parkway bridge which has a fixed span with a clearance of 55 feet.

The **St. Lucie Lock, Mile 13.1,** has a width of 50 feet, length of 250 feet, and a controlling depth of 11 feet over the sill. High water in Lake Okeechobee may cause the lock to be closed to navigation for parts of the day. Caution should be used when approaching the lock when it is being used to discharge water from Lake Okeechobee. Limited tieup facilities are available at the lock.

Overhead power and telephone cables crossing St. Lucie Canal at **Mile 14.8** have clearances of 55 feet. A State highway bridge crossing the canal at **Mile 14.9,** has a hand-operated swing span with a clearance of 6 feet.

At **Mile 20.4,** overhead power and telephone cables crossing the waterway have clearances of 55 feet.

At **Mile 21.7,** an overhead power cable with a clearance of 63 feet crosses the waterway.

Near **Indian Town,** two hand-operated swing bridges cross the waterway. State Route 710 highway bridge, at **Mile 24.2,** has a clearance of 12 feet. The Seaboard Air Line Railroad bridge at **Mile 24.5,** has a channel width of 47 feet and a clearance of 6 feet; drawspan regulations are given in **203.439,** Chapter 2. Two overhead cables at the bridge have a minimum clearance of 69 feet.

At **Mile 25.3,** there is a marina on the north side of the canal with 33 slips where craft up to 120 feet in length can be accommodated. Gasoline, diesel fuel, water, ice, electricity, restrooms, showers, laundry service, and snack bar are available. There is a surfaced launching ramp, a 3-ton marine lift, and a mechanic on call for minor engine repairs. Provisions, supplies, restaurants, and motels are available close by. In September 1963, the controlling depth in the entrance and in the basin was 6 feet.

The minimum clearance of the overhead cables at **Miles 29.7, 31.5,** and **32.8** is 55 feet.

Port Mayaca, Mile 33.0, has no gasoline, fresh water, or provisions. There are no docks, but one wall of the old lock is still present and can be used to tie up. The Florida East Coast Railway bridge across the waterway here has a lift span with clearances of 6 feet down and 48 feet up.

U.S. Route 441 highway bridge at **Mile 33.7** has a swing span with a clearance of 10 feet. The channel is through the north draw.

The waterway enters **Lake Okeechobee** at **Mile 33.8.** The lake is an approximately circular fresh-water lake in southern Florida, about 26 miles from the Atlantic coast, 50 miles from the Gulf coast, and 90 miles from the south end of the mainland. It varies in width from 22 to 30 miles and is shoal along its west and southwest sides with depths of 10 to 14 feet in the center part. The shoal areas are generally filled with a thick growth of watergrass which makes it necessary to equip boats with weedless propellers if operating in the lake for any length of time.

Taylor Creek empties into Lake Okeechobee at its northernmost extremity. Three miles above the mouth of the creek is the town of **Okeechobee** which has rail and highway connections. A Federal project provides for a channel 6 feet deep to Okeechobee. The centerline depth, in September 1963, from the entrance to the highway bridge was 4½ feet. There are two fishing camps in the creek where gasoline and water may be obtained.

At the head of navigation in Taylor Creek is the fixed Seaboard Air Line Railroad bridge, 4 miles above the mouth. U.S. Route 441 highway bridge 0.2 mile above the mouth of the creek has a 40-foot bascule span with a clearance of 9 feet. Overhead power cables north and south of the bridge have a minimum clearance of 40 feet. See Appendix for **storm warning display.**

Kissimmee River flows into the north side of Lake Okeechobee about 5.3 miles southwest of Taylor Creek. State Route 78 highway bridge about 0.5 mile above the river entrance has a swing span with a channel width of 40 feet and a clearance of 6 feet; drawspan regulations are given in **203.245,** Chapter 2. An overhead cable at the bridge has a clearance of 47 feet. In 1963, highway bridge with a removable span was under construction; design channel width is 36 feet and clearance 20 feet. This bridge will replace the existing swing bridge. In September 1963, the centerline depth in the entrance chan-

nel was 5 feet to the bridge, thence 15 feet for another 1.4 miles.

North Lake Shoal extends 4 miles off the northwest shore of the lake. **Observation Shoal** is an extensive sand shoal extending as much as 7 miles off the southwest shore of the lake. **Rocky Reef** extends across the south end of the bay between **Observation Island** and **Bacom Point**; depths of 2 to 7 feet are over it in places. The channel of Route 1 through the reef is marked by lights and daybeacons. **Halifax Bank** is a sand shoal toward the south end of **South Bay.**

Shelter may be found in Taylor Creek at the north end of the lake, in **Pelican Bay** at the southeast corner of the lake, and in the canals. Where depths are sufficient in the watergrass off the west and southwest sides of the lake, anchorage in moderate weather can be made, as the holding bottom is good and protection is afforded by the watergrass.

Route 1 across Lake Okeechobee from Port Mayaca follows a southwesterly course to Rocky Reef, thence a southerly course in the channel through the reef which is marked by lights and daybeacons, and then turns westward and branches into Routes 1–A and 1–B. **Route 1–A,** the shortest and shoalest of the routes to Liberty Point, is seldom used, although the channel is well marked and relatively free from hyacinths. **Route 1–B** is well marked and branches southward to Clewiston where it is joined by Route 2.

Clewiston, at **Mile 56.4** via Route 1–B, and **Mile 65.7** via Route 2, is an agricultural community on the southwest side of the lake. It is on a branch of the Atlantic Coast Line Railroad. There are several hotels, motels, restaurants, and a shopping district in the city. The area offices and general headquarters of the Corps of Engineers are on the east side of the canal at the east side of town. Gasoline, diesel fuel by truck, some supplies, and provisions can be obtained along the west side of the canal. There is a small marine railway that can haul boats up to 40 feet in length, for general repairs. Dock space is available along the bulkhead of the Clewiston Industrial Canal south of the levee. The depth alongside is 4 feet. An overhead power cable that has a clearance of 37 feet crosses the canal about 400 yards south of the hurricane gate. See Appendix for **storm warning display.**

From Clewiston, combined Routes 1–B and 2 follow the south shore of the lake northwesterly to **Liberty Point.**

Route 2 leaves St. Lucie Canal at **Mile 33.8** and follows the southern perimeter of the lake. It is marked by daybeacons, and is the route most used. It is recommended during periods of rough water and high winds in Lake Okeechobee. Levees are along the southern bank of this route.

Canal Point is at **Mile 41.2** on Route 2. **West Palm Beach Drainage Canal** joins the lake here; at the lock in the canal an overhead power cable has a clearance of 80 feet. See Appendix for **storm warning display.**

Pahokee, Mile 44.0, is a town on the southeast side of the lake with a protected boat basin which had a depth of 6 feet, in September 1963. Gasoline, water, and electricity are available at the pier in the basin, which had depths of 6 to 10 feet alongside. See Appendix for **storm warning display.**

At **Mile 52.7** is the only bridge crossing Route 2. State Route 717 highway bridge, connecting the mainland at **Belle Glade** with **Torry** and **Kreamer Islands,** has a swing span with a clearance of 11 feet. The channel is through the west draw. An overhead cable at the bridge has a clearance of 55 feet. Gasoline, water, ice, electricity, and launching ramps are available at boat landings on both sides of the bridge. South of the bridge, on Torry Island, there is a wharf maintained by the city with depths of 4 feet alongside; there are three surfaced launching ramps and a public picnic area.

About 0.3 mile below the bridge at **Mile 53.0** the **Hillsboro** and **North New River Drainage Canals** join the lake.

The **Miami Drainage Canal** joins the lake at **Lake Harbor, Mile 58.6.**

Route 2 continues northwestward to Clewiston where it joins Route 1–B, and the combined routes continue to Liberty Point.

Routes 1–A, 1–B, and 2 combine into one route on the southwest side of the lake at **Liberty Point: Mile 59.3** via Route 1–A; **Mile 61.1** via Route 1–B; and **Mile 70.4** via Route 2. Mileage westward of Liberty Point is based on use of Route 1–B.

Moore Haven Lock, Mile 67.8, has a width of 50 feet, a length of 250 feet, and a least depth of 11 feet over the sills. Two standby areas have been established for vessels waiting to pass through. The first area is about 275 yards northeast of the lock at the junction of the canals, and the second area is 150 yards southwest of it. During periods of discharge through the lock, the currents and turbulence are extremely hazardous to all craft. Under no circumstances shall any craft approach nearer to the lock than the standby areas until discharge has been stopped and the water pool stabilized.

A public address system at the Moore Haven Lock is an aid to navigation and safety feature. Craft coming to the lock should approach the passage only upon receiving instructions from the locktender through the loudspeaker system, and enter the lock chamber only after signal from him.

Fresh water is available at the lock. A Government boat basin with four slips for medium-sized boats is just west of the lock. In September 1963, there were depths of 6 to 30 feet in the basin.

The waterway between Moore Haven Lock and Ortona Lock passes through **Caloosahatchee Canal.**

The Atlantic Coast Line Railroad bridge, at **Mile 68.1,** has a hand-operated swing span with a clearance of 5 feet; the channel is through the east draw. See **203.245,** Chapter 2, for drawspan regulations. The span requires about 15 minutes for opening and westbound vessels should signal for opening the bridge while still in Moore Haven Lock. An overhead power cable about 150 yards south of the bridge has a clearance of 83 feet. At **Mile 68.2,** U.S. Route 27 highway bridge has a bascule span with a clearance of 23 feet.

There is a small-boat basin on the west side of the canal between the railroad and highway bridges. Gasoline,

water, ice, electricity, restrooms, launching ramp, and wet covered storage for 20 boats 20 feet in length are available. A depth of 3½ feet can be carried from the waterway to the basin. An overhead cable with a clearance of 18 feet crosses the entrance to the basin. Provisions can be obtained in the town of **Moore Haven** at **Mile 68.3**, on the west bank of Caloosahatchee Canal, about 0.5 mile south of the lock. There are hotels, motels, and restaurants; some supplies can be obtained. Bus service is available. The town dock is on the west side of the canal just south of the highway bridge; water and electricity are available on the dock and a small fee is charged for dockage. There is a depth of 9 feet alongside the dock. Gasoline and diesel fuel may be obtained at a small fuel pier at the south edge of town. See Appendix for **storm warning display.**

At **Mile 71.2**, the canal passes through shallow, freshwater **Lake Hicpochee**, about 5 miles long and 2.5 miles wide, soft mud bottom. Most of the surface is covered with hyacinth and saw grass. Spoil banks on both sides of the canal are overgrown to a height of about 12 feet and have only a few open spots where the lake can be seen.

Ortona Lock, Mile 81.2, has a width of 50 feet, a length of 250 feet, and a depth of 11 feet over the sills. During periods of heavy discharge through the spillway with the lock gates closed, the currents sweep toward the spillway. Navigators approaching the lock should exercise extreme caution and maintain maximum possible control at all times. There are tieup facilities on the north bank about 300 yards east of the lock. A boat basin, a ramp, and a 180-foot wharf are about 500 yards west of the lock on the north bank.

The waterway enters **Caloosahatchee River** through a land cut west of Ortona Lock. Normal current in the river and canal is about 1.5 knots; however, velocities are increased considerably during freshets.

An overhead power cable about 0.2 mile westward of Ortona Lock has a clearance of 71 feet.

At **Mile 81.7**, the Atlantic Coast Line Railroad bridge crossing the river has a hand-operated swing span with a clearance of 10 feet; the channel is south of the pivot pier. Westbound vessels should signal for opening of the bridge while still in Ortona Lock and anticipate delay awaiting the full opening. Full control should be maintained at all times.

LaBelle, Mile 89.5, has a dock and turnout basin. Groceries and docking space may be obtained here. In September 1963, there were depths of 7 to 9 feet alongside the dock. State Route 29 highway bridge crossing here has a bascule span with a clearance of 31 feet at the center. The overhead power cable at the bridge has a clearance of 79 feet.

At **Denaud, Mile 94.0**, an overhead power cable has a clearance of 79 feet.

Alva, on the north bank at **Mile 100.8**, has a small dock where gasoline and oil can be obtained, and there is a launching ramp just east of the bridge. State Route 873 highway bridge crossing here has a hand-operated swing span with a clearance of 7 feet; the channel is north of the pivot pier. The overhead power cable at the bridge has a clearance of 79 feet.

At **Olga, Mile 106.7**, an overhead power cable crossing the river has a clearance of 75 feet. In 1963, a navigation lock was under construction at Olga; length 400 feet; width 56 feet; depth over sills 14 feet.

At **Mile 107.4**, just below Olga, there is a small marina where gasoline, water, ice, electricity, and restrooms are available. There is a launching ramp and storage; hull and engine repairs may be obtained. A depth of 4½ feet was alongside the small pier on the waterway in September 1963.

At **Mile 108.7, Trout Creek** enters the river. **Owl Creek** branches from Trout Creek 0.7 mile above the entrance. There are two entrances from the waterway into Trout Creek. The controlling depth, in September 1963, was 5 feet in the western entrance, and 7 feet in the eastern entrance. At Owl Creek there is a marina at which a marine railway can haul out boats up to 45 feet in length, for hull work. There are depths of 4½ to 6½ feet alongside. Boats are put in fresh-water storage behind a dam here. Gasoline, water, and electricity are available.

At **Mile 110.3**, State Route 31 highway bridge which crosses the river has a bascule span with a clearance of 27 feet at the center.

At **Mile 110.7**, two overhead power cables have a minimum clearance of 80 feet.

Orange River enters the waterway at **Mile 111.8**. In September 1963, the controlling depth was 5½ feet from the waterway to the boatyard about 0.5 mile above the mouth. There are depths of 5 to 13 feet alongside the piers. The channel is marked by three private daybeacons. The yard can haul boats up to 65 feet in length for major hull and engine repairs. Wet storage facilities are available; there are berths for 60 boats and a surfaced launching ramp. Gasoline, water, ice, electricity, restrooms, marine hardware, and diesel fuel by truck may be obtained.

Orange River is a hurricane refuge for small yachts. The river is crossed by State Route 80 highway bridge 0.8 mile above the mouth. It has a 40-foot bascule span with a clearance of 11 feet; drawspan regulations are given in **203.245**, Chapter 2. Adjacent to the bridge is an overhead power cable with a clearance of 47 feet. From the bridge to 2 miles above the mouth, other overhead power cables have a minimum clearance of 54 feet.

The Caloosahatchee River is crossed at **Mile 112.9** by the Atlantic Coast Line Railroad bridge which has a hand-operated swing span with a channel width of 49 feet and a clearance of 2 feet. Overhead cables at **Mile 115.2** and **Mile 115.9** have a minimum clearance of 80 feet over the main channel.

Edison Memorial Bridge (U.S. Route 41), which crosses Caloosahatchee River at **Fort Myers, Mile 116.9**, has a bascule span with clearances of 10 feet in the center and 6 feet at the fenders; drawspan regulations are given in **203.462**, Chapter 2.

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's hotels, communications, and boating facilities are discussed in **United States Coast Pilot 5, Atlantic Coast—Gulf of Mexico, Puerto Rico, and Virgin Islands.**

Chart 845–SC.—The Intracoastal Waterway enters **Great Pocket** at **Mile 859.0,** proceeds to a canal at **Mile 860.5,** and continues through **Peck Lake** and **South Jupiter Narrows** to **Hobe Sound.**

State Route A1A highway bridge at **Mile 865.4** has a bascule span with a clearance of 10 feet at the center.

The town of **Hobe Sound** at **Mile 865.9** has railway connections.

The waterway continues in Hobe Sound to **Conch Bar, Mile 870.1,** and thence through **Jupiter Sound** to Jupiter Inlet. At **Mile 872.5,** near the southern end of Jupiter Sound, State Route A1A highway bridge crossing the waterway has a swing span with a clearance of 8 feet; the channel is through the west draw. Jupiter Inlet is discussed in Chapter 10.

The waterway continues into **Loxahatchee River** at **Mile 872.8.** U.S. Route 1 highway bridge across the waterway at **Mile 873.1** has a bascule span with a clearance of 26 feet at the center. Piers of a former bridge extend from shore on both sides of the channel just west of the bridge. About 0.3 mile westward of the bridge, the waterway makes a sharp turn just eastward of two other bridges, crosses Loxahatchee River and enters Lake Worth Creek.

Caution is advised when crossing Loxahatchee River. Vessels are to give ONE LONG BLAST on approaching the bend and then proceed at reduced speed on the right-hand side of the channel. Overtaking vessels must never attempt to pass another vessel proceeding in the same direction on bends where visibility ahead is restricted to such an extent that a collision with an unseen approaching vessel may result. See CG–169—Rules of the Road, published by the Coast Guard.

Care must be taken not to confuse the route of the waterway with the passage through the two bridges just westward of the sharp turn across the Loxahatchee River at Mile 873.3. State Route A1A highway bridge crossing the river has a 45-foot bascule span with a clearance of 6 feet, and the overhead power cable at the bridge has clearance of 64 feet. The Florida East Coast railroad bridge has a 40-foot bascule span with a clearance of 4 feet; drawspan regulations for the railroad bridge are given in **203.245,** Chapter 2. The overhead power cable at this bridge has a clearance of 64 feet. The river shoals beyond these bridges.

There are four marinas in the Jupiter Inlet area, and one makes repairs. Boats up to 50 feet in length can be hauled out. Dockage is available for boats up to 125 feet in length. Gasoline, diesel fuel, water, ice, electricity, restrooms, showers, restaurants, provisions, and some marine supplies are available. There is a 6-ton fixed lift at the facility just east of the bridge on the south bank.

At **Mile 875.1,** an overhead power cable has a clearance of 83 feet across the waterway. The highway bridge crossing the waterway at **Mile 877.1** has a bascule span with a clearance of 14 feet at the center.

A small shipyard is on the west bank of the waterway at **Mile 879.8.** The marine railway can haul out vessels up to 50 feet in length, for general repairs. A small machine shop is here. No fuel, supplies, or dockage are available.

At **Mile 880.9** the waterway is crossed by U.S. Route 1 highway bridge. It has a bascule span having a clearance of 25 feet at the center. The overhead power cable on the west side of the bridge has a clearance of 78 feet.

The Intracoastal Waterway enters **Lake Worth** at **Mile 881.3** and traverses the lake from one end to the other. The lake is a long, narrow, and shallow body of water separated from the ocean by an island varying in width from 0.1 to 0.5 mile. Considerable dredging has been done in Lake Worth for private channels and for real estate development. Local knowledge is necessary to carry the best water outside the limits of the marked channels.

Little Lake Worth, at the north end of Lake Worth, has a basin dredged to 10 feet. State Route 703 highway bridge across the entrance has a 15-foot fixed span with a clearance of 6 feet. A dredged channel leading northward into Little Lake Worth from the Intracoastal Waterway, at **Mile 881.3,** had a controlling depth of 8½ feet, in September 1963, to the cut, thence 2½ feet to the basin. The channel is marked by buoys.

State Route 703 highway bridge crossing the waterway at **Mile 883.9** just north of **Riviera Beach** has a bascule span with a clearance of 14 feet at the center; drawspan regulations are given in **203.439a,** Chapter 2. About 0.5 mile south of the bridge there is a repair yard with a marine railway that can haul out vessels up to 80 feet in length; hull repairs can be made. Dry storage facilities are available for boats up to 40 feet in length. A channel leading from the waterway to the repair yard had a controlling depth of 8 feet in September 1963.

There are several fishing piers and two marinas in this area. The largest marina has berthage, a launching ramp, and a 40-ton portable lift capable of handling boats up to 45 feet in length for hull and engine repairs. Gasoline, diesel fuel, water, ice, electricity, restrooms, showers, restaurants, motels, provisions, and marine hardware are available. A privately marked dredged channel leading from the waterway to the marina had a controlling depth of 7 feet in September 1963.

Lake Worth Inlet, Mile 884.9, and the ship channel leading to the basin at the **Port of Palm Beach,** are described in Chapter 10.

Anchorage for yachts drawing up to 14 feet is available in the buoyed channel on the east side of Lake Worth leading southward from Port of Palm Beach main ship channel; the best area is 0.8 mile south of the ship channel.

About 1.1 miles south of the ship channel at West Palm Beach there are three boat storage and repair yards. The first has a 7-ton portable lift that can handle boats up to 32 feet in length, for hull and engine repairs. There is

berthage for 25 boats with depths of 4 to 8 feet alongside. Gasoline, diesel fuel, water, ice, electricity, restrooms, showers, and marine supplies are available.

The second yard has a marine railway that can haul out boats up to 75 feet in length. Engine and hull repairs can be made, and machine shop work is done. Dry storage facilities and some overnight wet storage are available. There is berthage for 50 boats with depths of 5 to 11 feet alongside. Gasoline, diesel fuel, water, electricity, ice, restrooms, showers, restaurant, motel, supplies, and marine hardware are available; there is a 16-ton crane.

The third repair yard has two 200-foot long wharves with depths of 5 to 11 feet alongside; open storage is available. Repair facilities include a marine railway that can haul out boats up to 120 feet in length, a 10-ton crane, and well-equipped machine and carpenter shops. General repairs are made to hulls and engines. Gasoline, diesel fuel, water, ice, electricity, restrooms, showers, restaurant, motel, provisions, and some marine supplies are available. There is berthage for 100 boats with depths of 7 to 9 feet alongside. In September 1963, the controlling depth was 8 feet from the Intracoastal Waterway to the repair yards.

West Palm Beach, Mile 887.9, is a city of some commercial importance on the west shore of Lake Worth and is about 3 miles south of the Port of Palm Beach. The city has a business district with excellent hotel accommodations, and is a division point on the Florida East Coast Railway and the Seaboard Air Line Railroad. See Appendix for **storm warning display.**

Palm Beach Yacht Club has a wharf on the west side of Lake Worth at **Mile 887.8,** about 0.1 mile north of the highway bridge. Gasoline, diesel fuel, water, ice, and electricity are available at the docks. Restrooms and showers are available at the head of the pier. There is berthage for 45 boats with depths of 4½ to 11 feet alongside; the controlling depth was 6½ feet, in September 1963, from the waterway to the pier.

Flagler Memorial Bridge, Mile 887.9, has a bascule span with a clearance of 17 feet at the center; drawspan regulations are given in **203.440,** Chapter 2.

About 0.1 mile south of the bridge, a channel marked by daybeacons leads westward to the West Palm Beach Municipal Marina. The controlling depth in the channel was 10 feet, in September 1963, with the same depth along the offshore face. In the northern slips of the yacht basin there was 6 to 11 feet. There is adequate berthing space for 150 boats; gasoline, diesel fuel, water, electricity, ice, restrooms, and showers are available; restaurants, motels, hotels, provisions, and marine supplies are close by; the dockmaster's office is at the head of pier 3.

Royal Park (State Route A1A) bridge, **Mile 888.6,** has a bascule span with a clearance of 14 feet at the center; drawspan regulations are given in **203.440,** Chapter 2.

A yacht basin just south of the bridge and on the east side of the waterway has berthage for 75 boats with depths of 6 to 20 feet alongside and there is ample water from the waterway. Water and electricity are available on the piers. There are no other facilities.

Chart 847–SC.—From West Palm Beach, the waterway continues southward to the south end of Lake Worth at **Mile 898.8,** thence through a cut to Lake Wyman at **Mile 908.7.**

Southern Boulevard Bridge, Mile 890.4, has a bascule span with clearance of 14 feet at the center.

In **West Palm Beach Canal, Mile 892.3,** there is a marina with berthage for 60 boats with depths of 5 to 8 feet alongside. In September 1963, there was a controlling depth of 5 feet from the waterway to the marina. Gasoline, water, ice, electricity, restrooms, showers, restaurants, motel, provisions, and marine hardware are available. A marine railway can haul boats up to 40 feet in length for minor hull and engine repairs.

At **Lake Worth, Mile 894.0,** State Route 802 highway bridge crossing the waterway has a bascule span with a clearance of 15 feet at the center.

On the west side of the lake at **Mile 895.5** there is a yacht basin and repair yard that makes general repairs. The largest of four marine railways here can haul out boats up to 120 feet in length. There are also three portable lifts that can handle boats up to 45 feet in length. There is berthage for 200 boats with depths of 5 to 10 feet alongside, and a depth of 6 feet or more can be carried from the waterway to the basin. Gasoline, diesel fuel, water, ice, electricity, marine supplies, overnight dockage, storage, and all facilities are available.

At **Lantana, Mile 895.9,** a highway bridge crossing the waterway has a bascule span with a clearance of 13 feet at the center. At **South Lake Worth Inlet, Mile 898.2,** easterly winds cause strong currents that have great velocity and must be reckoned with when navigating the Intracoastal Waterway. The inlet is discussed in Chapter 10.

A small marina just inside the inlet has berthage for 33 boats with 7 to 11 feet alongside. Gasoline, diesel fuel, water, ice, electricity, restrooms, restaurant, and charter boats are available.

The waterway enters a cut at **Mile 898.8.** A highway bridge crossing the waterway at **Boynton Beach, Mile 899.4,** has a bascule span with a clearance of 10 feet at the center.

Just north of the bridge on the western shore of the lake there are three marinas, the largest of which has several finger piers with depths of 5 to 6 feet at the end. Gasoline, diesel fuel, water, ice, restrooms, restaurant, and marine hardware are available. There is a 2-ton lift which can handle boats up to 25 feet in length. The mouth of the basin is reported to be filling in from the south side.

At **Briny Breezes, Mile 900.5,** on the east bank of the waterway, there is a small marina with berthage for 50 boats with 5 to 7 feet alongside. Electricity, water and some provisions are available on the piers.

The Eighth Street highway bridge over the waterway at **Mile 902.6** has a bascule span with a clearance of 9 feet at the center.

Just south of the bridge on the west bank of the waterway there is a boatyard that makes general hull and engine repairs. It has a machine shop and a hoist that

can lift out boats up to 58 feet in length. Gasoline, diesel fuel, water, ice, electricity, restrooms, showers, launching ramp, and marine supplies are available at the yard; groceries can be delivered to the dock. There are depths of 5 to 9 feet alongside.

At **Delray Beach, Mile 903.4,** the Atlantic Avenue highway bridge has a bascule span with a clearance of 12 feet at the center. A yacht basin is on the west bank of the waterway south of the bridge and at present has berthage for 23 boats with depths of 5 to 8 feet alongside. Construction is in progress to expand the yacht basin on the east bank of the waterway with 78 more berths with proposed depths of 8 to 10 feet alongside. Gasoline, diesel fuel, water, ice, electricity, restrooms, showers, restaurant, supplies, marine hardware, and charter boats are available. A small marina on the west bank, 0.9 mile south of the bridge, has berthage for 12 boats with 3 feet alongside. Gasoline, water, and ice are available. There are a 12-ton marine lift that can haul boats up to 40 feet in length and surfaced launching ramp. Minor hull and engine repairs may be obtained.

At **Mile 908.7,** the waterway enters **Lake Wyman,** crosses the lake through a dredged channel, marked by lights and daybeacons, and then continues southward to Lake Boca Raton and Boca Raton Inlet.

The highway bridge at **Boca Raton, Mile 910.2,** has a bascule span with a clearance of 9 feet at the center. Just south of the bridge on the west bank, there is a surfaced launching ramp.

The waterway enters **Lake Boca Raton** at **Mile 910.4. Boca Raton Inlet** leads from the lake to the Atlantic Ocean; it is described in Chapter 10.

The waterway leaves Lake Boca Raton at **Mile 910.8** and enters a long land cut. Crossing the north end of the land cut at **Mile 910.9,** a highway bridge has a bascule span with a clearance of 9 feet at the center. Care should be exercised at this bridge as strong currents may be encountered; the sides of the canal are rocky.

Just north of the bridge is the Boca Raton Hotel and Marina. Gasoline, diesel fuel, water, and dockage may be obtained only in an emergency. Depths of 5 to 10 feet are alongside the piers.

Hillsboro Drainage Canal enters the Intracoastal Waterway from the west at **Mile 912.4** near **Deerfield Beach.** The confluence of the canal and the waterway on the north side of the bridge creates a dangerous condition in the channel. During periods of maximum discharge through the canal, hazardous currents develop in the Intracoastal Waterway channel about 100 yards north of Deerfield Beach Bridge.

Vessels proceeding southward should not approach the bridge until it is fully opened for passage, and should at all times maintain sufficient headway to avoid being carried toward the east fender system by the flow of water from Hillsboro Drainage Canal that generates considerable cross current, especially during periods of flood.

About 0.8 mile up Hillsboro Drainage Canal, U.S. Highway 1 bridge, has a 32-foot fixed span with a clearance of 9 feet. Just below the bridge there is a marina and repair yard. Half of the finger piers are covered, and there is berthage for 55 boats up to 55 feet in length. Gasoline, water, ice, restrooms, showers, some marine hardware, and electricity are available. The yard has a 15-ton travel lift that hauls out boats up to 55 feet in length. Minor hull and engine repairs may be obtained, and there is a surfaced launching ramp. The controlling depth was 8 feet, in September 1963, from the Intracoastal Waterway to the marina and there were depths of 5 to 12 feet alongside.

Just below the canal, at **Mile 912.4,** the Intracoastal Waterway is crossed by the Deerfield Beach highway bridge that has a bascule span with a clearance of 21 feet at the center.

Just south of the bridge on the west bank of the waterway there is a marina with berthage for 40 boats with 5 feet alongside. The controlling depth was 7 feet, in September 1963, from the waterway into the basin. Gasoline, diesel fuel, water, ice, electricity, restrooms, showers, restaurant, supplies, and marine hardware are available.

Hillsboro Inlet, at **Mile 915.5,** is described in Chapter 10. Between Hillsboro Inlet and **Pompano Beach,** including **Lake Placid,** there are several marinas and repair facilities that have marine lifts and vertical lifts, the largest of which can handle boats up to 63 feet in length for complete hull and engine repairs; there is a machine shop on the premises. Gasoline, diesel fuel, water, ice, electricity, restrooms, showers, restaurants, motels, supplies, marine hardware, and launching ramps are available. In September 1963, depths of 4½ to 8 feet were available alongside at various marinas and depths of 4½ to 12 feet in the approaches.

Near **Pompano Beach, Mile 917.6,** there is a highway bridge with a bascule span with a clearance of 15 feet at the center; drawspan regulations are given in **203.443,** Chapter 2.

Just north of the bridge on the east bank a yacht basin has finger piers with depths that vary from 10 feet near the waterway to 7 feet at the inner end of the basin; the piers have water and electricity. Gasoline, diesel fuel, ice, and some provisions are available, and there is berthage for 83 boats.

A marina on the west bank of the waterway, 1.4 miles south of the bridge at Pompano Beach, has dry and wet storage, and berthage for 75 boats with 6 to 11 feet alongside and 9 feet in the approach. Gasoline, diesel fuel, water, ice, electricity, and all provisions are available. There are a 50-ton marine railway, a 25-ton marine lift, and a launching ramp. Complete hull and engine repairs may be obtained.

At **Mile 921.5,** the Oakland Park Beach Boulevard highway bridge over the waterway near **Oakland Park** has a bascule span with a clearance of 22 feet at the center.

At **Mile 923.4,** the two Sunrise Boulevard highway bridges, at Fort Lauderdale, have bascule spans with a minimum clearance of 16 feet at the center; drawspan regulations are given in **203.446,** Chapter 2.

Middle River enters the waterway from westward about

0.6 mile south of the Sunrise Boulevard bascule bridges; the controlling depths, in September 1963, were 6 feet to the Sunrise Boulevard highway bridge 0.9 mile above the mouth, thence 5 feet to the two U.S. Route 1 bridges 2.2 miles above the mouth, and thence 3 feet in South Fork to the fixed bridge. The Sunrise Boulevard highway bridge about 0.9 mile above the mouth has a 27-foot fixed span with a clearance of 6 feet. A small marina just south of the bridge has charter boats and berthage for 15 boats with 7 to 11 feet alongside. Gasoline, water, ice, electricity, restaurant, motel, hardware, and supplies are available. The two U.S. Route 1 highway bridges have 30-foot fixed spans with clearances of 4 feet.

Fort Lauderdale, Mile 924.6, a large and colorful city known as the "Venice of America," is served by the Florida East Coast Railway and the Seaboard Air Line Railroad. Navigable waters include the myriad of man-made canals in addition to the natural waterways. The canals between the man-made islands are used by the riparian owners and their guests.

All facilities for yachts are available at Fort Lauderdale, and several thousand yachts base here in the winter season. There are many bathing and recreation facilities, excellent hotels, restaurants, and shopping centers in the city. A monument marks the original site of Fort Lauderdale, built in 1838 during the Seminole War.

At **Mile 924.6,** Las Olas Boulevard highway bridge has a bascule span with a clearance of 31 feet at the center; drawspan regulations are given in **203.446,** Chapter 2.

The large Bahia Mar yacht basin on the eastern bank of the Intracoastal Waterway about 0.4 mile southward of Las Olas Boulevard Bridge, has an outer wharf with depths of 7 to 14 feet at the face and decreasing depths from 11 to 5½ feet at the finger piers in the basin. The office of the yacht basin's dockmaster is in the administration building on the outer wharf. The dockmaster makes all berthing arrangements. Gasoline, diesel fuel, water, electricity, restrooms, showers, ice, restaurant, motel, laundry, shopping center, and marine supplies are available. All kinds of supplies are available in the city, and oil companies will make deliveries of gasoline and diesel fuel directly to boats. See Appendix for **storm warning display.**

The boatyard at the southeast corner of the yacht basin makes major repairs and has three vertical lifts for small boats up to 50 feet in length. A depth of 8 feet can be carried to the boatyard.

New River, the main navigation channel in this area, enters the waterway from westward at **Mile 925.4.** A Federal project provides for a channel 8 feet deep from the Intracoastal Waterway to **Tarpon Bend,** 0.6 mile above the mouth. In September 1963, the controlling depth was 8 feet from the Intracoastal Waterway to the junction of South Fork, thence 5 feet through the fork and South New River Canal to the junction with Dania Cut-Off Canal.

Above the junction of New River with the Intracoastal Waterway, New River and South Fork are crossed by the following bridges with bascule spans and overhead cables: U.S. Route 1 passes through a tunnel under the river at Southeast Sixth Avenue; at 1.1 miles, Southeast Third Avenue highway bridge, clearance 16 feet; at 1.3 miles, South Andrews Avenue Bridge, clearance 5 feet; at 1.4 miles, Florida East Coast Railway bridge, clearance 6 feet; at 1.8 miles, Southwest Seventh Avenue Bridge, has a 40-foot bascule span with a clearance of 10 feet, and the overhead power cable at this bridge has clearance of 80 feet; on the South Fork, 0.8 mile above the mouth, Southwest 12th Street bridge has a clearance of 21 feet; at 2.8 miles, Seaboard Air Line Railroad bridge, clearance 2 feet; the overhead power cable at the bridge has a clearance of 71 feet; at 3.8 miles, State Highway 84 bridge has a 40-foot bascule span with a clearance of 21 feet; drawspan regulations for the bridges are given in **203.446,** and **203.446c,** Chapter 2.

The mean range of tide at the Andrews Avenue Bridge, New River, is 1.8 feet. The range increases towards the mouth of the river and is 2.3 feet at the Bahia Mar yacht basin, Fort Lauderdale. Strong currents may be encountered above the Southeast Sixth Avenue Tunnel; strangers going upriver are advised to obtain information from the City Dockmaster.

Speed in New River is limited to no wake.

Both banks of New River between Southeast 6th Avenue Tunnel and Florida East Coast railroad bridge are owned by the city. Along the bulkheads, berths with water and electricity are provided for yachts. Arrangements for space are made with the city dockmaster, whose office is located on the river between Southeast 6th Avenue Tunnel and Southeast Third Avenue. He has police powers over all the waterways within the city limits.

South New River Canal joins the South Fork of New River with the Dania Cut-off Canal. Overhead power cables across it have a minimum clearance of 45 feet.

A number of large storage yards are on New River about 2.5 miles above the city-owned berthing area. Several repair yards and storage basins are located up the river. The largest shipyard has a marine railway that can haul out vessels up to 140 feet in length. Any hull or engine repairs can be made, and machine shops are available. Some yards have cranes of up to 50-ton capacity for rail-water or truck-water transfer.

From New River, the Intracoastal Waterway continues southward. At **Mile 926.2,** Fort Lauderdale Southeast 17th Street (State Route A1A) highway bridge has a bascule span with a clearance of 25 feet at the center.

The entrance channel to the Lauderdale Yacht Club is on the west bank of Stranahan River about 0.5 mile north of A1A highway bridge. The channel to the club from the Intracoastal Waterway is marked by privately maintained piles and ranges. The controlling depth in the channel was 5 feet in September 1963. Water, electricity, and dockage are available for members with 5 feet alongside the pier and bulkhead.

Two marinas are on the west bank of Stranahan River. One is just north of Highway A1A bridge, and the other is near the head of Seminole River, the first canal extending westward just north of the bridge. There are dockage for 60 boats and dry storage for 250 boats up to 25 feet in length. Gasoline, diesel fuel, water, ice, elec-

tricity, restrooms, showers, marine supplies, and engine repairs are available. A 12-ton marine lift and a 5-ton portable lift are here. The controlling depth was 12 feet in Seminole River, in September 1963, from the Intracoastal Waterway and 4 feet near the head. Depths of 7 to 4½ feet are available alongside.

The **Mercedes River** extends eastward from the Intracoastal Waterway at **Mile 926.0** to **Lake Sylvia.** A highway bridge crossing the river has a 26-foot fixed span with a clearance of 7 feet. A large marina on the south side of the entrance has gasoline, diesel fuel, water, ice, electricity, restrooms, showers, unlimited berthing, marine hardware, motel, restaurant, and provisions available. Depths alongside the piers and bulkheads are 15 to 4½ feet. In September 1963, the controlling depth in Mercedes River from the waterway to the bridge was 8 feet.

A highway bridge over **Marietta River,** which extends southward from Mercedes River, has a 23-foot fixed span with a clearance of 8 feet. From just south of the bridge, **Marion River** extends eastward into **Mayan Lake** from Marietta River.

Port Everglades, Mile 926.6, is described in Chapter 10.

The waterway enters a land cut at **Mile 927.3,** and **Dania Cutoff Canal** enters the cut at **Mile 928.6.** The canal was constructed by the county for drainage purposes, and during floodwater periods it may cut through to the ocean. Although not maintained for navigation, in September 1963, the canal had a controlling depth of 5½ feet to the powerplant at the intersection with South New River Canal, a distance of about 5 miles.

About 1 mile along the canal from the waterway, the larger of two marinas and repair yards has a 50-ton vertical lift that can haul out boats up to 60 feet in length for general repairs. Gasoline, diesel fuel, water, ice, electricity, restrooms, showers, restaurant, and maine supplies are available. There are also 30-ton and 20-ton marine lifts available and berthage for 123 boats with 6½ feet alongside.

A yacht basin is in the canal at **Dania,** 1.7 miles from the waterway. Gasoline, electricity, ice, restrooms, showers, and water are obtainable. There are two marine railways, the larger of which can haul boats up to 65 feet in length for general hull and engine repairs. There is berthage for 40 boats with 3½ feet alongside. West of the basin, bridges, overhead cables, pipelines, and other obstructions restrict the channel width to 31 feet and overhead clearance to 7 feet.

Dania Beach (State Route A1A) highway bridge, **Mile 929.3,** has a bascule span with a clearance of 22 feet at the center. The highway bridge across the waterway at **Mile 930.4** has a bascule span with a clearance of 22 feet at the center. The overhead power cable at **Mile 931.2** has a clearance of 79 feet. Just south of the bridge and on the east side of the waterway there are several places where some supplies may be obtained. Depths are 8 to 12 feet alongside the bulkhead.

At the southeast corner of **North Lake, Mile 931.5,** the Hollywood City Yacht Basin has berthage for 75 boats with depths of 4½ to 12 feet alongside. Gasoline, diesel fuel, water, ice, electricity, restrooms, showers, restaurant, and some supplies are available; there is a small-boat launching ramp.

Hollywood, Mile 931.7, is about 1 mile west of the waterway. On the ocean side east of the city is the Hollywood Hotel, a very prominent structure. Several marine service stations are on the east side of the waterway. Berthage, gasoline, diesel fuel, water, ice, electricity, and other supplies are available. There are no repair facilities. See Appendix for **storm warning display.**

Hollywood Beach (State Route 820) bridge, **Mile 931.7,** has a bascule span with a clearance of 10 feet at the center; drawspan regulations are given in **203.446a,** Chapter 2.

At **Hallandale Beach, Mile 933.3,** State Route 824 highway bridge has a bascule span with a clearance of 22 feet; drawspan regulations are given in **203.446b,** Chapter 2.

On the east bank of the waterway at **Golden Beach, Mile 935.0,** there is a marina with berthage for 15 boats with depths of 3½ to 5½ feet alongside. Gasoline, diesel fuel, water, ice, electricity, restrooms, showers, restaurants, motels, and some supplies are available. There are no repair facilities.

At **Mile 935.3,** the waterway enters shallow **Dumfoundling Bay.** On the east shore of the bay there is a small-boat facility where gasoline and some facilities may be obtained. A depth of 6 feet can be carried from the waterway to the facility. Care is required here as spoil banks are close aboard on both sides of the dredged channel through the bay. A sharp turn to the east is necessary to enter **Biscayne Creek** at **Mile 936.2.**

Maule Lake, on the west bank of the waterway at **Mile 936.2,** is entered through a privately marked channel leading from the waterway at the southwest corner of Dumfoundling Bay. The controlling depth in the channel, in September 1963, was 9 feet, and depths in the lake were 11 to 16 feet. At a marina on the west shore of the lake there is berthage for 280 boats with depths from 18 to 8 feet alongside; controlling depth is 8 feet to the piers. All facilities are available, and there are a 100-ton vertical lift and a 2½-ton portable lift capable of handling any boat that can reach the marina for complete marine repairs. See Appendix for **storm warning displays.**

At **Mile 936.8,** State Route 826 highway bridge crossing the waterway has a bascule span with a clearance of 19 feet at the center; the overhead power cable 55 yards north of the bridge has a clearance of 80 feet.

On the east bank of the waterway, at **Mile 936.8,** and just south of the highway bridge, there are two small marinas with berthage for 49 boats. Gasoline, diesel fuel, water, ice, electricity, restrooms, showers, supplies, motels, and restaurants are available. There is a 10-ton marine lift that can handle boats up to 30 feet. Hull and engine repairs may be obtained. The controlling depth was 6 feet, in September 1963, from the waterway to the marinas and there were depths of 7 to 6 feet alongside.

Oleta River leads westward from Biscayne Creek, at **Mile 936.8,** and continues on into Maule Lake. The

controlling depths, in August 1963, were 4 feet from the Intracoastal Waterway to the highway bridge 1.5 miles above the entrance, thence 2½ feet into Maule Lake. This highway bridge over the river has a 25-foot fixed span with a clearance of 6 feet. At a marina 0.5 mile above the entrance and a small-boat facility just south of the bridge, there is berthage for 100 boats with depths of 6 to 3½ feet alongside the piers. The controlling depth leading to the piers was 3½ feet in August 1963. Gasoline, water, ice, electricity, restrooms, showers, and some supplies are available. There is a 55-ton vertical lift that can handle boats up to 55 feet in length for hull and engine repairs; there are launching ramps at both facilities.

The Intracoastal Waterway enters the northern end of **Biscayne Bay** at **Mile 937.2.** The bay is a shallow body of water extending about 33 miles southward, and is unexcelled as a yachting and small-boating area. The upper part of the bay is very shallow, about 2 miles wide, and is separated from the Straits of Florida by a narrow peninsula, Virginia Key, and by Key Biscayne. The remainder of the bay south of Miami has an average width of about 7 miles, general depths of 9 to 10 feet with several places having depths of 13 to 15 feet, and is separated from Hawk Channel by a number of keys and coral banks through which there are several narrow and shallow channels. In the lower part of Biscayne Bay and in the bays and sounds southward, the water is so clear on calm days that the bottom can be seen at considerable depths. On windy days, the water becomes milky and opaque.

On the east side of the Intracoastal Waterway at **Mile 938.1** is an entrance to a large municipal marina for the use of yachtsmen and party fishermen. In August 1963, there were depths of 7 to 13 feet in the entrance, and at the finger piers, and 9 to 15 feet in the channel leading southward about 0.3 mile to Bakers Haulover Inlet. Gasoline, diesel fuel, water, ice, restrooms, showers, restaurant, and electricity are available. There is berthage for 58 boats; a charge is made for docking. A launching ramp is also available. A dockmaster assigns berths. See Appendix for **storm warning display.**

Bakers Haulover Inlet is described in Chapter 10.

Bal Harbour, a private development, is immediately southward of Bakers Haulover Inlet. Several large hotels are conspicuous landmarks.

At **Mile 938.9,** a dredged channel marked by privately maintained daybeacons leads south-southeasterly to Bal Harbour yacht basin that has a depth of 14 feet. The channel had a controlling depth of 6 feet in August 1963. The yacht basin is for members only, but other craft may take refuge here during bad storms.

Indian Creek extends southward about 6 miles along the eastern part of **Biscayne Bay** from **Bal Harbour** to Collins Canal in Miami Beach. In August 1963, the controlling depth was 5 feet in Indian Creek. A highway bridge across the creek from **Bal Harbour** to **Bay Harbor Islands** has a 28-foot fixed span with a clearance of 12 feet. About 0.5 mile southward, the bridge at **Surfside** has a 40-foot fixed span with a clearance of 12 feet. The bridge between **Atlantic Heights** and **Normandy Isle** has an 18-foot fixed span with a clearance of 6 feet.

On the east side of **Allison Island,** Indian Creek is crossed by a bridge with a bascule span having a clearance of 11 feet. A highway bridge over the channel west of the island has a 23-foot fixed span with a clearance of 6 feet. Southward of Allison Island, fixed bridges crossing Indian Creek limit the channel to a minimum width of 41 feet and a clearance of 12 feet.

From the southern end of Indian Creek, **Collins Canal** leads southwesterly along the southeast side of the prolongation of **Venetian Causeway.** In August 1963, the controlling depth was 2½ feet in the canal. Fixed bridges crossing the canal limit the channel width to 47 feet and the clearance to 5 feet.

At **Mile 939.3,** a channel on the west side of the Intracoastal Waterway leads northwestward to the west shore, follows the shore in a northeasterly direction to **Arch Creek,** and follows the creek about 0.8 mile westward to two marinas where berthage for 60 boats with gasoline, water, ice, electricity, restrooms, showers, supplies, marine hardware, and repairs are available. There is a 12-ton marine lift; hull and engine repairs may be obtained. There are depths of 4 to 12 feet alongside the piers. The channel is marked and, in August 1963, had a controlling depth of 6 feet.

At **Mile 939.7, Broad Causeway** (123d St.) highway bridge crossing the Intracoastal Waterway has a bascule span with a clearance of 16 feet at the center.

Miami Beach Channel, about 0.5 mile south of Broad Causeway, is a natural channel that leads southeastward to **Biscayne Point,** thence along the west and south sides of **Normandy Isle,** thence along the east shore of the bay southward to **Venetian Causeway** and Collins Canal in **Miami Beach,** and thence along the west side of Miami Beach southward to MacArthur Causeway and **Meloy Channel.** In August 1963, the controlling depths were 5 feet from the waterway southward to Venetian Causeway, thence 7 feet to Meloy Channel.

Four bridges cross this channel. At Normandy Isle the easterly bascule span of the 79th Street Causeway has a clearance of 19 feet. The large marina on **Treasure Island,** at the west end of this bridge, has ample berthage and all services available. Depths at the piers were 6 to 21 feet in August 1963. The easterly fixed span of the 36th Street Causeway has a clearance of 35 feet; Venetian Causeway bascule span between Rivo Alto Island, the most easterly of the Venetian group, and Belle Isle, has a clearance of 9 feet; drawspan regulations are given in **203.447,** Chapter 2.

There are several boatyards on the channel just north of the eastern end of Venetian Causeway. The most northerly yard has a vertical lift that can haul boats up

to 110 feet in length, for complete hull repairs. Boats are built and all services are available at the yard. Depths are ample for any craft that can reach the basins.

The fixed bridge near the east end of MacArthur Causeway has a clearance of 35 feet. A marina on Miami Beach Channel, just north of the MacArthur Causeway Bridge, has berthage for 18 boats with depths of 10 to 12 feet alongside. Gasoline, diesel fuel, water, ice, electricity, restrooms, limited hardware, bait, and tackle are available. There is a 2-ton marine lift, and outboard motor repairs may be obtained. A depth of 9 feet can be carried from the bridge to the basin. On the south side of the bridge on Meloy Channel, there is a charter-boat facility and a marina with similar services. Meloy Channel is described in Chapter 10.

At **Mile 941.9** a dredged channel leads southeastward from the Intracoastal Waterway to a private yacht basin in **Harbor Island** just north of the 79th Street Causeway. In August 1963, the controlling depth was 5 feet. The channel is marked by privately maintained piling.

Seventy–Ninth Street Causeway, Mile 942.5, has a bascule span over the waterway that has a clearance of 18 feet at the center. See Appendix for **storm warning displays.**

There are two marinas on the north side of the causeway between the Intracoastal Waterway and **Harbor Island** with berthage for 200 boats and depths of 4 to 14 feet alongside. The controlling depth in the channel leading north of the causeway to the marinas was 5 feet in August 1963. Gasoline, diesel fuel, water, ice, electricity, restrooms, showers, restaurants, motels, telephones, supplies, marine hardware, and boat rental are available. At the smaller of the two there are a 2-ton marine lift and a launching ramp; hull and engine repairs may be obtained at the larger one

Little River flows into the west side of Biscayne Bay at **Mile 942.7.** Yachts tie up along the banks of the river. In August 1963, the controlling depth was 5 feet to the highway bridge about 0.6 mile above the mouth. The bridge (U.S. Route 1) has a 34-foot fixed span with a clearance of 8 feet. Boats that can clear this bridge can continue upstream to the dam at the Florida East Coast Railway bridge, which is the head of navigation. The controlling depth was 3 feet, in August 1963, from the highway bridge to the dam.

The two boatyards on the north shore of Little River make general repairs and have a marine railway that can haul out boats up to 55 feet in length, a 20-ton marine lift can handle boats 40 feet in length. Gasoline, water, ice, electricity, restrooms, showers, marine hardware, bait, and tackle are available. There is berthage for 52 boats with 7 to 10 feet alongside. There is a machine shop on the premises; hull and engine repairs may be obtained.

Thirty-Sixth Street Causeway, Mile 944.7, has a fixed span over the waterway with a clearance of 56 feet, which is the least overhead clearance of the fixed bridges over the main route of the Intracoastal Waterway between Norfolk and Miami.

Venetian Causeway, Mile 946.0, has a bascule span over the waterway with a clearance of 9 feet at the center. **MacArthur Causeway, Mile 946.1,** has a bascule span over the waterway with a clearance of 35 feet. Drawspan regulations for both bridges are given in **203.447,** Chapter 2.

In August 1963, combined highway and railroad bridges with bascule spans were under construction 0.5 mile south of MacArthur Causeway, from Miami to **Dodge Island;** design clearances of the bascule spans are 21.0 feet.

Miami, Miami Beach, and **Miami Harbor, Mile 946.5,** are described in Chapter 10. See Appendix for **storm warning displays.**

Fishermans Channel (Railroad Channel) leads southeastward from the waterway at **Mile 947.0,** thence eastward to the deep-water channel at **Fisher Island;** it is used by yachtsmen and charter-boat fishermen. In August 1963, the controlling depth was 5 feet; the channel is marked by daybeacons. About 1.1 miles westward of Fisher Island, a natural channel leads southward from Fishermans Channel to Rickenbacker Causeway. The channel is little used and marked only at the north entrance. It had a controlling depth of 6 feet in August 1963.

From Miami the Intracoastal Waterway continues southward along the waterfront, thence through Miami South Channel to **Rickenbacker Causeway** at **Mile 948.6.** The controlling depth was 10 feet in August 1963. The causeway has a bascule span over the waterway with a clearance of 23 feet at the center; drawspan regulations are given in **203.447a,** Chapter 2.

About 0.5 mile south of Rickenbacker Causeway there is a Coast Guard **seaplane operating area** and a **restricted area;** limits and regulations are given in **207.172,** Chapter 2.

About 2 miles south of Rickenbacker Causeway, **Crandon Park Marina Channel,** privately marked by lights and daybeacons, and a **140°** lighted range leading into the basin, leads northeasterly in **Bear Cut** to the Dade County Yacht Basin located in the bight of Northwest Point, Key Biscayne. The controlling depth was 8 feet in July 1963. The basin is used by party-fishing boats. Gasoline, diesel fuel, water, ice, electricity, restrooms, restaurant, and dockage for 122 boats are available, with depths of 7 to 12 feet alongside. A 4-ton marine lift and a launching ramp are here. The highway bridge over Bear Cut has a 38-foot fixed span with a clearance of 13 feet. A buoy marks the eastern approach to Bear Cut outside the keys.

About 2.3 miles southward of Rickenbacker Causeway are two channels leading westward to the facilities at **Dinner Key** in **Coconut Grove.** Both channels are marked. The northerly channel had a controlling depth of 5 feet, in July 1963.

The yacht storage yards, the Coast Guard Seaplane Base, and the Biscayne Yacht Club are reached through the northern channel. The boatyards have extensive yacht storage; gasoline, diesel fuel, water, electricity, and

repair facilities are available. There are two vertical-lift docks and hoists, the largest of which can lift boats up to 55 feet in length. Marine supplies are available and there is a launching ramp.

Dinner Key Channel, the southerly channel, leads to the large **Dinner Key Yacht Basin.** The controlling depth in the channel was 8 feet in July 1963, with 7 feet in the basin. The yacht basin is maintained by the city of Miami, and has five piers with water and electrical connections; a charge is made for berthage assigned by the dockmaster. There is berthage for 370 boats with depths of 5 to 8 feet alongside. There is a launching ramp; a restaurant is at the head of the piers.

Four-way Channel is 3 miles south of Rickenbacker Causeway and leads westward to some private piers and a mooring area; the controlling depth in the channel was 5 feet in July 1963. A privately maintained unlighted **296°** range and daybeacons mark the entrance channel.

Entrada Channel, about 0.5 mile southward of Four-way Channel, is marked by daybeacons privately maintained. In July 1963, the controlling depth was 5 feet.

Coral Gables Waterway is 4.2 miles south of Rickenbacker Causeway. It is a dredged channel through coral, and extends westward about 2 miles inland to U.S. Route 1 highway bridge. The canal, used for drainage purposes, has no docks along the banks; craft tie up to the banks. The controlling depth was 7 feet, in July 1963. The entrance is marked by lights and daybeacons.

Coral Gables is a picturesque resort that joins Miami on the southwest. The tower of the Veterans Administration Hospital is a conspicuous landmark that shows over the lower part of Biscayne Bay.

At **Matheson Hammock Beach, Mile 953.5** on the west side of Biscayne Bay, there is a marina which has berthage for 80 boats with depths of 4 to 7 feet alongside the piers. There is a launching ramp, and gasoline, diesel fuel, water, ice, electricity, restrooms, telephone, bait, and tackle are available. The two entrance channels are marked by privately maintained daybeacons and a **347°** lighted range. The channels, in July 1963, had a controlling depth of 5 feet.

Chart 848.—At **Kings Bay, Mile 957.4** on the west side of Biscayne Bay 9 miles southward of Rickenbacker Causeway, there is a Yacht and Country Club. There is berthage for 150 boats with depths of 7 to 10 feet alongside the piers. Gasoline, water, ice, electricity, restrooms, and restaurant are available and there is a launching ramp. **Cutler Channel,** leading to the yacht basin and a power plant, is marked by a light, buoys, and daybeacons, privately maintained. The controlling depth in the channel was 6 feet in July 1963.

The Intracoastal Waterway crosses **Featherbed Bank** at **Mile 962.1** and is marked by daybeacons and lights. Another channel through Featherbed Bank about 2.5 miles eastward of the waterway is marked by a light and daybeacons. In July 1963, the controlling depth was 5 feet. Care must be taken to stay in the center of the channel; the appearance of the water is the best guide, as the shoals on each side are usually visible. The daybeacon northeastward of Featherbed Bank is not easily seen at a distance. A good landmark is the tower resembling a lighthouse located on the key northward of **Sands Key.**

Chart 849.—The **Homestead Bay Front Park Marina** at the entrance to **North Canal,** 5 miles west of **Mile 966.3,** is entered just south of **Convoy Point.** The entrance is marked by a privately maintained light and daybeacons. In July 1963, the controlling depths were 3 feet at the entrance light, thence 6 feet to and alongside the piers. Slips are available for berthing 70 boats up to 40 feet in length, and there is a 10-ton vertical lift dock, a 1-ton small-boat hoist, and a launching ramp. Gasoline, water, ice, electricity, restrooms, bait, and tackle are available at the basin. See Appendix for **storm warning display.**

Caesar Creek, 1.2 miles southeast of **Mile 969.0,** between **Elliott Key** and **Old Rhodes Key,** connects Biscayne Bay with Hawk Channel. The controlling depth was 4 feet, in July 1963. The channel is privately marked across the shoals northwestward of Adams Key.

The Intracoastal Waterway leaves Biscayne Bay via a straight dredged cut through **Cutter Bank** at **Mile 970.7** and enters **Card Sound.** The sound is a body of water about 5 miles long and 2.7 miles wide with depths of 7 to 12 feet in the center.

Angelfish Creek, 1.5 miles southeast of **Mile 973.2** between **Palo Alto Key** on the north and **Key Largo** and **Angelfish Key** on the south, connects Card Sound with Hawk Channel. The controlling depth, in July 1963, was 4 feet. The channel is marked by lights and daybeacons.

Good anchorage in depths of 9 feet is available in Card Sound on the south side of **Pumpkin Key,** 1.5 miles southeast of **Mile 974.9.**

Gasoline, diesel fuel, lubricating oil, fresh water, ice, and electricity are available at the Key Largo Anglers Club, 1.8 miles southeast of **Mile 975.3.** A lift is available for hauling out boats up to 35 feet in length.

From Card Sound the waterway follows a dredged cut across **Card Bank, Mile 977.0,** the shoal that separates Card Sound from **Little Card Sound.** Little Card Sound has depths of 7 to 8 feet in the center.

The waterway enters a dredged channel through the shoal that separates Little Card Sound and **Barnes Sound** opposite **Barnes Point, Mile 979.2.** Caution is necessary in the curved portion of the channel west of the point. The partly submerged ruins of an old highway bridge are on both sides of the channel here. Barnes Sound is about 6 miles long and 3 miles wide, with depths of 7 to 10 feet in the center.

Near the south end of Barnes Sound the waterway enters **Jewfish Creek, Mile 984.6.** The highway bridge crossing the creek at **Cross Key, Mile 985.5,** has a bascule span with a clearance of 11 feet at the center. An overhead power cable about 25 yards northward of the bridge has a clearance of 80 feet. On the southwest side of the bridge are two marinas where gasoline, diesel fuel, water, electricity, ice, restrooms, showers, lodging, and restaurant facilities are available. There is berthage for 40 boats at one and 30 boats at the other. Each has a launching ramp and a 1-ton marine lift. Engine repairs may be

obtained at the larger one and some supplies are available. The piers at the two marinas have depths of 4 to 8 feet alongside. See Appendix for **storm warning display.**

The waterway continues southward into **Blackwater Sound,** a body of water about 3 miles square that has depths of 7 to 8 feet in the center.

The waterway follows **Dusenberry Creek** from Blackwater Sound to **Tarpon Basin.**

Chart 850.—The waterway follows an east-to-west course across Tarpon Basin and on the west side exits through **Grouper Creek** into **Buttonwood Sound;** in the eastern end of the creek, the deepest water is close to the south bank.

From Buttonwood Sound, which has depths of 6 to 8 feet, the Intracoastal Waterway follows **Baker Cut, Mile 993.2,** into **Florida Bay.** The route across the bay crosses many bars and is well marked by lights and daybeacons.

Community Harbor, a bight on the southerly end of Key Largo and 1 mile southeast of **Mile 999.2,** is the bayside waterfront of **Tavernier.** The entrance is marked by daybeacons and stakes. In August 1963, the controlling depth was 3 feet to the wharf. Gasoline, water, ice, and provisions are available. A marine railway that can haul out boats up to 40 feet in length is available for emergency minor repairs.

Tavernier Creek, just westward of Tavernier, in August 1963, had a controlling depth of 3 feet to Hawk Channel and is frequently used by local fishing craft. A bridge near the southern end of the creek has a 36-foot fixed span with a clearance of 10 feet. A strong current sets through the bridge; at maximum flood and ebb the difference in height of water on opposite sides of the bridge is about 1 foot.

Cross Bank, Mile 1001.4, is crossed by **Cowpens Cut,** a straight dredged channel marked by lights and daybeacons.

At **Mile 1003.0,** in **Cowpens Anchorage,** there is a marina that can berth 50 boats. The controlling depth to the anchorage was 3 feet in August 1963, but at the piers there was 6 to 17 feet. There is a launching ramp and gasoline, diesel fuel, water, ice, electricity, restrooms, showers, restaurant, and motel are available. Boat rental, bait, and tackle may be obtained.

Snake Creek, 1.3 miles south of **Mile 1004.2** between **Plantation Key** and **Windley Key,** is used by local fishing boats as a passage between the bay and the ocean. In August 1963, the controlling depth was 6 feet. The bridge across the creek has a 35-foot fixed span with a clearance of 10 feet. An overhead power cable at the bridge has a clearance of 26 feet. On the north side of the bridge there is a small marina and a fishing camp with berthage for 20 boats. Depths at the piers are 4 to 6 feet. Gasoline, diesel fuel, water, ice, restrooms, launching ramp, boat rental, bait, and tackle are available. Currents are strong through the creek. Gasoline, water, and ice are available at the wharf at the ocean entrance on Windley Key.

Windley Harbor, 1.7 miles south of **Mile 1005.3,** is a good but seldom used refuge that is well protected from all directions; the main channel, west of **Wilson Key,** in August 1963, had a controlling depth of 6 feet. A highway bridge over the channel has a 40-foot fixed span with a clearance of 10 feet. An overhead power cable close northward of the bridge has a clearance of 26 feet. See Appendix for **storm warning display.**

Upper Matecumbe Key is 2 miles southeast of **Mile 1007.5. Islamorada** is on the northeast part of the key and **Matecumbe** is on the southwest part. The **Florida Key Memorial** is in about the middle of the key. See Appendix for **storm warning display.**

A yacht basin and a marina are about the center of the key on the northwest side. Gasoline, diesel fuel, water, ice, electricity, restrooms, showers, restaurant, launching ramp, engine repairs, supplies, 1-ton marine hoist, and berthage for 40 boats with 4 feet alongside the piers are available at the yacht basin. The controlling depth in the entrance channel to the basin was 4 feet in August 1963. A 50-ton lift at the marina can hoist boats for hull and engine repairs; gasoline, diesel fuel, water, ice, electricity, restrooms, showers, lodging, supplies, boat rental, bait, and tackle are available. There is berthage for 24 boats at the piers which have 3 feet alongside.

At **Mile 1008.4,** the waterway passes through **Steamboat Channel,** a dredged cut through **Shell Key Bank.** The channel in the cut is marked by lights and daybeacons.

Chart 851.—Shell Key Channel and **Race Channel,** just to the northwestward of Upper Matecumbe Key, are used by small sport-fishing craft able to pass under the highway trestle which has a 13-foot fixed span and a clearance of 6 feet. An overhead pipeline at the trestle has a clearance of 13 feet. These channels join to form **Teatable Key Channel** connecting the Intracoastal Waterway and Hawk Channel. In August 1963, the controlling depth was 7½ feet from Hawk Channel to Florida Bay through Teatable Key Channel and Shell Key Channel.

A small marina is on the southwest end of **Upper Matecumbe Key.** Gasoline, water, ice, restaurant, and motel are available. The dredged entrance channel to it had a controlling depth of 4 feet in August 1963, and there is 4 feet alongside. Berthage is limited.

Lignumvitae Channel, 1 mile southeast of **Mile 1011.9** and west of Lignumvitae Key, forms a passage from the Intracoastal Waterway to Hawk Channel. The controlling depth, in August 1963, was 3½ feet. Gasoline and water are available at the northern end of **Lower Matecumbe Key** in an emergency only. The highway bridge across the channel has a 33-foot fixed span with a clearance of 10 feet. Indian Key Channel is described in Chapter 11.

Overhead power cables at the fixed bridges along the highway viaduct between Upper Matecumbe Key and Grassy Key have a minimum clearance of 26 feet, but are submerged at the drawbridges.

Peterson Key Bank, Mile 1012.5, is crossed by **Bowlegs Cut.** After passing through the cut, traffic may continue southwestward through Channel Five to Hawk Channel. The controlling depth in the channel was 7 feet in August 1963.

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Matecumbe Harbor is at the southwest end of **Lower Matecumbe Key,** 1 mile southeast of **Mile 1016.0** via Channel Five. The entrance is marked by a light and the remainder of the channel is privately marked. In August 1963, the controlling depth was 3 feet in the entrance, with deeper water inside.

Channel Two, just west of Matecumbe Harbor, connects Florida Bay and Hawk Channel, and passes beneath the highway trestle. The controlling depth in the channel, in August 1963, was 8 feet. The trestle has a 34-foot fixed span with a clearance of 10 feet.

Channel Five, Mile 1017.5, one of the main routes by which boats can reach Hawk Channel, is described in Chapter 11.

At **Mile 1017.6,** there is a small-boat marina on **Greyhound Key** where gasoline, water, ice, restrooms, showers, restaurant, motel, electricity, hull repairs, boat rental, and limited supplies are available. The controlling depth in the channel leading to the marina was 1 foot in August 1963, with 3 feet alongside the pier.

At **Mile 1019.1,** there is a small marina where gasoline, water, ice, electricity, restrooms, showers, restaurant, motel, launching ramp, boat rental, and supplies are available. Berthage is limited. The controlling depth in the channel leading to the marina and alongside the pier was 3 feet, in August 1963. See Appendix for **storm warning display.**

At the west end of **Long Key,** 2.2 miles south of **Mile 1020.7,** gasoline is available at a small pier. **Conch Keys,** 2.4 miles west of the west end of Long Key, are marked by a water tank. The channel to the wharf, in August 1963, had a controlling depth of 3 feet and was privately marked. Gasoline, water, and other services are obtainable at the wharf, on the bay side, which has 2 feet alongside.

At **Mile 1024.2,** the waterway goes through **Channel Key Banks** at **Channel Key Pass** which is marked by a light and daybeacons.

Chart 852.—At **Mile 1026.8,** on **Grass Key, storm signals are displayed,** see Appendix. At **Mile 1035.5** on the north side of **Vaca Key** there is a boatyard which has a marine railway that can haul boats up to 55 feet in length, for hull and engine repairs. Gasoline, diesel fuel, water, electricity, restrooms, and supplies are available. There is berthage for 36 boats, and dry storage for 32. The controlling depth leading to the boatyard is 5 feet and there is 9 to 17 feet alongside the piers.

Marathon is on Vaca Key, 1.5 miles south of **Mile 1036.1.** It is the second largest town on the Florida Keys. Several fish wharves have 6 feet of water at their faces. Gasoline, diesel fuel, water, ice, electricity, restrooms, showers, lodging, boat rental, and supplies are available at the basin on the north side, and there is berthage for 50 boats with depths from 8 to 15 feet alongside. The entrance channel and basin had a controlling depth of 5 feet in August 1963. Provisions are available in the town.

At **Mile 1037.2,** on the north side of Vaca Key, there is a boat basin where gasoline, diesel fuel, water, ice, electricity, restrooms, showers, restaurant, motel, and supplies are available. There is a launching ramp and berthage for 40 boats with 4 to 6 feet alongside the piers. The controlling depth in the channel leading to the basin was 4 feet in August 1963. See appendix for **storm warning display.**

Knight Key Channel, just west of Marathon, passes under the highway trestle close westward of **Knight Key.** The controlling depth in the channel was 6 feet in August 1963. The trestle has a fixed span with a clearance of 19 feet. The highway bridge crossing **Pigeon Key Channel** between Knight Key Channel and Pigeon Key has a fixed span with a clearance of 15 feet. **Boot Key Harbor** is described in Chapter 11.

Bethel Bank, Mile 1037.3, is a junction point in the Intracoastal Waterway. Vessels may follow the southern route via Moser Channel or Bahia Honda and Hawk Channel to Key West, or the northern alternate route via Big Spanish Channel and the Gulf of Mexico. The mileage along the northern route is suffixed by the letter "A". The southern route is about 14 miles shorter to Key West.

Pigeon Key, on the east side of Moser Channel, is marked by a group of white houses. The viaduct passes high overhead at the key.

Moser Channel, Mile 1040.2, and **Bahia Honda,** 7 miles to the westward, connect Florida Bay and Hawk Channel. These channels are described in Chapter 11.

Chart 853.—The Intracoastal Waterway routes through Moser Channel and Bahia Honda rejoin at **Mile 1049.6,** about 2.1 miles south of the bridge over Bahia Honda, and then the route follows the aids in Hawk Channel to Key West. Hawk Channel is described in Chapter 11.

Newfound Harbor Keys Anchorage, Newfound Harbor Channel, Niles Channel, Loggerhead Key Anchorage, Cudjoe Bay, and **Sugarloaf Channel** are discussed in Chapter 11.

Chart 854.—From Hawk Channel, the Intracoastal Waterway joins the Main Ship Channel at **Mile 1079.2,** 1.1 miles southwestward of Key West Light, and then follows the main channel to **Key West, Mile 1080.7.** The supply and repair facilities at Key West are described in Chapter 11.

Saddlebunch Harbor, Boca Chica Channel, and **Safe Harbor Channel** are discussed in Chapter 11.

Charts 859, 1251.—Big Spanish Channel to Key West, north of Florida Keys.—The northern alternate route of the Intracoastal Waterway leads northwestward from Bahia Honda through **Big Spanish Channel** to Harbor Key Bank, thence along the north side of the Florida Keys to Northwest Channel, thence to Key West. The controlling depth for this route was 5 feet in August 1963.

At **Mile 1055.0A** the waterway passes through a crooked channel marked by daybeacons southwest of **Big Spanish Key.** Caution should be exercised in this shoal area. Northward of the key the color of the water is a good

indication of the channel location.

At **Harbor Key Bank Light, Mile 1058.7A,** the waterway enters the Gulf of Mexico, turns westward and follows a course of **246°** for about 28 miles to the lighted bell buoy at the entrance to **Northwest Channel, Mile 1087.2A.** A course closer to the Florida Keys should not be attempted because the landmarks are difficult to identfy and the bottom inside the 18-foot contour rises abruptly.

Use charts **1251** and **584** westward of Johnston Key to Northwest Channel, thence to **Key West, Mile 1095.2A.** Northwest Channel and Key West are described in Chapter 11.

Charts 859, 854.—Inside passage from Big Spanish Channel to Key West.—At **Mile 1048.9A,** an inside route to Key West branches off to the westward, about 0.5 mile north of **No Name Key,** and passes south of **Porpoise Key,** thence winds through a narrow and crooked channel between the smaller keys northward of U.S. Highway 1. In August 1963, the controlling depth in the channel was 3 feet. The irregular line of daybeacons marking the channel for the most part were broken off or missing, with pointers missing, or were hard to make out. Fresh to strong winds from any direction may change the depth in the channel in a short period of time.

APPENDIX

COAST AND GEODETIC SURVEY.—United States Coast Pilots, Tide Tables, Tidal Current Tables, and Tidal Current Charts: For sale by U.S. Coast and Geodetic Survey, Washington, D.C., 20230, and its district offices and sales agencies which are listed semiannually in the Notice to Mariners.

United States Coast Pilots:

1. Atlantic Coast, Eastport to Cape Cod, 1960.
2. Atlantic Coast, Cape Cod to Sandy Hook, 1960.
3. Atlantic Coast, Sandy Hook to Cape Henry, 1961.
4. Atlantic Coast, Cape Henry to Key West, 1964.
5. Atlantic Coast—Gulf of Mexico, Puerto Rico, and Virgin Islands, 1962.
7. Pacific Coast—California, Oregon, Washington, and Hawaii, 1963.
8. Pacific Coast, Alaska—Dixon Entrance to Cape Spencer, 1962.
9. Alaska, Cape Spencer to Arctic Ocean, 1954.

Distances Between United States Ports, Third (1961) Edition.

A Coast Pilot for which a supplement has been issued should not be used except with reference to the latest issue of its supplement. Supplements may be obtained from the U.S. Coast and Geodetic Survey, Washington, D.C., 20230, or any of its district offices.

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.
Narrangansett 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.

District Offices.—Norfolk District, 102 West Olney Road, Norfolk, Va., 23510. The Norfolk District includes all of the States of West Virginia, Virginia, North Carolina, and parts of Kentucky and Tennessee east of the Tennessee River.

Tampa District, 19th and Grant Streets, Tampa, Fla., 33605. The Tampa District includes all of the States of South Carolina, Georgia, and Florida; this office, however, does not sell Coast Pilots, charts, or other publications.

Coast and Geodetic Survey Sales Agents.—Agents marked with an (*) asterisk also handle certain U.S. Naval Oceanographic Office publications, and those marked with a (†) dagger also handle certain U.S. Coast Guard publications.

Virginia:

Norfolk: Coast and Geodetic Survey Office, 102 West Olney Rd.; *†W. T. Brownley, 121 Randolph St.; *†Henry Eagleton, 430 Boush St.; M. Lee Hudgins & Son, 511 Front St.; *†E. Smola Co., 316 West Olney Rd.

Virginia Beach: Beach-Bay Marina, Inc., 31st St. Extended.

North Carolina:

Bayboro: Ensley's Radio Co.
Beaufort: Beaufort Florist, 121 Turner St.
Belhaven: River Forest Manor.
Coinjock: Coinjock Esso Marine Dock.
Elizabeth City: Riverside Boat Works, 808 Riverside Ave.
Fayetteville: †A. K. McCallum Co., 715 Ramsey St.
Jacksonville: †Carolina Office Supply Co., 624 New Bridge St.
Manteo: Eastern National Park & Monument Association; Cape Hatteras National Seashore.
Morehead City: Dee Gee's Gift Shop, On the Waterfront; Woodies Groceries, 703 Arendell St.
Nags Head: Nags Head Ice & Cold Storage.
New Bern: Barbour Boat Works, Inc.; Trent Marine Service.
Raleigh: Raleigh Blue Printers, 126 West Martin St.
Southport: Elizabeth River Marina, Long Beach Rd.
Washington: Kugler-Nicholson, Inc.
Wilmington: †O. E. Durant, Water and Market Sts.
Wrightsville Beach: Wrightsville Marina.

South Carolina:

Beaufort: Beaufort Book Shop, 808 Bay St.; Motor Boat Sales Co., Lady's Island.

Charleston: *†Heyward Supply Co., 212–16 Huger St.; Marine Center; *†Capt. Chester H. Taylor, 141 East Bay St.

Georgetown: Essomarine Dock.

Myrtle Beach: Hague Marina, Inc., Pine Island Rd. at Intracoastal Waterway.

Georgia:

Brunswick: Georgia Hardware & Marine Supply, 205 Monk St.

Savannah: John D. Robinson Co., 13–15–17 West Bay St.; *†Southern Marine Supply Co., Inc., 202 West Bay St.

Florida:

Big Pine Key: The Sea Center.

Dania: DePadro Yacht Basin.

Daytona: Daytona Marine Supplies & Sales, Div. of Southern Aero, 645 South Beach St.

Delray Beach: *Marineway Corp., 777 Palm Trail.

Fernandina Beach: Fernandina Beach Marina.

Flamingo: Everglades Park Co., Inc.

Fort Lauderdale: *Bahia Mar Marine, Inc.; Bahia Mar Yachting Center; *Herold Boat Co., 1112 East Las Olas Blvd.: *Lauderdale Marina, Inc., 1900 Southeast 15th St.; *Phillips Petroleum Co., Pier 66; Vogel's Marine Supply Co., 601 South Andrews Ave.

Fort Myers: Fort Myers Yacht Basin; Parker's Book Store.

Fort Pierce: Horton's, Inc., 122 North 2d St.

Gainesville: Florida Bookstore, Inc., 1614 West University Ave.

Hialeah: R & H Marine Service, 33 East 2d St.

Homestead: Don's Bait and Tackle, 30711 South Federal Hwy.; Maxson Marine Mart, Inc., 1460 North Federal Hwy.

Islamorada: The Four Winds, Overseas Highway at Ocean Lane.

Jacksonville: †H. & W. B. Drew Co., 22–30 West Bay St.; *†Nautical Supply Co., 213 East Bay St.; Outboard, Inc., 1344 University Blvd.

Jacksonville Beach: Beach Marine Service.

Key West: *Capt. Red's, 517 Fleming St.

Lantana: Lake Worth Marine, Inc., 808 North Dixie.

Marathon: Thomas Marina, Inc., 2055 Overseas Highway; Ye Ole Feshin Hole.

Melbourne: Melbourne Marine Service Center, 42 Front St.

Merritt Island: Banana River Marine Service, Banana River Dr.

Miami: Fisherman's Paradise, Inc., 1260 Northwest 42d Ave.; *Florida Precision Instrument Corp., 800 Northwest 7th Ave.; *†L. B. Harvey, 252 Southwest 6th St.; *†Hopkins-Carter Hardware Co., 135 South Miami Ave.; †Phillips Hardware Co., 490 Northwest South River Dr.; †Santana Marine Service, Dinner Key.

New Smyrna Beach: Dan's Boathouse, Inc., City Yacht Basin.

North Miami: Challenger Marine, 13301 Biscayne Blvd.

North Miami Beach: Breuil Boat Co., Inc., 17201 Biscayne Blvd.

Orlando: Florida Marine & Equipment Co., 1104–06 North Mills St.; Ransom Downes Outboard Service, 1118 South Orange Ave.

Palatka: Oliver & Garrett Co.

Pompano Beach: *Lighthouse Marine Center, 2507 North Ocean Blvd.; Sea Chest of Pompano Beach, Inc., 12 North Riverside Dr.

South Miami: †Johnson-Kirby, Inc., 5966 South Dixie Hwy.

Stuart: Ideal Sport Shop, 245 Osceola Ave.

Travernier: Roberts Bait Supply.

Titusville: Correct Craft Marina, Inc.

Vero Beach: †Vero Marine Center, 12 Royal Palm Blvd.

West Palm Beach: *Hopkins Marine Hardware Co., 207 6th St.; Spencer Marine Hardware Co., 4006 North Dixie.

PUBLICATIONS.—A résumé 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, Part I (Atlantic and Mediterranean) and Part II (Pacific and Indian Oceans)—U.S. Naval Oceanographic Office; Weekly Notice to Mariners, Great Lakes—Com-

mander, 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.—District offices and areas covered by this Coast Pilot follow:

Norfolk District, Foot of Front St., Norfolk, Va. Coastal and tributary waters of Virginia, including Chesapeake Bay and tributaries southward of Smith Point on the western shore and Onancock Creek southward on the eastern shore.

Wilmington District, 308 Customhouse, Wilmington, N.C. Coastal and tributary waters of North Carolina.

Charleston District, Municipal Marina, Charleston, S.C. Coastal and tributary waters of South Carolina.

Savannah District, 200 East St. Julian St., Savannah, Ga. Coastal and tributary waters of Georgia and Fernandina Harbor, Fla.

Jacksonville District, 575 Riverside Avenue, Jacksonville, Fla. Coastal and tributary waters of Florida, except Fernandina Harbor.

COAST GUARD.—District offices and areas covered by this Coast Pilot follow:

Commander, Fifth Coast Guard District, Federal Building, 301 Crawford St., Portsmouth, Va. Coastal waters and tributaries of Maryland, Virginia, North Carolina, District of Columbia, and the Chesapeake and Delaware Canal.

Norfolk Captain of the Port, % Coast Guard Group Office, P.O. Box 4557, Berkley Station, Norfolk, Va.

Commander, Seventh Coast Guard District, Federal Building, 51 Southwest First Ave., Miami, Fla. Coastal waters and tributaries of South Carolina, Georgia, Florida except the part west of Apalachicola River.

Wilmington Captain of the Port, U.S. Customhouse, Princess and Water Sts., Wilmington, N.C.

Charleston Captain of the Port, 196 Tradd St., Charleston, S.C.

Savannah Captain of the Port, Municipal Dock, P.O. Box 194, Savannah, Ga.

Jacksonville Captain of the Port, 6925 Evergreen Ave., Jacksonville, Fla.

Miami Captain of the Port, % Coast Guard Base, 100 McArthur Causeway, Miami Beach, Fla.

Key West Captain of the Port, Coast Guard Base, Key West, Fla.

Lifeboat stations.—The lifeboat stations operated by the Coast Guard in the areas covered by this Coast Pilot are:

No. 162: Virginia Beach, Va.; 36°51.2′ N., 75°58.5′ W. On beach front, 5 miles south of Cape Henry Light.

No. 164: Little Island, Va.; 36°41.5′ N., 75°55.3′ W. On Beach front abreast North Bay.

No. 170: Caffeys Inlet, N.C.; 36°13.6′ N., 75°46.2′ W. On beach front 9.8 miles south of Currituck Beach Light.

No. 173: Kill Devil Hills, N.C.; 36°00.7′ N., 75°39.1′ W. On beach front abreast south end Colington Island.

No. 176: Oregon Inlet, N.C.; 35°46.0′ N., 75°31.5′ W. Northerly end of Pea Island, 0.7 mile south of Oregon Inlet Light.

No. 183: Cape Hatteras, N.C.; 35°14.7′ N., 75°32.0′ W. About 0.8 mile southwest of Cape Hatteras Light.

No. 186: Hatteras Inlet, N.C.; 35°12.5′ N., 75°42.4′ W. Southern end of Hatteras Island, 1 mile southwest of town of Hatteras.

No. 187: Ocracoke, N.C.; 35°06.9′ N., 75°59.3′ W. At Ocracoke, about 0.5 mile north of Ocracoke Light.

No. 190: Cape Lookout, N.C.; 34°36.2′ N., 76°32.3′ W. About 1.5 miles south of Cape Lookout Light.

No. 191: Fort Macon, N.C.; 34°41.8′ N., 76°40.9′ W. East side of Beaufort Inlet.

No. 192: Swansboro, N.C.; 34°38.8′ N., 77°05.8′ W. About 1 mile east of Bogue Inlet, on west end of Bogue Banks.

No. 196: Sullivans Island, S.C.; 32°45.5′ N., 79°50.6′ W. At Charleston Light.

No. 198: St. Simons Island, Ga.; 31°08.7′ N., 81°22.4′ W. Near south end of St. Simons Island.

No. 203: Ponce de Leon Inlet, Fla.; 29°03.9′ N., 80°54.9′ W. About 1.2 miles south-southeast of Ponce de Leon Inlet Light.

No. 206: Fort Pierce, Fla.; 27°28.1′ N., 80°17.9′ W. South side of entrance to Fort Pierce Inlet.

No. 208: Lake Worth Inlet, Fla.; 26°46.3′ N., 80°02.7′

W. South side of Peanut Island, 0.5 mile west of Lake Worth Inlet.

CUSTOMS DISTRICTS.—The first port listed in each district is the headquarters port. An asterisk (*) precedes the names of ports authorized to issue marine documents.

Virginia District: The limits are the State of Virginia.

Ports of entry: *Norfolk and *Newport News.

North Carolina District: The limits are the State of North Carolina.

Ports of entry: *Wilmington, *Beaufort-Morehead City, *Elizabeth City, and Reidsville. *Washington is a customs station, but not a port of entry.

South Carolina District: The limits are the State of South Carolina.

Ports of entry: *Charleston and *Georgetown.

Georgia District: The State of Georgia, except St. Marys River north bank and the city of St. Marys.

Ports of entry: *Savannah and *Brunswick.

Florida District: The State of Florida, the north bank of St. Marys River, and the city of St. Marys.

Ports of entry: *Fernandina Beach, *Jacksonville, St. Augustine, Cape Canaveral, *West Palm Beach, Port Everglades, *Miami, and *Key West.

PUBLIC HEALTH SERVICE—Quarantine stations where supervision of quarantine and medical examination of aliens are performed:

Savannah, Ga.: Public Health Service Hospital, 115 East York St.

Jacksonville, Fla.: Federal Building, 311 West Monroe St.

Miami, Fla.: Fisher Island.

Additional ports at which quarantine inspections and/or medical examinations of aliens are performed:

Norfolk, Va.; Morehead City, Wilmington, and Sunny Point, N.C.; Charleston, Port Royal, and Georgetown, S.C.; Brunswick and St. Marys, Ga.; Fernandina Beach, West Palm Beach, Port Everglades, Fort Pierce, Cape Canaveral, and Key West, Fla.

Hospitals:

Norfolk, Va.: 6500 Hampton Blvd., Larchmont.

Savannah, Ga.: 115 East York St.

Outpatient Clinics:

Charleston, S.C.: Customhouse, Market and East Bay Sts.

Jacksonville, Fla.: 403 Federal Bldg., 311 West Monroe St.

Miami, Fla.: 51 Southwest First Ave.

Outpatient Offices:

Elizabeth City, N.C.: 224 Carolina Bldg.

Edenton, N.C.: 108 East King St.

Washington, N.C.: 604 East 12th St.

New Bern, N.C.: 81 Pollock St.

Beaufort, N.C.: 509 Front St.

Morehead City, N.C.: 104 North 7th St.

Southport, N.C.

Wilmington, N.C.: 201 North Front St.

Brunswick, Ga.: Dunwoody Bldg., 1501½ Newcastle St.

Fort Lauderdale, Fla.: Broward Medical Bldg., 3025 West Broward Blvd.

Key West, Fla.: 420 Simonton St.

IMMIGRATION AND NATURALIZATION.—Offices of this service are in the following places:

Virginia:

Norfolk: Room 426, U.S. Post Office Bldg.

North Carolina:

Wilmington: Room 231, U.S. Customhouse.

South Carolina:

Charleston: Room 7, U.S. Customhouse, Bay & Market Sts.

Georgia:

Savannah: Room 8, U.S. Customhouse, Bull and Bay Sts.

Florida:

Jacksonville: Room 427, U.S. Post Office and Federal Bldg., 311 West Monroe St.

West Palm Beach: Customs Immigration Bldg.

Port Everglades: Room 101, U.S. Customhouse.

Miami: 3915 Biscayne Blvd.

Key West: Room 105, New Post Office Bldg., Simonton and Carolina Sts.

FEDERAL COMMUNICATIONS COMMISSION.—District field offices:

Norfolk: Room 402, Federal Bldg., Norfolk, Va.

Savannah: (subdistrict office) Room 214, Post Office Building, Savannah, Ga.

Miami: Room 312, Federal Bldg., Miami, Fla.

WEATHER BUREAU.—Offices: Barometers may be compared with standards at the following offices:

Norfolk, Va.: U.S. Customhouse, 101 East Main St.; Municipal Airport.

Wilmington, N.C.: New Hanover County Airport.

Charleston, S.C.: Municipal Airport.

Savannah, Ga.: Travis Field Municipal Airport.

Jacksonville, Fla.: Imeson Municipal Airport.

Miami, Fla.: 3240 Northwest 27th Ave.

Radiotelephone broadcasts of weather information.—Regular broadcasts of weather forecasts, storm warnings, and other information are made by commercial coastal harbor radiotelephone stations in plain language. Storm warnings are broadcast on receipt and at intervals thereafter while in effect. Regular scheduled times:

WGB, Norfolk, Va., 2538 kc.: 0000, 0600, 1200 and 1800 EST.

WJO, Charleston, S.C., 2566 kc.: 0715 and 1915 EST.

WNJ, Jacksonville, Fla., 2566 kc.: 0700 and 1900 EST.

WDR, Miami, Fla., 2514 kc. daytime only; 2490 kc.: 0715 and 1915 EST. (Seasonal)

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 made

several times 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.

Radiotelephone broadcasts by Coast Guard.—Scheduled marine information broadcasts of notices to mariners, hydrographic information, storm warnings, small-craft warnings, advisories, and other important marine information are broadcast by radiotelephone at the scheduled times and indicated frequencies preceded by an initial call on 2182 kc. Urgent broadcasts are made on 2182 kc upon receipt.

NMN, Portsmouth, Va., 2670 kc., warnings at 0020 and 1220, EST.

NMB, Charleston, S.C., 2670 kc., warnings at 1120 and 2320, EST.

NMV, Jacksonville Beach, Fla., 2670 kc., warnings at 0120 and 1320, EST.

NMA, Miami, Fla., 2670 kc., warnings at 1150 and 2350. EST.

Radiotelegraph broadcasts by Coast Guard.—Scheduled marine information broadcasts of notices to mariners, hydrographic information, forecasts, reports, storm warnings, advisories, and other important marine information are broadcast by radiotelegraph at the scheduled times and indicated frequencies, preceded by an initial call on 500 kc. Urgent broadcasts are made on 500 kc. upon receipt and repeated during the last 15 seconds of the first silent period after receipt. Whenever this transmission occurs outside the watch hours for single radio-operator ships, the message will be repeated at the end of the next silent period falling within the radio watch hours for such vessels. Urgent broadcasts are preceded by the Urgent Signal (XXX).

NMN, Portsmouth, Va., 466 kc., 1120 and 2020, EST.

NMV, Jacksonville Beach, Fla., 430 kc., 1125 and 2025, EST.

NMA, Miami, Fla., 440 kc., 1100 and 2000, EST.

STORM WARNING STATIONS.—Weather Bureau listing of display stations in the area covered by this Coast Pilot follow. **DN** indicates day and night display; **D**, day display only; **W**, no display, posted warnings only.

Virginia:

DN Cape Henry Light; 36°55.8′, 76°00.5′.

North Carolina:

DN Coinjock; 36°20.7′, 75°57.1′.
DN Elizabeth City; 36°17.8′, 76°13.2′.
DN Edenton; 36°03.4′, 76°36.8′.
D Columbia; 35°55.0′, 76°15.2′.
DN Manteo; 35°54.6′, 75°40.5′.
DN Washington; 35°32.2′, 77°02.8′.
D Diamond Shoals Lightship; 35°05.3′, 75°19.7′.
DN Hatteras; 35°13.0′, 75°41.0′.
D Ocracoke Lifeboat Station; 35°06.9′, 75°59.2′.
DN Morehead City; 34°43.2′, 76°42.9′.
D Cape Lookout Lifeboat Station; 34°36.2′, 76°32.3′.
D Wrightsville; 34°13.0′, 77°48.8′.
D North Carolina State Docks; 34°12.2′, 77°57.3′.
D Wrightsville Beach; 34°12.1′, 77°48.1′.
D Carolina Beach; 34°01.9′, 77°53.7′.
DN Southport; 33°55.0′, 78°01.1′.
D Frying Pan Shoals Lightship; 33°28.0′, 77°34.0′.

South Carolina:

D Little River; 33°52.1′, 78°36.5′.
D Ocean Drive Beach; 33°49.0′, 78°40.4′.
D Crescent Beach; 33°48.5′, 78°42.6′.
D Briar Cliffe; 33°48.0′, 78°45.0′.
D Murrells Inlet; 33°33.0′, 79°02.4′.
D Garden City Beach; 33°34.5′, 78°59.9′.
DN Georgetown; 33°21.8′, 79°17.0′.
D McClellanville; 33°04. 8′, 79°27.6′.
D Charleston Army Transportation Depot; 32°54.8′, 79°55.4′.
D Charleston, Post-Courier Building; 32°47.6′, 79°56.5′.
D Charleston Municipal Yacht Basin; 32°46.7′, 79°57.1′.
DN Charleston, Coast Guard Base; 32°46.4′, 79°56.6′.
DN Sullivans Island Lifeboat Station; 32°45.5′, 79°50.6′.
D Edisto Island; 32°29.5′, 80°20.6′.
W Port Royal; 32°22.4′, 80°41.4′.

Georgia:

D Isle of Hope; 31°59.0′, 81°03.3′.
DN Brunswick; 31°08.6′, 81°29.8′.

Florida:

DN Fernandina Beach; 30°40.3′, 81°27.9′.
D Jacksonville Beach, El Verde Yacht Basin; 30°17.2′, 81°25.2′.
D St. Augustine; 29°53.5′, 81°18.6′.
D Daytona Beach, Halifax River Yacht Club; 29°12.5′, 81°00.9′.
D Ponce de Leon Inlet Lifeboat Station; 29°03.9′, 80°54.9′.
D Titusville; 28°37.1′, 80°48.2′.
D Cocoa Beach; 28°21.5′, 80°36.9′.
D Eau Gallie; 28°07.5′, 80°37.7′.
D Melbourne Marina; 28°04.7′, 80°36.0′.
D Vero Beach; 27°39.2′, 80°22.2′.
D Fort Pierce Inlet Lifeboat Station; 27°28.0′, 80°18.0′.
D Stuart, Rocky Point; 27°09.8′, 80°11.0′.
D Stuart No. 2; 27°11.8′, 80°15.4′.
W Okeechobee; 27°14.0′, 80°50.0′.
W Canal Point; 26°51.0′, 80°38.0′.
D Moore Haven; 26°50.0, 81°05.9′.
W Pahokee; 26°49.0′, 80°40.0′.
D Clewiston; 26°45.3′, 80°55.0′.
D Lake Worth Inlet Lifeboat Station; 26°46.3′, 80°02.8′.
D West Palm Beach; 26°43.0′, 80°03.0′.
D Port Everglades; 26°05.6, 80°07.5′.
DN Fort Lauderdale, Bahia Mar; 26°06.8′, 80°06.5′.
DN Fort Lauderdale (Pier 66); 26°06.1′, 80°07.1′.
D Hollywood City Yacht Basin; 26°00.8′, 80°07.1′.
DN North Miami Beach, Harbor One; 25°56.0′, 80°09.0′.
D Bakers Haulover, Miami; 25°54.2, 80°07.5′.
D Miami Beach, Flamingo Marina; 25°50.9′, 80°08.8′.
D Miami Beach Yacht Corp. Slip; 25°47.7′. 80°08.7′

D Miami City Yacht Basin; 25°46.7′, 80°11.2′.
D Miami Beach, Fisher Island; 25°45.8′, 80°08.3′.
D Miami, Dinner Key; 25°43.7′, 80°14.2′.
D Miami, Crandon Park; 25°43.4′, 80°09.3′.
D Fowey Rocks Light Station; 25°35.4′, 80°05.8′.
D Homestead Bayfront Park; 25°27.7′. 80°20.3′.
D Jewfish Creek; 25°11.0′, 80°23.2′.
D Tavernier; 25°00.5′, 80°31.1′.
D Windley Key; 24°56.5′, 80°36.4′.
D Islamorada; 24°55.0′, 80°38.2′.
D Long Key; 24°49.6′, 80°48.8′.
D Grassy Key, Bonefish Harbor; 24°46.0′, 80°56.7′.
D Marathon, Leonards Store; 24°43.8′, 81°01.8′.
D Key Colony Beach; 24°43.4′, 81°01.1′.
D Marathon; 24°42.5′, 81°06.3′.
D Marathon, Overseas Boat Rental; 24°42.5′, 81°06.7′.
D Key West, Sands' Marine Station; 24°33.8′, 81°48.0′.
DN Key West, Lumley & Roberts Hardware Co., 24°33.6′, 81°48.1′.
D Key West, Eisner Yacht Basin; 24°33.5′, 81°47.3′.
D Key West, Naval Station; 24°33.1′, 81°48.4′.
D Flamingo No. 2; 25°08.5′, 80°55.5′.

LEGAL HOLIDAYS.—In the areas covered by this Coast Pilot, the following holidays are observed throughout:

January 1, New Year's Day; January 19, Robert E. Lee's Birthday; February 22, Washington's Birthday; July 4, Independence Day; Labor Day; November 11, Veterans Day; Thanksgiving Day; December 25, Christmas Day.

In addition, these holidays are observed as indicated: Arbor Day, third Friday in January, Florida; Easter Monday, North Carolina; April 13, Thomas Jefferson's Birthday, Virginia; April 26, Conferedate Memorial Day, Georgia and Florida; May 10, Confederate Memorial Day, North Carolina, South Carolina; May 30, Memorial Day, Florida; June 3, Jefferson Davis' Birthday, South Carolina, Georgia, and Florida.

CLIMATOLOGICAL TABLES

These tables were compiled from U. S. Weather Bureau data.

Sky cover is expressed in a range of 0 for no clouds to 10 for complete sky cover. The number of clear days is based on average cloudiness of 0 to 3, partly cloudy days on 4 to 7, and cloudy days on 8 to 10.

Heavy fog includes data referred to at various times in the past as "Dense" or "Thick." The upper visibility limit for heavy fog is 1/4 mile.

(a) means length of record in years.
* means less than one-half.
T means trace, an amount too small to measure.

NORFOLK, VA. (Municipal Airport) 36°53'N., 76°12'W. Elevation (ground) 26 feet. WB-63

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): 7:00 a.m. EST	1:00 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)				15	15		15	15	15	15	15	15	10	10	15	15	15	15	15	15	15	15
Jan.	50.2	32.2	41.2	77	12	3.33	2.26	2.8	78	61	10.0	SW	49SW	58	6.3	9	7	15	10	1	*	2
Feb.	51.0	32.2	41.6	78	11	3.21	1.70	1.2	77	59	10.3	NNE	45SW	56	6.4	8	6	14	10	*	1	3
Mar.	57.2	38.7	48.0	85	20	3.45	3.18	0.7	74	54	10.8	SW	50W	61	6.1	9	7	15	12	*	2	2
Apr.	68.0	47.9	58.0	97	30	3.16	2.40	T	74	50	10.3	SW	54N	65	5.8	9	10	11	10	0	3	2
May	77.3	57.7	67.5	97	36	3.36	2.94	0.0	77	56	8.4	SW	31NE	65	6.0	8	11	12	10	0	6	2
June	84.9	66.3	75.6	100	48	3.61	6.85	0.0	78	57	7.9	SW	42NW	65	5.7	8	12	10	9	0	6	2
July	87.9	69.6	78.8	103	57	5.92	3.57	0.0	82	58	7.3	SW	55SW	66	5.7	8	13	10	11	0	9	1
Aug.	86.2	68.8	77.5	97	56	5.97	5.79	0.0	85	62	7.6	SW	50NE	63	5.7	8	12	11	11	0	8	2
Sept.	80.9	64.3	72.6	98	46	4.22	6.79	0.0	84	62	8.3	NE	63W	62	5.7	9	9	12	8	0	3	2
Oct.	70.9	53.1	62.0	95	30	2.92	4.19	0.0	85	62	9.1	NE	68S	61	5.3	13	6	12	8	0	2	3
Nov.	61.0	41.8	51.4	85	20	3.05	3.35	T	81	56	9.4	SW	45SE	61	5.4	11	8	11	9	0	*	2
Dec.	51.8	33.1	42.5	77	14	2.74	2.12	1.7	78	58	9.5	SW	42NW	62	5.8	10	8	13	8	*	*	3
Year	68.9	50.5	59.7	103	11	44.94	6.85	6.4	79	58	9.0	SW	68S	62	5.8	110	109	146	117	2	39	25

CAPE HATTERAS, N.C. (Weather Bureau Building) 35°16'N., 75°33'W. Elevation (ground) 7 feet. WB-1963

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): 7:00 a.m. EST	1:00 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)				6	6		6	6	6	6	6	6		2	6	6	6	6	6	6	6	6
Jan.	53.2	39.9	46.6	71	18	3.90	3.31	0.6	80	67	10.4	NNE		62	5.8	9	9	13	10	*	1	3
Feb.	53.5	39.5	46.5	73	14	3.93	2.76	0.9	81	69	11.6	NNE		52	6.5	8	4	16	11	*	2	4
Mar.	58.0	44.0	51.0	76	25	4.16	2.86	1.4	81	63	11.1	SW		66	6.3	8	8	15	12	*	1	2
Apr.	66.3	52.2	59.3	80	33	2.99	5.60	0.0	76	61	11.5	SW		67	5.5	10	9	11	10	0	3	1
May	74.8	61.1	68.0	88	42	3.98	3.28	0.0	82	66	10.1	SW		64	6.0	7	13	11	11	0	6	1
June	81.7	68.6	75.2	94	54	4.14	6.63	0.0	84	71	10.0	SSW		61	6.6	6	10	14	10	0	6	1
July	83.8	72.2	78.0	92	55	6.15	3.12	0.0	85	70	9.0	SW		70	6.6	6	9	16	11	0	10	*
Aug.	83.5	71.6	77.6	93	57	6.42	8.11	0.0	86	70	8.6	SW		64	6.2	7	12	12	11	0	9	*
Sept.	79.8	68.3	74.1	90	51	5.89	4.77	0.0	83	67	9.7	NE		59	5.6	10	8	12	8	0	3	*
Oct.	71.3	59.4	65.4	86	33	4.24	3.60	0.0	83	67	9.7	NNE		71	5.2	13	6	12	11	0	3	1
Nov.	62.8	49.5	56.2	80	29	4.09	4.02	T	82	64	10.1	NNE		64	5.7	10	7	13	10	0	2	1
Dec.	54.8	41.5	48.2	72	19	4.58	2.97	T	80	67	10.3	NNE		56	5.5	12	6	13	9	0	1	2
Year	68.6	55.7	62.2	94	14	54.47	8.11	2.9	82	67	10.2	SW		63	5.9	106	101	158	121	1	45	16

WILMINGTON, N.C. (New Hanover Airport) 34°16'N., 77°55'W. Elevation (ground) 28 feet. WB-1963

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): 7:00 a.m. EST	1:00 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)				11	11		12	12	11	11	12	12	12	12	12	12	12	12	12	12	12	12
Jan.	58.4	37.3	47.9	79	16	2.85	1.95	0.2	84	58	9.0	N	50S	57	5.9	10	7	14	9	*	1	2
Feb.	59.4	37.9	48.7	85	11	3.42	1.87	0.4	83	56	10.0	NW	57SW	57	5.9	10	5	13	10	*	1	1
Mar.	65.1	43.2	54.2	84	20	4.03	3.31	0.6	82	53	10.2	SSW	49SW	61	5.7	10	8	13	11	*	2	1
Apr.	73.6	51.4	62.5	91	34	2.86	3.52	0.0	81	51	10.6	SSW	49NE	69	5.0	11	10	9	8	0	3	2
May	81.0	60.0	70.5	98	42	3.52	4.95	0.0	83	55	9.1	SSW	40NE	69	5.5	9	12	10	10	0	6	2
June	87.4	67.9	77.7	104	53	4.26	4.18	0.0	85	58	8.4	SSW	47NW	66	5.8	8	12	10	10	0	8	1
July	89.0	70.9	80.0	101	60	7.68	3.91	0.0	88	62	8.1	SSW	36N	65	5.9	7	13	11	12	0	11	1
Aug.	88.1	70.7	79.4	102	58	6.86	3.63	0.0	90	63	7.9	SW	63NE	65	5.8	8	13	10	11	0	9	1
Sept.	84.0	66.4	75.2	95	46	6.29	8.24	0.0	91	62	8.3	N	76N	62	5.8	9	10	11	10	0	4	3
Oct.	75.7	55.0	65.4	95	27	3.01	3.85	0.0	90	57	8.2	N	71SE	66	4.6	15	7	9	8	0	1	2
Nov.	66.8	43.9	55.4	83	24	3.09	2.89	T	88	56	8.3	N	51N	65	4.9	13	7	10	8	0	1	2
Dec.	59.3	37.1	48.2	80	10	3.42	3.23	0.4	83	55	8.3	N	41SW	61	5.3	12	7	12	9	*	0	2
Year	74.0	53.5	63.8	104	10	51.29	8.24	1.6	86	57	8.9	SSW	76N	64	5.5	122	111	132	115	1	46	20

CHARLESTON, S.C. (Municipal Airport) 32°54'N., 80°02'W. Elevation (ground) 41 feet. WB-1963

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): 7:00 a.m. EST	1:00 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)				21	21		21	21	21	21	14	14		5	14	15	15	15	21	21	21	14
Jan.	61.2	39.3	50.3	83	16	2.54	2.26	T	86	56	8.3	SW		62	6.2	8	8	15	9	0	1	4
Feb.	62.5	40.4	51.5	86	14	3.29	3.28	T	84	53	9.0	NNE		57	6.1	9	6	13	9	0	1	3
Mar.	68.0	45.4	56.7	90	21	3.93	6.63	T	84	51	9.2	SSW		66	6.2	8	9	14	11	0	2	2
Apr.	75.9	52.7	64.3	93	29	2.88	4.10	0.0	84	50	9.0	SSW		75	5.3	12	7	11	8	0	3	2
May	82.9	60.8	71.9	98	36	3.61	3.05	0.0	85	54	7.6	S		74	5.9	8	12	11	9	0	7	2
June	88.2	68.1	78.2	103	52	4.98	5.31	0.0	87	60	7.4	S		68	6.3	5	13	12	11	0	11	2
July	89.2	71.0	80.1	101	58	7.71	5.81	0.0	89	64	7.0	SW		69	6.6	5	12	14	14	0	14	1
Aug.	88.8	70.5	79.7	102	58	6.61	4.60	0.0	92	63	6.6	SW		70	6.1	6	13	12	12	0	12	2
Sept.	84.9	66.2	75.6	99	49	5.83	8.84	0.0	91	64	7.0	NNE		64	6.4	6	11	13	9	0	6	2
Oct.	77.2	55.1	66.2	94	27	2.84	5.77	0.0	90	56	7.0	NNE		71	5.0	12	9	10	6	0	1	3
Nov.	67.9	43.9	55.9	88	15	2.09	3.07	T	88	53	7.2	N		62	5.1	13	6	11	8	0	1	4
Dec.	61.3	38.6	50.0	81	8	2.85	2.38	0.1	85	54	7.6	NNE		69	5.8	10	7	14	8	*	*	3
Year	75.7	54.3	65.0	103	8	49.16	8.84	0.1	87	56	7.7	NNE		67	5.9	102	113	150	115	*	58	29

SAVANNAH, GA. (Travis Field) 32°08'N., 81°12'W. Elevation (ground) 48 feet. WB-1963

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): 7:00 a.m. EST	1:00 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)				13	13		13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Jan.	62.5	40.9	51.7	84	16	2.78	2.09	T	86	56	8.0	WNW	40NW	56	5.9	10	7	14	9	0	1	4
Feb.	64.4	41.7	53.1	86	14	3.68	3.34	0.1	87	55	8.6	NE	38WNW	57	6.0	8	7	13	9	*	1	3
Mar.	69.6	46.9	58.3	90	20	3.97	4.65	T	85	52	8.4	WNW	34SW	62	6.0	9	9	13	10	0	3	3
Apr.	77.3	54.1	65.7	94	32	3.70	3.66	0.0	85	51	8.3	SSE	35N	70	5.3	10	10	10	7	0	5	3
May	84.8	62.0	73.4	100	39	3.77	3.30	0.0	84	52	7.1	SW	34N	70	5.5	10	11	10	8	0	8	3
June	90.2	69.1	79.7	103	53	5.09	4.06	0.0	86	56	6.8	SW	57E	67	6.1	6	13	11	11	0	12	1
July	91.2	71.4	81.3	104	63	6.61	6.36	0.0	88	58	6.5	SW	44SE	66	6.3	5	15	11	13	0	16	1
Aug.	90.8	71.2	81.0	104	62	6.62	4.60	0.0	90	58	6.3	SW	50N	68	5.8	6	16	9	12	0	13	2
Sept.	85.9	67.4	76.7	97	50	5.25	5.87	0.0	91	61	7.1	NE	49NW	57	6.4	6	11	13	11	0	7	4
Oct.	78.1	56.3	67.2	94	28	2.58	3.57	0.0	89	55	7.2	NNE	32NE	65	4.7	13	8	10	5	0	1	3
Nov.	69.1	45.5	57.3	89	20	2.05	2.37	0.0	88	53	7.4	NNE	30W	62	5.1	12	6	12	7	0	*	5
Dec.	62.6	40.2	51.4	82	9	2.81	1.70	T	84	54	7.6	NE	32NW	56	5.7	10	7	14	7	0	*	4
Year	77.2	55.6	66.4	104	9	48.91	6.36	0.1	87	55	7.5	SW	57E	63	5.7	105	120	140	108	*	65	37

JACKSONVILLE, FLA. (Thomas C. Imeson Airport) 30°25'N., 81°39'W. Elevation (ground) 24 feet. WB-1963

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): 7:00 a.m. EST	1:00 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)				22	22		22	22	27	27	14	14	14	13	14	15	15	15	22	22	22	19
Jan.	66.8	45.0	55.9	85	20	2.45	3.02	T	88	56	7.4	NW	34W	57	5.8	10	8	13	7	0	1	5
Feb.	68.5	46.5	57.5	88	19	2.91	3.46	0.1	86	52	8.5	WSW	45NE	62	5.7	9	8	11	8	*	1	4
Mar.	73.3	51.1	62.2	90	25	3.49	3.21	T	85	49	8.4	NW	38W	63	5.8	9	10	12	8	0	3	3
Apr.	79.6	57.8	68.7	93	35	3.55	4.88	0.0	84	47	8.3	SE	42SW	70	5.3	10	10	10	7	0	4	3
May	86.4	65.1	75.8	99	49	3.47	5.09	0.0	82	48	7.8	WSW	40NE	69	5.3	9	14	8	8	0	6	2
June	90.5	71.1	80.8	103	57	6.33	4.19	0.0	85	55	7.6	SW	47E	59	6.2	6	12	12	12	0	10	1
July	92.0	73.2	82.6	105	65	7.68	3.72	0.0	86	57	6.9	SW	43SW	59	6.3	4	15	12	15	0	16	1
Aug.	91.4	73.2	82.3	102	64	6.85	3.91	0.0	90	59	6.6	SW	39E	58	6.1	5	16	10	14	0	12	1
Sept.	87.6	71.1	79.4	100	55	7.56	10.17	0.0	91	62	7.7	NE	45NE	47	6.8	4	12	14	14	0	6	1
Oct.	80.2	61.8	71.0	96	38	5.16	6.66	0.0	90	57	7.8	NE	63E	56	5.4	11	9	11	8	0	2	3
Nov.	72.2	51.2	61.7	88	23	1.69	4.21	0.0	88	55	7.4	NW	52S	59	5.2	12	7	11	6	0	1	5
Dec.	66.7	45.5	56.1	84	12	2.22	2.51	T	88	57	7.2	NW	54N	54	6.0	10	8	13	8	0	*	5
Year	79.6	59.4	69.5	105	12	53.36	10.17	0.1	87	54	7.6	NW	63E	60	5.8	99	129	137	115	*	61	34

DAYTONA BEACH, FLA. (Municipal Airport) 29°11'N., 81°03'W. Elevation (ground) 31 feet. WB-1963

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): 7:00 a.m. EST	1:00 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)				20	20		20	20	19	19	18	18			15	20	20	20	20	20	19	19
Jan.	69.6	48.7	59.2	85	24	1.96	2.21	0.0	90	60	8.2	NW			5.4	10	10	11	6	0	1	6
Feb.	70.9	50.2	60.6	88	24	2.75	3.57	T	89	58	9.0	NNW			5.5	9	9	10	7	0	2	4
Mar.	74.2	53.4	63.8	90	31	3.56	5.74	0.0	88	57	9.2	SSW			5.7	9	10	12	8	0	4	3
Apr.	78.8	59.0	68.9	93	35	2.97	4.00	0.0	86	56	9.0	E			5.3	10	11	9	7	0	5	2
May	83.5	64.9	74.2	100	46	2.85	4.22	0.0	86	58	8.3	E			5.1	10	12	9	8	0	9	2
June	86.9	69.9	78.4	102	57	5.81	5.04	0.0	88	64	7.3	SW			6.2	7	11	12	12	0	14	2
July	88.2	72.0	80.1	99	65	6.74	3.60	0.0	90	67	6.8	SSW			6.2	4	14	13	14	0	19	1
Aug.	88.3	73.1	80.7	99	65	6.37	4.41	0.0	92	68	6.6	E			6.3	4	15	12	14	0	16	2
Sept.	86.2	72.2	79.2	99	52	7.00	4.49	0.0	91	68	8.0	E			6.6	5	12	13	14	0	9	1
Oct.	81.2	65.6	73.4	95	41	5.61	9.29	0.0	89	65	8.4	NE			5.6	10	10	11	11	0	4	2
Nov.	74.4	56.1	65.3	89	27	2.33	4.62	0.0	89	61	8.0	NW			5.0	11	9	10	7	0	1	3
Dec.	70.1	50.4	60.3	85	21	1.95	3.27	T	89	62	8.1	NW			5.8	9	10	12	7	0	1	6
Year	79.4	61.3	70.3	102	21	49.90	9.29	T	89	62	8.1	E			5.7	98	133	134	117	0	85	34

WEST PALM BEACH, FLA. (Palm Beach International Airport) 26°41'N., 80°06'W. Elevation (ground) 15 feet. WB-1963

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): 7:00 a.m. EST	1:00 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)				11	11		25	18	10	10	21	14			15	18	18	18	21	21	21	21
Jan.	75.5	58.3	66.9	87	31	2.48	6.36	0.0	86	58	8.5	NW			5.4	8	12	11	7	0	1	2
Feb.	76.5	58.6	67.6	89	35	2.35	2.91	0.0	86	57	9.0	SE			5.5	8	11	9	6	0	1	2
Mar.	78.6	61.1	69.9	92	41	3.44	4.83	0.0	84	54	9.2	SE			5.5	8	13	10	8	0	2	1
Apr.	82.4	65.4	73.9	95	50	4.34	15.23	0.0	80	57	9.3	E			5.6	8	13	9	8	0	4	1
May	85.9	69.2	77.6	95	54	5.11	7.04	0.0	82	60	8.0	ESE			5.7	8	13	10	11	0	8	*
June	89.2	72.7	81.0	97	65	7.53	9.21	0.0	84	64	6.9	ESE			6.7	4	13	13	14	0	13	*
July	90.8	74.3	82.6	98	69	6.66	3.35	0.0	84	62	6.5	ESE			6.5	3	14	14	15	0	16	0
Aug.	91.1	74.8	83.0	98	65	6.74	5.89	0.0	86	63	6.4	ESE			6.6	3	15	13	16	0	17	*
Sept.	89.7	74.5	82.1	95	68	9.66	8.71	0.0	86	66	7.7	ENE			6.9	3	13	14	17	0	11	*
Oct.	85.2	71.1	78.2	95	52	7.96	8.84	0.0	84	60	8.6	ENE			6.3	6	14	11	14	0	5	*
Nov.	80.2	64.8	72.5	90	40	2.86	4.10	0.0	84	58	8.6	ENE			5.6	7	14	9	8	0	1	1
Dec.	76.9	59.4	68.2	87	30	2.57	5.26	0.0	84	57	8.4	NNW			5.7	8	12	11	8	0	1	1
Year	83.5	67.0	75.3	98	30	61.70	15.23	0.0	84	60	8.1	ESE			6.0	74	157	134	132	0	79	8

MIAMI, FLA. (International Airport) 25°48'N., 80°16'W. Elevation (ground) 7 feet. WB-1963

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): 7:00 a.m. EST	1:00 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)				21	21		21	21	21	21	14	15			15	14	14	14	21	14	14	15
Jan.	75.8	57.9	66.9	87	34	2.03	2.50	0.0	86	56	8.0	NNW			4.7	12	12	7	6	0	1	2
Feb.	77.0	58.8	67.9	89	32	1.87	2.06	0.0	86	56	8.6	ESE			5.0	9	12	7	5	0	1	1
Mar.	79.8	61.1	70.5	90	40	2.27	7.07	0.0	83	55	8.9	SE			5.0	10	13	8	6	0	2	1
Apr.	82.6	65.8	74.2	93	41	3.88	5.18	0.0	80	56	9.0	ESE			5.5	7	16	7	6	0	3	1
May	85.4	69.7	77.6	94	53	6.44	8.42	0.0	81	59	8.0	ESE			5.4	8	14	9	10	0	7	1
June	88.0	73.5	80.8	98	65	7.37	7.43	0.0	83	63	7.0	SE			6.6	4	14	12	14	0	12	0
July	88.8	74.7	81.8	96	69	6.75	4.55	0.0	84	64	6.8	SE			6.3	3	18	10	16	0	15	0
Aug.	89.7	74.9	82.3	98	68	6.97	3.16	0.0	86	63	6.3	SE			6.4	3	19	9	16	0	16	*
Sept.	88.0	74.6	81.3	95	69	9.47	7.58	0.0	88	66	7.0	ESE			6.6	3	15	12	18	0	12	*
Oct.	84.7	70.9	77.8	92	51	8.21	9.95	0.0	88	63	7.7	ENE			5.9	6	14	11	15	0	6	*
Nov.	80.2	64.6	72.4	89	39	2.83	7.93	0.0	87	60	7.8	N			5.2	9	14	7	8	0	1	1
Dec.	77.1	59.1	68.1	86	35	1.67	2.42	0.0	86	59	7.2	N			5.2	10	12	9	7	0	1	1
Year	83.1	67.1	75.1	98	32	59.76	9.95	0.0	85	60	7.7	ESE			5.7	84	173	108	126	0	79	8

MIAMI BEACH, FLA. (Miami Beach Patrol) 25°47'N., 80°08'W. Elevation (ground) 9 feet. WB-1963

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)		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)				23	23		23	22			3		20	21	21	22	22	22	22	22		
Jan.	74.2	63.9	69.1	84	35	1.68	3.07	0.0			9.2		57NE	68	4.4	14	9	8	7	0		
Feb.	74.9	64.2	69.6	88	38	1.65	2.65	0.0			9.3		59SE	74	4.3	14	8	6	6	0		
Mar.	76.7	66.5	71.6	91	46	1.95	2.89	0.0			10.5		45W	74	4.4	15	10	6	6	0		
Apr.	79.5	70.2	74.9	92	48	2.92	6.91	0.0			10.5		61N	72	4.7	14	9	7	7	0		
May	82.4	74.0	78.2	94	60	4.54	5.90	0.0			9.6		42SW	68	5.0	14	10	7	10	0		
June	85.5	76.7	81.1	97	68	5.63	6.64	0.0			8.3		42SE	62	5.8	12	8	10	13	0		
July	87.0	77.6	82.3	98	69	4.45	4.94	0.0			8.2		42S	62	5.9	11	12	8	14	0		
Aug.	87.7	78.1	82.9	98	68	5.06	5.34	0.0			8.0		54SW	63	5.8	11	13	7	14	0		
Sept.	86.0	77.3	81.7	95	70	7.36	8.35	0.0			9.6		95SE	58	6.1	9	11	10	16	0		
Oct.	83.0	73.8	78.4	93	55	6.71	5.85	0.0			12.2		106S	59	5.6	10	11	10	15	0		
Nov.	78.4	69.2	73.8	89	40	2.53	6.70	0.0			11.9		49NE	66	4.7	13	10	7	8	0		
Dec.	75.5	65.1	70.3	86	35	1.78	2.07	0.0			10.7		42NW	65	4.8	13	9	9	8	0		
Year	80.9	71.4	76.2	98	35	46.26	8.35	0.0			9.8		106S	66	5.1	150	120	95	123	0		

KEY WEST, FLA. (International Airport) 24°33'N., 81°45'W. Elevation (ground) 5 feet. WB-1963

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): 7:00 a.m. EST	1:00 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)				11	11		15	15	15	15	10	3	15	5	11	11	11	11	15	15	15	15
Jan.	73.7	65.4	69.6	85	49	1.53	4.43	0.0	84	69	10.7	NE	62N	71	4.6	12	13	6	6	0	1	*
Feb.	74.6	66.1	70.4	85	47	1.98	1.88	0.0	82	67	10.6	NE	55WNW	79	4.3	13	11	4	5	0	1	*
Mar.	76.5	68.4	72.5	87	55	1.77	1.78	0.0	79	66	11.1	NE	41SW	78	4.4	14	12	5	6	0	2	0
Apr.	79.6	72.0	75.8	88	55	2.48	3.15	0.0	78	64	11.3	ESE	42NNW	80	4.6	12	13	5	5	0	2	0
May	82.7	75.3	79.0	91	66	2.73	8.89	0.0	77	65	9.3	ESE	44E	75	4.8	11	14	6	7	0	4	0
June	85.6	78.0	81.8	94	68	3.97	4.00	0.0	77	67	8.6	SE	42S	65	6.2	5	14	11	11	0	8	0
July	87.4	79.1	83.3	95	69	4.16	2.78	0.0	76	65	9.0	ESE	45ESE	69	6.2	4	18	9	13	0	13	0
Aug.	88.0	79.1	83.6	95	68	4.33	3.23	0.0	77	66	8.1	ESE	49S	68	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	58	6.4	3	17	10	16	0	10	*
Oct.	82.5	75.4	79.0	93	60	5.82	3.65	0.0	83	69	10.1	ENE	56NNE	67	5.7	8	13	10	12	0	5	*
Nov.	77.5	70.7	74.1	88	49	2.80	7.33	0.0	83	69	10.7	ENE	66NW	67	4.8	11	12	7	7	0	1	*
Dec.	74.5	66.7	70.6	85	46	1.69	4.60	0.0	84	70	10.5	NE	41N	68	5.0	11	12	8	8	0	1	*
Year	80.8	72.9	76.8	95	46	39.99	8.89	0.0	80	67	9.9	ESE	106NW	70	5.3	107	167	91	112	0	59	1

MEAN SURFACE WATER TEMPERATURE (T) AND SALINITIES (S) -- ATLANTIC COAST

Station	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
Diamond Shoal Lightship 35°05'N., 75°20'W.	5	61.8	35.3	60.0	35.3	58.6	34.5	62.1	34.8	70.0	35.5	76.0	35.7	79.1	35.5	80.4	35.7	78.3	34.6	73.7	35.0	66.8	34.8	64.4	34.9	69.3	35.1
Southport, N. C. 33°55'N., 78°01'W.	9	51.7	20.8	51.6	19.1	55.5	17.4	64.0	19.2	72.9	22.0	79.4	25.6	82.3	23.8	82.3	25.5	78.1	25.9	70.2	26.4	61.4	24.7	53.1	22.7	66.9	22.8
Myrtle Beach, S. C. 33°41'N., 78°53'W.	12	48.6	34.2	50.4	33.7	55.1	33.1	63.0	32.5	71.9	32.8	78.8	33.8	82.3	34.8	82.0	35.5	78.9	35.0	70.5	34.5	60.4	34.5	51.4	34.4	66.1	34.1
Charleston, S.C. 32°47'N., 79°55'W.	21	51.4	17.5	52.4	15.3	57.3	13.5	65.5	13.2	73.9	14.4	80.6	16.1	83.5	17.4	83.5	19.0	80.1	19.3	71.6	20.6	62.2	20.1	53.4	18.6	68.0	17.1
Ft. Pulaski, Savannah River, Georgia 32°02'N., 80°54'W.	23	51.8	15.8	53.7	14.6	58.7	12.2	66.5	12.0	75.1	14.6	81.5	17.5	84.2	19.0	84.2	19.9	80.4	19.6	72.5	19.9	63.4	19.7	54.0	18.2	68.8	16.9
Fernandina, Beach, Fla. 30°40'N., 81°28'W.	19	56.8	29.5	58.5	29.1	62.7	28.2	69.2	28.9	76.6	31.1	81.5	31.9	83.4	31.9	83.6	31.2	81.7	29.3	74.5	27.5	66.3	29.3	58.1	30.1	71.1	29.8
Mayport, Fla. 30°24'N., 81°26'W.	19	57.7	22.6	59.1	22.9	62.8	22.2	68.9	25.2	75.7	28.1	80.7	29.3	82.5	26.4	82.7	25.4	81.8	23.4	75.2	20.3	67.2	20.0	59.5	22.6	71.2	24.0
Jacksonville, Fla. 30°21'N., 81°37'W.	8	56.9	8.4	61.1	9.2	65.7	10.1	72.4	9.8	80.0	13.9	84.1	11.7	87.2	8.1	86.7	9.1	84.0	8.5	76.5	7.9	68.4	6.1	59.9	7.9	73.6	9.2
Daytona Beach (ocean) Florida 29°14'N., 81°00'W.	16	61.8	34.4	62.0	34.5	64.5	35.1	70.4	35.4	75.8	35.9	78.9	36.2	78.7	36.2	78.4	36.0	81.5	35.7	76.4	34.1	71.1	34.4	65.0	34.1	72.0	35.2
Daytona Beach (Halifax River), Fla. 29°13'N., 81°01'W.	2	64.6	22.7	58.6	24.3	68.1	14.1	77.7	13.9	81.7	18.8	84.6	20.6	86.2	12.6	87.4	9.0	84.3	9.8	78.2	11.0	73.4	14.8	66.4	20.6	75.9	16.0
Eau Gallie Beach, Fla. 28°08'N., 80°35'W.	17	65.1	35.8	65.7	36.0	68.2	36.0	72.2	36.4	76.5	36.6	79.2	36.4	78.8	36.4	80.1	36.3	82.2	36.2	78.3	35.5	73.2	35.4	67.8	35.9	73.9	36.1
Miami Beach, Fla. 25°46'N., 80°08'W.	20	70.9	35.7	71.9	35.9	73.9	36.2	76.9	36.3	80.6	36.4	84.0	36.3	85.9	36.2	86.3	35.9	84.4	35.3	80.5	34.9	76.1	35.4	72.7	35.7	78.7	35.8
Key West, Fla. 24°33'N., 81°48'W.	32	71.1	35.9	72.4	36.0	74.7	36.4	78.4	36.7	82.3	37.0	85.3	36.6	86.8	36.6	87.0	36.6	85.4	36.0	81.6	35.8	76.0	36.3	72.1	36.2	79.4	36.3

°/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)

Station	13 Calendar Years - 1950 thru 1962														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				
Chesapeake Lightship, Va. 36°58.7'N., 75°42.2'W.	55	66	54	44	51	33	18	18	16	19	24	31	429	863	652	14	1122
Cape Henry Light Station, Va. 36°55.6'N., 76°00.4'W.	44	58	39	30	37	20	7	13	15	18	27	42	350	501	359	65	667
Diamond Shoal Lightship, N.C. 35°05.3'N., 75°19.7'W.	30	32	31	13	10	6	3	8	7	11	14	21	186	415	214	45	504
Frying Pan Shoals Lightship, N.C. 33°28.0'N., 77°33.8'W.	12	14	9	5	10	2	1	7	7	8	7	10	92	158	95	37	246
Savannah Lightship, Ga. 31°56.6'N., 80°39.8'W.	51	45	29	10	4	2	4	4	8	7	20	33	217	401	182	57	821
St. Johns Lightship, Fla. * 30°23.5'N., 81°18.0'W.	25	15	16	8	2	1	3	6	9	9	14	35	143	163	196	20	401

* 5 Calendar Years - 1950 thru 1954

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ATLANTIC OCEAN DISTANCES FOR DEEP-DRAFT VESSELS
QUEBEC, CANADA, TO PANAMA CANAL ZONE

March 21, 1964

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.

	Quebec, Canada 46°49.5'N., 71°11.5'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°55.4'N., 82°26.9'W.	Pensacola, Fla. 30°24.0'N., 87°13.0'W.	Mobile, Ala. 30°41.5'N., 88°02.2'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°18.5'N., 94°48.1'W.	Corpus Christi, Tex. 27°48.8'N., 97°24.0'W.	San Juan, P.R. 18°27.8'N., 66°06.7'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.
542																													
578	120																												
1137	595	484																											
1179	637	526	100																										
1172	630	519	203	163																									
1395	853	742	426	386	223																								
1543	1001	890	575	535	372	240																							
1699	1157	1046	734	694	531	417	392																						
1550	1008	896	584	544	381	267	242	150																					
1577	1035	923	611	571	408	294	269	173	27																				
1590	1048	936	628	588	425	345	322	267	117	144																			
1809	1267	1155	847	807	644	564	541	486	336	363	219																		
1875	1333	1221	913	873	710	630	607	552	402	429	285	151																	
1949	1407	1295	987	947	784	704	681	626	476	503	359	227	102																
2033	1491	1379	1071	1031	868	788	765	710	560	587	443	315	197	145															
2340	1798	1690	1387	1347	1184	1109	1086	1031	881	908	764	667	572	543	462														
2401	1859	1751	1448	1408	1245	1170	1147	1092	942	969	825	728	633	604	523	73													
2633	2091	1983	1680	1640	1477	1402	1379	1324	1174	1201	1057	960	865	836	755	305	232												
2832	2290	2182	1879	1839	1676	1601	1578	1523	1373	1400	1256	1159	1064	1035	954	504	431	331											
2872	2330	2222	1919	1879	1716	1641	1618	1563	1413	1440	1296	1199	1104	1075	994	544	471	383	86										
2941	2399	2291	1988	1948	1785	1710	1687	1632	1482	1509	1365	1268	1173	1144	1063	613	540	495	255	244									
3077	2535	2427	2124	2084	1921	1846	1823	1768	1618	1645	1501	1404	1309	1280	1199	749	676	649	414	403	362								
3103	2561	2453	2150	2110	1947	1872	1849	1794	1644	1671	1527	1430	1335	1306	1225	775	702	682	446	436	395	76							
3208	2666	2558	2255	2215	2052	1977	1954	1899	1749	1776	1632	1535	1440	1411	1330	880	807	809	583	572	531	240	188						
2306	1764	1669	1531	1486	1334	1399	1395	1375	1225	1252	1114	1153	1138	1156	1121	966	1017	1249	1448	1488	1557	1693	1719	1824					
3064	2522	2419	2189	2149	1986	1972	1955	1904	1754	1781	1637	1609	1563	1564	1513	1060	1005	1215	1342	1368	1396	1482	1493	1549	992				
3110	2568	2465	2235	2195	2032	2018	2001	1950	1800	1827	1683	1655	1609	1610	1559	1106	1051	1261	1388	1414	1442	1528	1539	1595	1038	46			

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.

COASTWISE DISTANCES

NORFOLK, VA., TO KEY WEST, FLA.

March 21, 1964

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: Norfolk, Va., is 503 nautical miles from Savannah, Ga.

	CHESAPEAKE BAY ENTRANCE 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.	Morehead City, N.C. 34°42.8'N., 76°41.8'W.	Southport, N.C. 33°54.8'N., 78°01.0'W.	Wilmington, N.C. 34°14.0'N., 77°57.0'W.	Georgetown, S.C. 33°21.4'N., 79°16.9'W.	Charleston, S.C. 32°47.2'N., 79°55.2'W.	Port Royal, S.C. 32°22.3'N., 80°41.6'W.	Savannah, Ga. 32°05.0'N., 81°05.7'W.	Brunswick, Ga. 31°08.0'N., 81°29.7'W.	Fernandina Beach, Fla. 30°40.3'N., 81°28.0'W.	Jacksonville, Fla. 30°19.2'N., 81°39.0'W.	St. Augustine, Fla. 29°53.6'N., 81°18.5'W.	Cape Canaveral, Fla. 28°24.6'N., 80°36.5'W.	Fort Pierce, Fla. 27°27.5'N., 80°19.3'W.	Stuart, Fla. 27°12.2'N., 80°15.6'W.	Port of Palm Beach, Fla. 26°46.1'N., 80°03.0'W.	Port Everglades, Fla. 26°05.6'N., 80°07.0'W.	Miami, Fla. 25°47.0'N., 80°11.0'W.	Key West, Fla. 24°33.7'N., 81°48.5'W.	STRAITS OF FLORIDA 24°25.0'N., 83°00.0'W.
CHESAPEAKE BAY ENTRANCE 36°56.3'N., 75°58.6'W.		27	117	222	315	336	365	402	465	476	527	533	560	557	612	647	666	678	720	743	881	942
Norfolk, Va. 36°50.9'N., 76°17.9'W.			144	249	342	363	392	429	492	503	554	560	587	584	639	674	693	705	747	770	908	969
DIAMOND SHOALS 35°08.0'N., 75°15.0'W.				105	198	219	248	285	348	359	410	416	443	440	495	530	549	561	603	626	764	825
Morehead City, N.C. 34°42.8'N., 76°41.8'W.					133	154	184	220	284	295	346	352	379	377	438	476	497	509	550	573	711	772
Southport, N.C. 33°54.8'N., 78°01.0'W.						21	87	130	191	206	260	265	294	296	367	407	423	443	485	508	646	707
Wilmington, N.C. 34°14.0'N., 77°57.0'W.							108	151	212	227	281	286	315	317	388	428	444	464	506	529	667	728
Georgetown, S.C. 33°21.4'N., 79°16.9'W.								79	141	154	210	216	247	246	324	368	391	407	449	472	610	671
Charleston, S.C. 32°47.2'N., 79°55.2'W.									90	102	156	166	197	199	283	329	353	369	411	434	572	633
Port Royal, S.C. 32°22.3'N., 80°41.6'W.										51	110	120	152	157	251	298	324	341	383	406	544	605
Savannah, Ga. 32°05.0'N., 81°05.7'W.											104	115	145	152	251	298	324	340	382	405	543	604
Brunswick, Ga. 31°08.0'N., 81°29.7'W.												50	82	90	195	242	268	285	327	350	488	549
Fernandina Beach, Fla. 30°40.3'N., 81°28.0'W.													53	61	169	216	242	262	304	327	465	526
Jacksonville, Fla. 30°19.2'N., 81°39.0'W.														56	167	214	240	259	301	324	462	523
St. Augustine, Fla. 29°53.6'N., 81°18.5'W.															120	167	192	211	253	276	414	475
Cape Canaveral, Fla. 28°24.6'N., 80°36.5'W.																69	91	110	152	175	313	374
Fort Pierce, Fla. 27°27.5'N., 80°19.3'W.																	32	52	94	117	255	316
Stuart, Fla. 27°12.2'N., 80°15.6'W.																		36	78	101	239	300
Port of Palm Beach, Fla. 26°46.1'N., 80°03.0'W.																			46	68	207	267
Port Everglades, Fla. 26°05.6'N., 80°07.0'W.																				27	165	226
Miami, Fla. 25°47.0'N., 80°11.0'W.																					151	211
Key West, Fla. 24°33.7'N., 81°48.5'W.																						73
STRAITS OF FLORIDA 24°25.0'N., 83°00.0'W.																						

Each distance is by shortest route that safe navigation permits between the two ports concerned. The navigator must make his own adjustments for non-direct routes selected to run with or avoid the Gulf Stream. For example, the table shows a distance of 561 miles by direct route from Diamond Shoals to Port of Palm Beach; distances via the routes shown in Chapter 3, Coast Pilot 4, are: Outer route, 572 miles; Gulf Stream route, 593 miles; Inner route, 628 miles.

INSIDE-ROUTE DISTANCES

NORFOLK, VA., TO FERNANDINA BEACH, FLA.

September 12, 1959

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: Morehead City, N. C., is 445 nautical miles from Fernandina Beach, Fla.

	Norfolk, Va. 36°50.9'N., 76°17.9'W.	Elizabeth City, N. C. 36°18.1'N., 76°13.0'W.	Hertford, N. C. 36°11.6'N., 76°28.0'W.	Columbia, N. C. 35°55.0'N., 76°15.4'W.	Edenton, N. C. 36°03.3'N., 76°36.6'W.	Plymouth, N. C. 35°51.8'N., 76°45.6'W.	Manteo, N. C. 35°54.6'N., 75°40.2'W.	Belhaven, N. C. 35°32.1'N., 76°37.4'W.	Washington, N. C. 35°32.6'N., 77°03.7'W.	Ocracoke, N. C. 35°06.8'N., 75°59.1'W.	Oriental, N. C. 35°01.5'N., 76°41.8'W.	New Bern, N. C. 35°06.1'N., 77°02.1'W.	Beaufort, N. C. 34°43.1'N., 76°40.2'W.	Morehead City, N. C. 34°42.8'N., 76°41.8'W.	Swansboro, N. C. 34°41.0'N., 77°07.3'W.	Jacksonville, N. C. 34°44.7'N., 77°26.3'W.	Wrightsville, N. C. 34°13.1'N., 77°48.8'W.	Wilmington, N. C. 34°14.0'N., 77°57.0'W.	Southport, N. C. 33°54.8'N., 78°01.0'W.	Little River, S. C. 33°52.2'N., 78°36.6'W.	Bucksport, S. C. 33°39.0'N., 79°05.6'W.	Georgetown, S. C. 33°21.4'N., 79°16.9'W.	McClellanville, S. C. 33°04.7'N., 79°27.6'W.	Charleston, S. C. 32°47.2'N., 79°55.2'W.	Beaufort, S. C. 32°25.6'N., 80°40.2'W.	Savannah, Ga. 32°05.0'N., 81°05.7'W.	Thunderbolt, Ga. 32°01.5'N., 81°02.8'W.	Brunswick, Ga. 31°08.0'N., 81°29.7'W.	Fernandina Beach, Fla. 30°40.3'N., 81°28.0'W.
Norfolk, Va.																													
Elizabeth City, N. C.	77*																												
Hertford, N. C.	89	43																											
Columbia, N. C.	89	44	26																										
Edenton, N. C.	98	52	35	25																									
Plymouth, N. C.	105	60	42	33	14																								
Manteo, N. C.	80	39	46	45	54	61																							
Belhaven, N. C.	120	79	79	78	87	95	70																						
Washington, N. C.	156	114	115	114	123	130	105	39																					
Ocracoke, N. C.	131	91	97	96	104	113	66	43	60																				
Oriental, N. C.	160	118	119	118	126	134	109	43	56	41																			
New Bern, N. C.	180	139	139	138	146	155	130	63	76	62	23																		
Beaufort, N. C.	177	134	137	136	144	152	127	61	74	59	22	38																	
Morehead City, N. C.	178	136	137	136	145	152	127	61	74	59	22	38	3																
Swansboro, N. C.	200	158	160	158	166	175	150	83	96	81	44	60	24	22															
Jacksonville, N. C.	231	189	190	189	197	206	181	114	127	112	75	91	55	53	31														
Wrightsville, N. C.	246	204	205	204	213	221	196	130	142	128	91	107	70	69	46	48													
Wilmington, N. C.	269	227	229	227	236	244	219	153	165	151	114	130	94	92	70	71	23												
Southport, N. C.	268	226	227	226	235	243	218	152	164	150	113	129	93	91	69	70	22	21											
Little River, S. C.	299	257	259	257	266	274	249	183	195	181	144	160	124	122	100	101	53	52	31										
Bucksport, S. C.	328	286	287	286	294	303	278	211	224	209	172	188	152	150	128	129	82	81	60	28									
Georgetown, S. C.	352	311	311	310	318	327	302	235	248	233	196	213	177	174	152	154	106	105	84	53	24								
McClellanville, S. C.	374	332	333	332	340	349	324	257	270	255	218	235	199	196	174	176	128	127	106	75	46	24							
Charleston, S. C.	406	364	366	364	373	381	356	290	302	288	251	267	231	229	207	208	160	159	138	107	79	56	32						
Beaufort, S. C.	466	424	425	424	432	441	416	349	362	347	310	327	290	288	266	268	220	219	198	167	138	116	92	60					
Savannah, Ga.	508	466	467	466	475	483	458	392	404	390	353	369	333	331	309	310	262	261	240	209	181	159	135	104	43				
Thunderbolt, Ga.	507	465	466	465	474	482	457	391	403	389	352	368	332	330	307	309	261	260	239	208	179	157	133	103	41	14			
Brunswick, Ga.	595	553	554	553	562	570	546	479	491	477	440	456	420	418	396	397	349	349	327	296	268	246	222	191	130	102	88		
Fernandina Beach, Fla.	623	581	582	581	589	598	573	506	519	504	467	484	447	445	423	425	377	376	355	324	295	273	249	218	157	130	116	35	

* 44 miles via Dismal Swamp Canal

INSIDE-ROUTE DISTANCES

FERNANDINA BEACH, FLA., TO KEY WEST, FLA.

September 12, 1959

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: St. Augustine, Fla., is 271 nautical miles from Miami, Fla.

	Norfolk, Va. 36°50.9'N., 76°17.9'W.	Fernandina Beach, Fla. 30°40.3'N., 81°28.0'W.	Jacksonville, Fla. 30°19.2'N., 81°39.0'W.	St. Augustine, Fla. 29°53.6'N., 81°18.5'W.	Marineland, Fla. 29°40.1'N., 81°13.0'W.	Daytona Beach, Fla. 29°12.6'N., 81°00.7'W.	New Smyrna Beach, Fla. 29°01.7'N., 80°55.1'W.	Titusville, Fla. 28°37.3'N., 80°47.9'W.	Cocoa, Fla. 28°21.3'N., 80°43.1'W.	Eau Gallie, Fla. 28°07.9'N., 80°37.1'W.	Melbourne, Fla. 28°05.0'N., 80°35.5'W.	Vero Beach, Fla. 27°39.0'N., 80°22.4'W.	Fort Pierce, Fla. 27°27.5'N., 80°19.3'W.	Salerno, Fla. 27°08.8'N., 80°11.6'W.	Stuart, Fla. 27°12.2'N., 80°15.6'W.	Port Mayaca, Fla. 26°59.1'N., 80°36.8'W.	Clewiston, Fla. 26°45.6'N., 80°55.2'W.	Moore Haven, Fla. 26°50.0'N., 81°05.3'W.	Fort Myers, Fla. 26°38.9'N., 81°52.3'W.	Jupiter, Fla. 26°56.8'N., 80°05.4'W.	Port of Palm Beach, Fla. 26°46.1'N., 80°03.0'W.	Fort Lauderdale, Fla. 26°06.8'N., 80°07.2'W.	Port Everglades, Fla. 26°05.6'N., 80°07.0'W.	Miami, Fla. 25°47.0'N., 80°11.0'W.	Tavernier, Fla. 25°00.7'N., 80°31.3'W.	Matecumbe Harbor, Fla. 24°51.1'N., 80°44.5'W.	Marathon, Fla. 24°42.2'N., 81°06.7'W.	Flamingo, Fla. 25°08.5'N., 80°55.4'W.	Key West, Fla. 24°33.7'N., 81°48.5'W.
Norfolk, Va.	623																												
Fernandina Beach, Fla.	659	36																											
Jacksonville, Fla.	676	53	49																										
St. Augustine, Fla.	692	69	65	16																									
Marineland, Fla.	722	99	95	46	30																								
Daytona Beach, Fla.	735	113	108	59	44	14																							
New Smyrna Beach, Fla.	764	141	137	88	72	42	28																						
Titusville, Fla.	780	157	153	104	89	58	45	17																					
Cocoa, Fla.	795	172	168	119	103	73	59	31	14																				
Eau Gallie, Fla.	798	175	171	122	106	76	63	34	18	3																			
Melbourne, Fla.	827	204	200	151	136	105	92	64	47	33	29																		
Vero Beach, Fla.	839	216	212	163	148	117	104	76	59	45	41	12																	
Fort Pierce, Fla.	860	237	233	184	169	138	125	97	80	66	62	33	21																
Salerno, Fla.	865	242	238	189	173	143	130	101	85	70	67	38	26	8															
Stuart, Fla.	892	269	265	216	200	170	157	128	112	97	94	65	53	35	27														
Port Mayaca, Fla.	915	292	288	239	223	193	180	151	135	120	117	88	76	58	50	23													
Clewiston, Fla.	926	303	299	250	235	204	191	163	146	132	128	99	87	70	61	34	11												
Moore Haven, Fla.	975	353	349	299	284	254	240	212	195	181	178	148	136	119	111	83	61	49											
Fort Myers, Fla.	873	251	247	197	182	152	138	110	93	79	76	46	34	17	22	49	72	83	132										
Jupiter, Fla.	885	262	258	209	193	163	150	121	105	90	87	58	46	28	33	60	83	94	144	12									
Port of Palm Beach, Fla.	925	303	299	249	234	204	190	162	145	131	128	98	86	69	74	101	124	135	184	52	41								
Fort Lauderdale, Fla.	927	304	300	251	235	205	191	163	146	132	129	99	87	70	75	102	125	136	185	53	42	1							
Port Everglades, Fla.	947	324	320	271	255	225	211	183	166	152	149	119	107	90	95	122	145	156	205	73	62	21	20						
Miami, Fla.	999	378	374	324	309	279	265	237	220	206	203	173	161	144	149	176	199	210	259	127	116	75	74	54					
Tavernier, Fla.	1017	394	390	341	325	295	282	253	237	223	219	190	178	161	165	192	215	227	276	144	132	92	91	71	19				
Matecumbe Harbor, Fla.	1045	422	418	369	353	323	309	281	264	250	247	217	205	188	193	220	243	254	303	171	160	119	118	98	47	29			
Marathon, Fla.	1050	427	423	374	358	328	315	286	270	255	252	223	211	193	198	225	248	259	309	177	165	125	123	104	52	35	38		
Flamingo, Fla.	1081	458	454	405	389	359	345	317	301	286	283	254	242	224	229	256	279	290	339	207	196	155	154	134	83	65	42	73	

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		

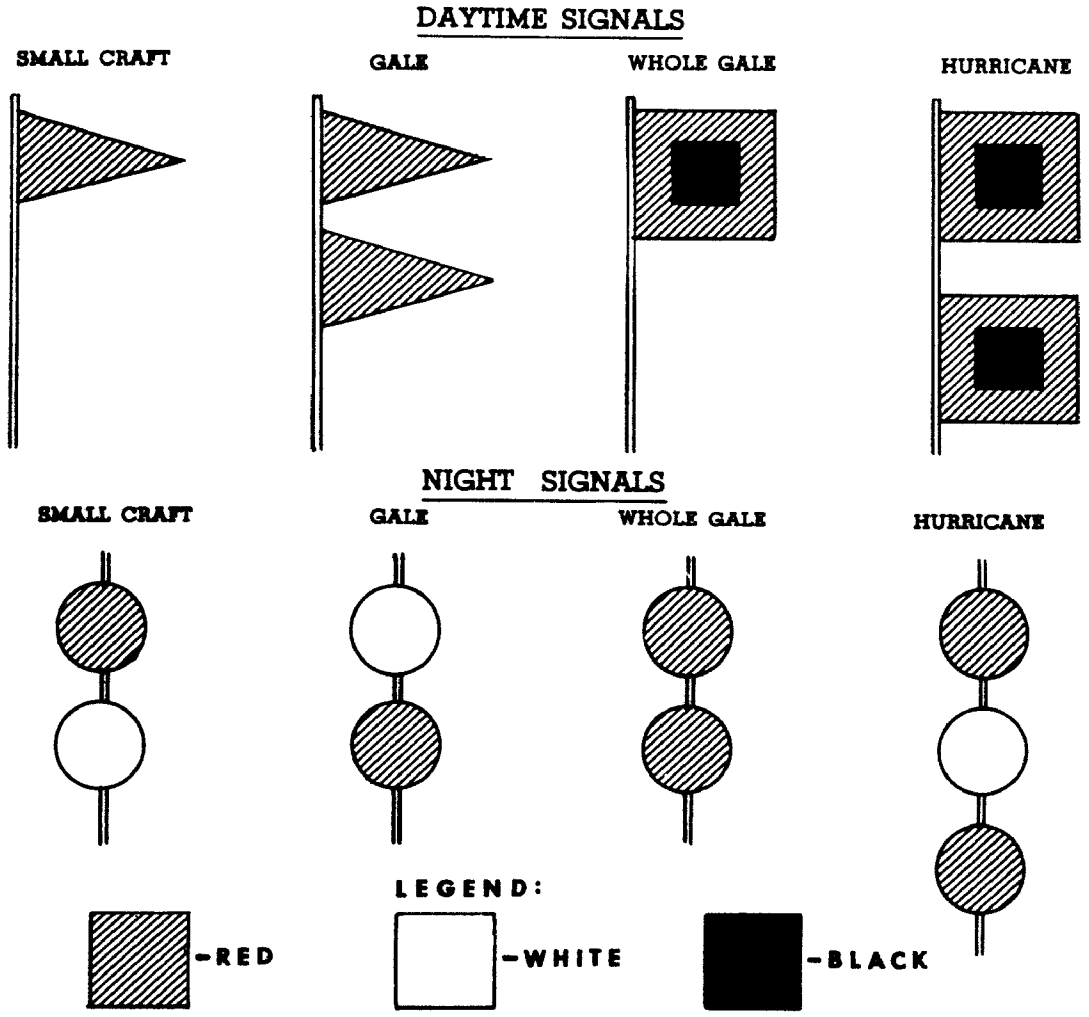
Conversion Table, Degrees to Points and Vice Versa

° ′	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.

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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 Arctic Ocean

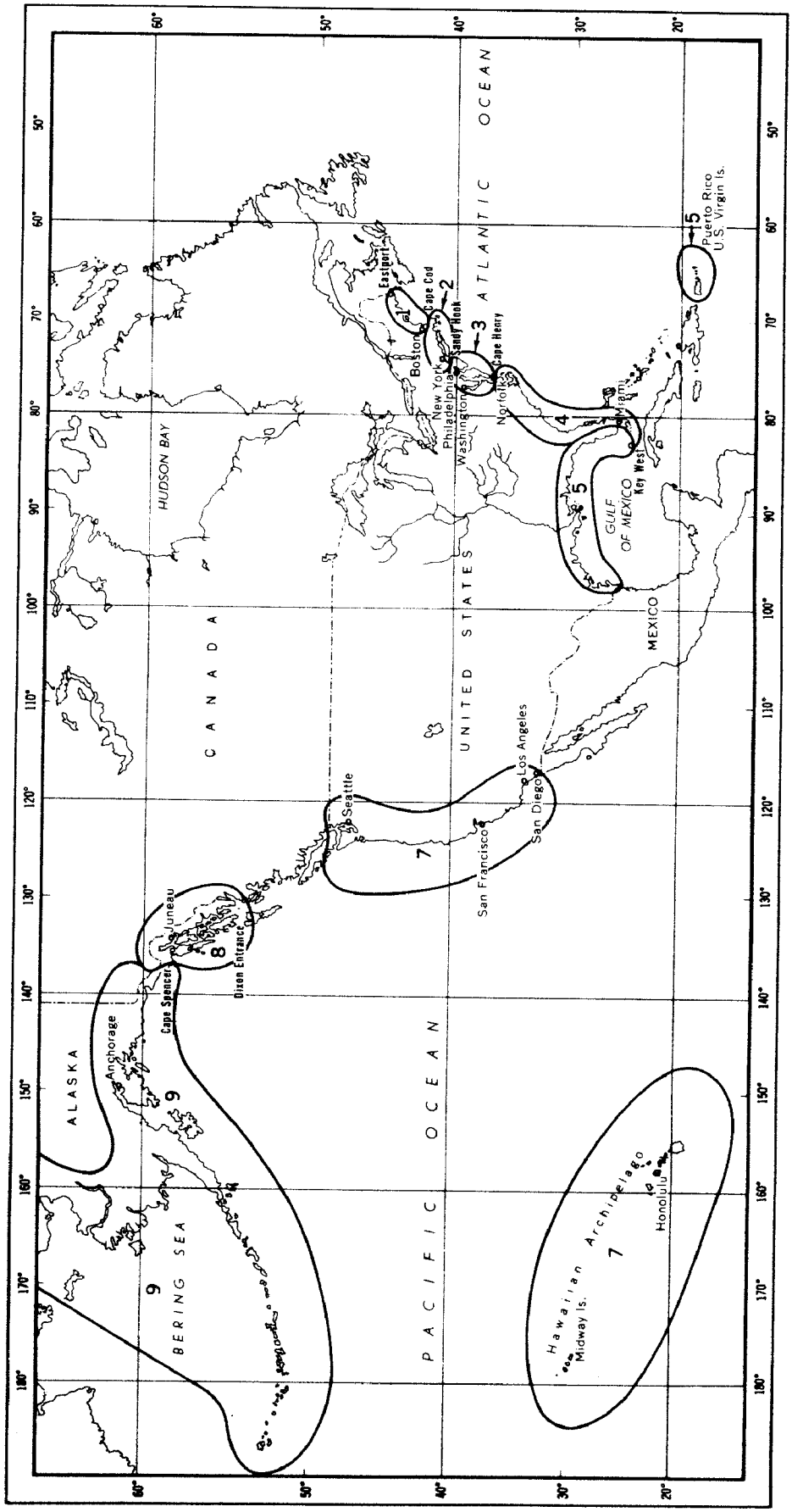
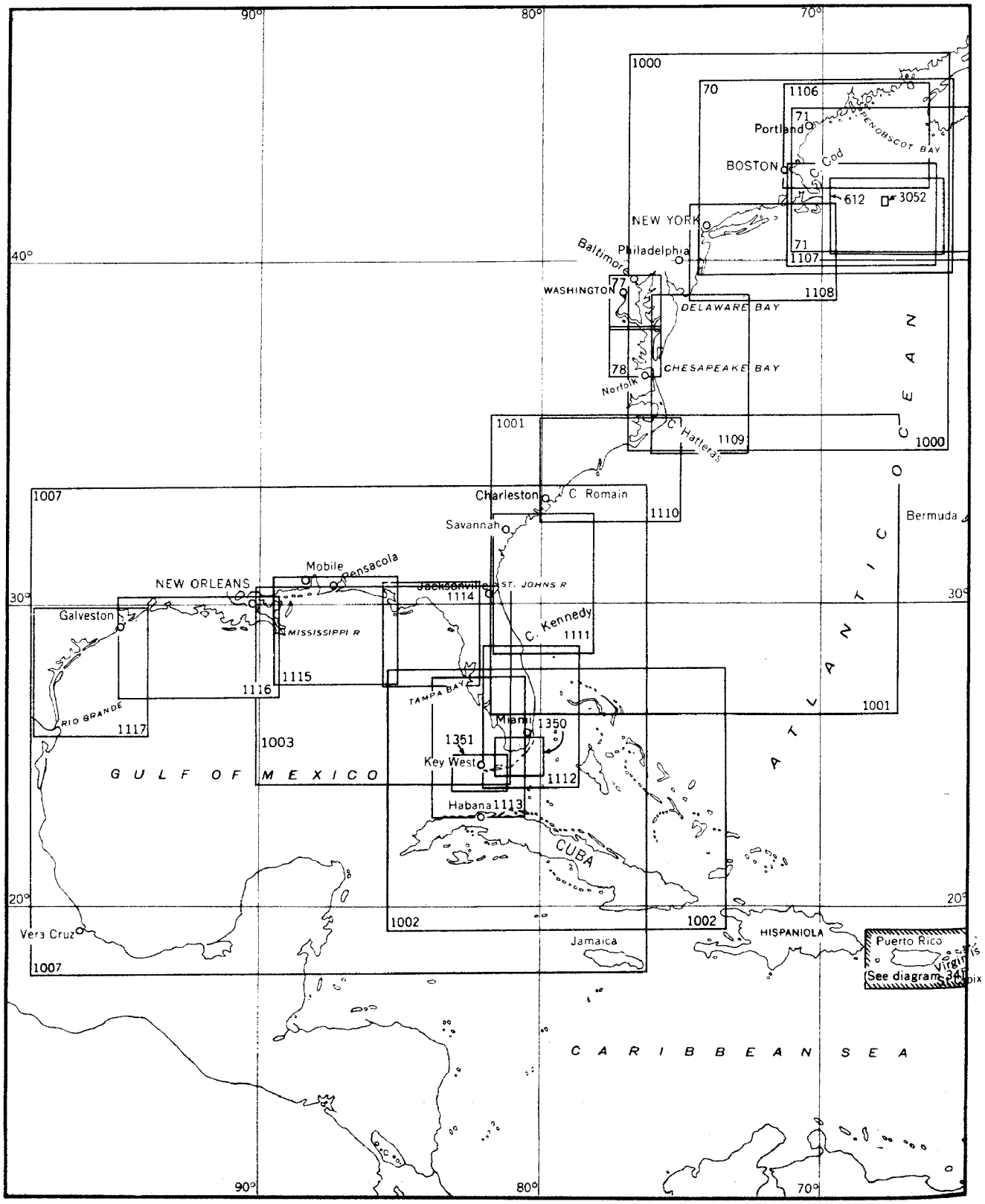


Diagram No. 1

March 1964

SAILING AND GENERAL CHARTS - ATLANTIC AND GULF COASTS



SAILING AND GENERAL CHARTS—ATLANTIC AND GULF COASTS

No.	Price	TITLE	Scale	Paper Size (inches)
		SAILING CHARTS		
70	$1.00	West Quoddy Head to New York	1:675,000	36X46
†1000	1.00	Cape Sable to Cape Hatteras	1:1,200,000	35X43
†1001	1.00	Cape Hatteras to Straits of Florida	1:1,200,000	36X48
†1002	1.00	Straits of Florida and approaches	1:1,200,000	35X43
†1003	1.00	Gulf Coast—Key West to the Mississippi River	1:875,000	36X44
†1007	1.00	Gulf of Mexico	1:2,160,000	35X43
		GENERAL CHARTS		
†71	1.00	Gulf of Maine and Georges Bank	1:500,000	36X44
77	.75	Chesapeake Bay—northern part	1:197,250	34X37
78	.75	Chesapeake Bay—southern part	1:200,000	33X34
†1106	1.00	Bay of Fundy to Cape Cod	1:378,838	36X46
†1107	1.00	Georges Bank and Nantucket Shoals	1:400,000	34X48
†1108	1.00	Approaches to New York, Nantucket Shoals to Five Fathom Bank	1:400,000	34X48
†1109	1.00	Cape May to Cape Hatteras	1:416,944	33X52
†1110	1.00	Cape Hatteras to Charleston	1:432,720	34X46
†1111	1.00	Charleston Light to Cape Kennedy	1:449,659	33X45
†1112	1.00	Cape Kennedy to Key West	1:466,940	31X47
1113	1.00	Habana to Tampa Bay	1:470,940	31X45
1114	.75	Tampa Bay to Cape San Blas	1:456,394	30X34
†1115	1.00	Cape St. George to Mississippi Passes	1:456,394	35X41
1116	1.00	Mississippi River to Galveston	1:458,596	36X49
1117	1.00	Galveston to Rio Grande	1:460,732	36X44
1350	.75	Florida Keys—Fowey Rocks to American Shoal	1:180,000	35X39
1351	.75	Florida Keys—Sombrero Key to Dry Tortugas	1:180,000	30X48
		SPECIAL CHARTS		
612	1.00	Georges Bank	1:220,000	36X46
3052	.75	Georges Bank—Georges Shoal, approaches to Texas Tower No. 2	1:20,000	26X42

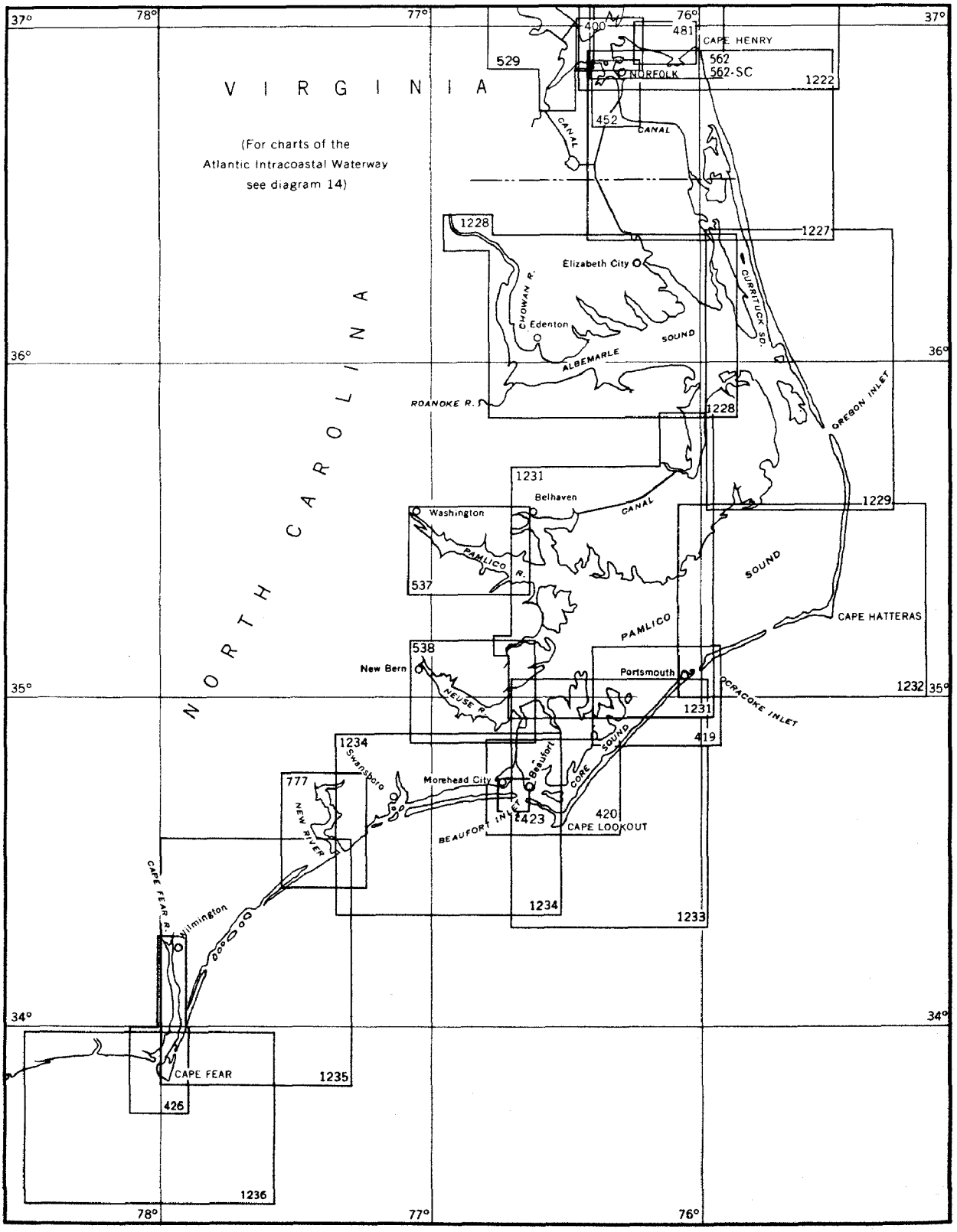
†Includes Loran Lines of Position

COAST AND HARBOR CHARTS - ATLANTIC COAST

CAPE HENRY, VA. TO CAPE FEAR, N.C

Diagram No. 8

March 1964



COAST AND HARBOR CHARTS—ATLANTIC COAST

CAPE HENRY, VA. TO CAPE FEAR, N. C.

No.	Price	TITLE	State	Scale	Paper size (inches)
		COAST CHARTS			
1227	$1.00	Cape Henry to Currituck Beach Light	Va. & N.C.	1:80,000	35X43
1228	1.00	Albemarle Sound	North Carolina	1:80,000	34X44
1229	1.00	Currituck Beach Light to Wimble Shoals	"	1:80,000	34X48
1231	1.00	Pamlico Sound—western part	"	1:80,000	36X44
1232	1.00	Cape Hatteras—Wimble Shoals to Ocracoke Inlet	"	1:80,000	36X44
1233	1.00	Portsmouth Island to Beaufort, including Cape Lookout Shoals	"	1:80,000	35X44
1234	1.00	Cape Lookout to New River	"	1:80,000	34X41
1235	1.00	New River Inlet to Cape Fear	"	1:80,000	35X44
1236	1.00	Approaches to Cape Fear River	"	1:80,000	35X45
		HARBOR CHARTS			
400	1.00	Hampton Roads	Virginia	1:20,000	36X45
419	1.00	Ocracoke Inlet and part of Core Sound	North Carolina	1:40,000	36X44
420	1.00	Beaufort Inlet and part of Core Sound Lookout Bight	" "	1:40,000 1:20,000	35X46
423	.75	Morehead City Harbor	"	1:12,500	32X37
426	.75	Cape Fear River—Cape Fear to Wilmington	"	1:40,000	34X36
452	1.00	Norfolk Harbor and Elizabeth River	Virginia	1:20,000	35X43
481	1.00	Cape Henry to Thimble Shoal Light	"	1:20,000	35X44
529	1.00	James River—Newport News to Jamestown Island	"	1:40,000	36X43
537	.75	Pamlico River	North Carolina	1:40,000	32X43
538	1.00	Neuse River and upper part of Bay River	"	1:40,000	36X44
562	1.00	Norfolk Harbor and approaches	Virginia	1:40,000	36X48
777	.75	New River	North Carolina	1:40,000	31X41
		SMALL-CRAFT CHART			
562-SC*	1.00	Norfolk Harbor and approaches	Virginia	1:40,000	

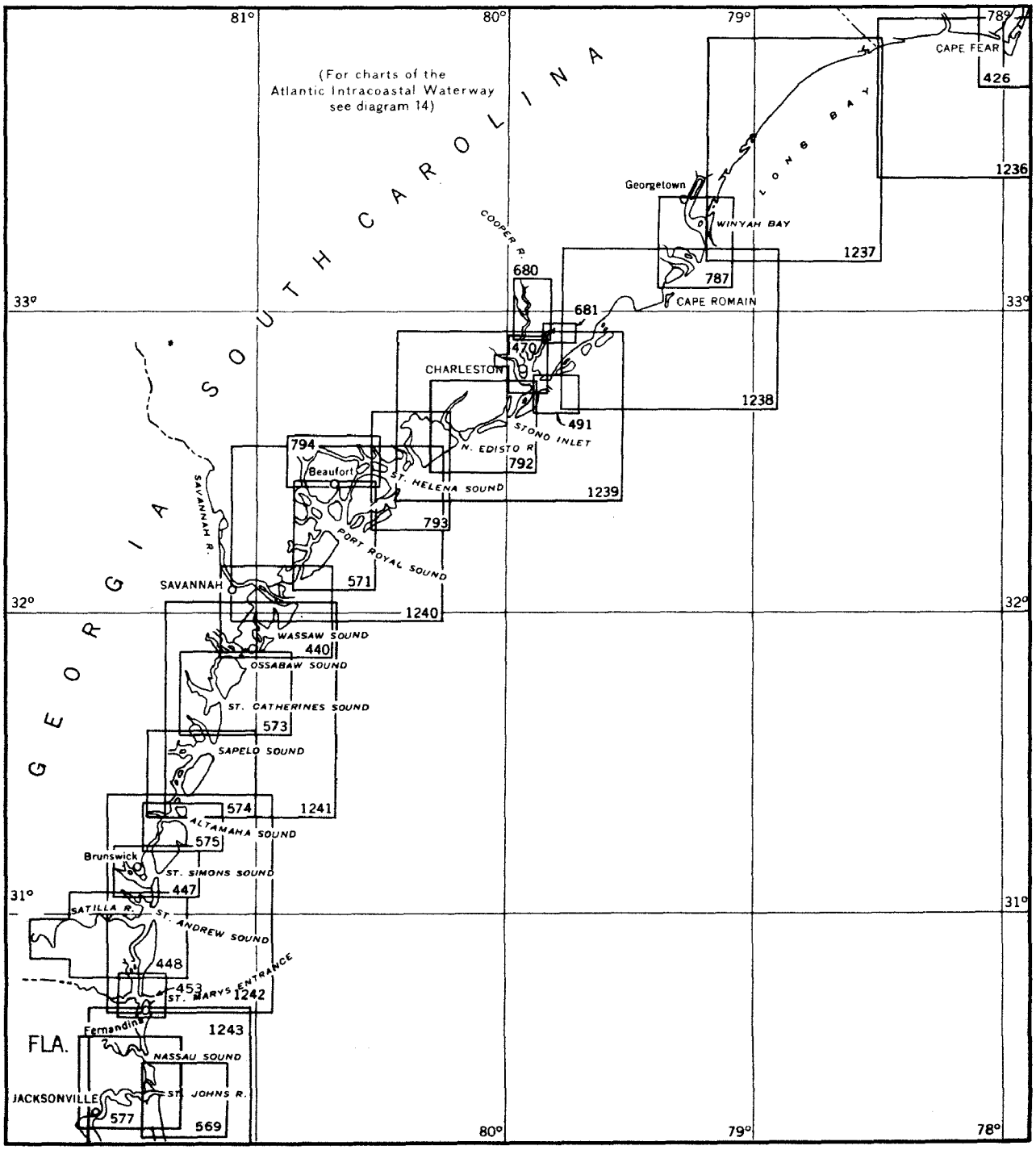
* SC designates Small-craft Folded Charts with marine service and supply information.

Diagram No. 9

August 1959

COAST AND HARBOR CHARTS - ATLANTIC COAST

CAPE FEAR, N.C. TO JACKSONVILLE, FLA.



COAST AND HARBOR CHARTS—ATLANTIC COAST

CAPE FEAR, N. C. TO JACKSONVILLE, FLA.

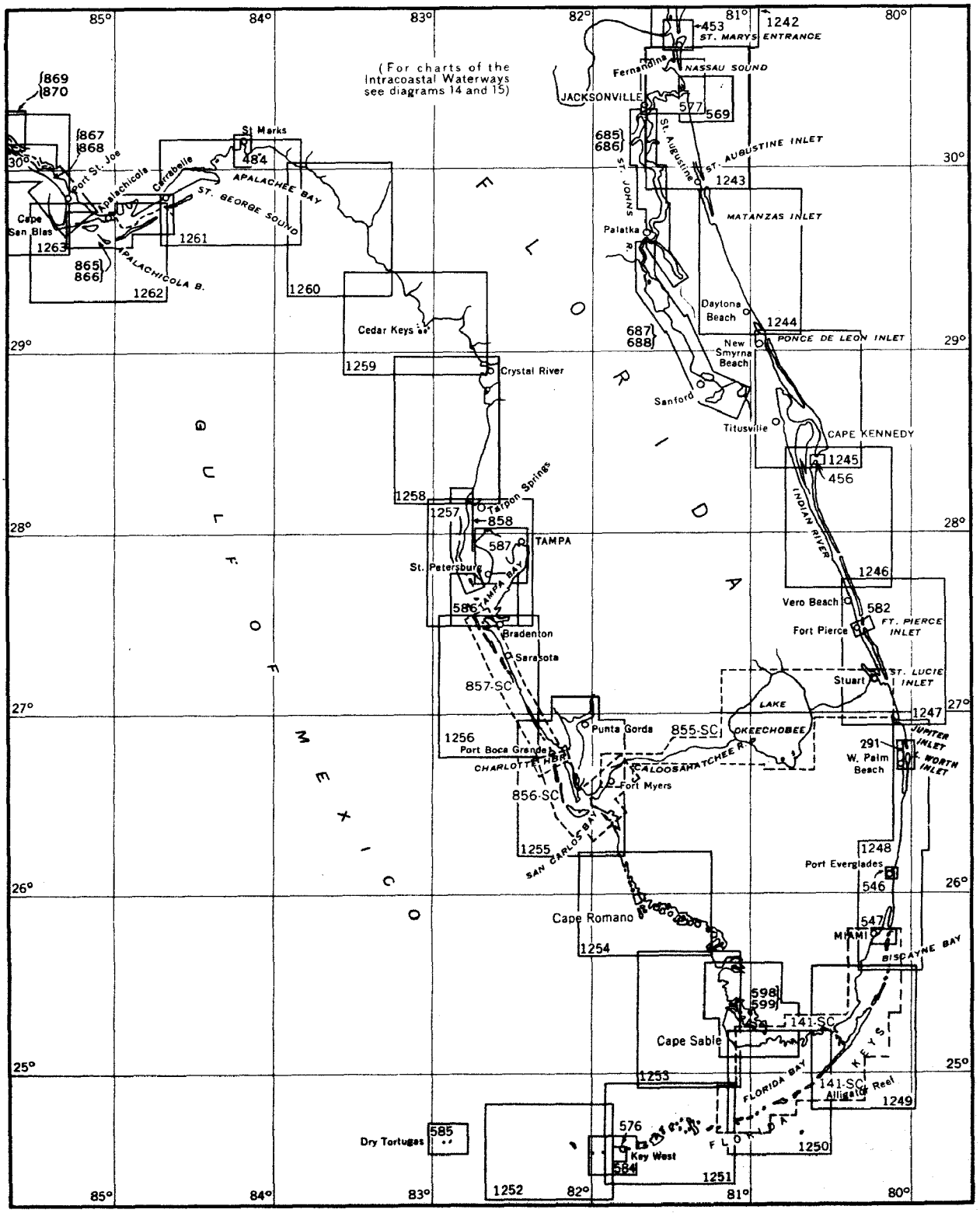
No.	Price	TITLE	State	Scale	Paper size (inches)
		COAST CHARTS			
1236	$1.00	Approaches to Cape Fear River	North Carolina	1:80,000	35X45
1237	1.00	Little River Inlet to Winyah Bay Entrance	N.C. & S.C.	1:80,000	35X44
1238	1.00	Winyah Bay Entrance to Isle of Palms	South Carolina	1:80,000	35X44
1239	1.00	Charleston Harbor and approaches	"	1:80,000	34X44
1240	1.00	St. Helena Sound to Savannah River	S.C. & Ga.	1:80,000	35X43
1241	1.00	Tybee Island to Doboy Sound	Georgia	1:80,000	35X43
1242	1.00	Doboy Sound to Fernandina	Georgia & Florida	1:80,000	34X44
1243	1.00	Amelia Island to St. Augustine	Florida	1:80,000	34X47
		HARBOR CHARTS			
440	1.00	Savannah River and Wassaw Sound	S.C. & Ga.	1:40,000	36X47
447	.50	St. Simons Sound, Brunswick Harbor, and Turtle River	Georgia	1:40,000	24X36
448	1.00	St. Andrew Sound and Satilla River	"	1:40,000	35X48
453	1.00	Fernandina Harbor to King Bay	Georgia & Florida	1:20,000	36X43
470	1.00	Charleston Harbor	South Carolina	1:20,000	35X45
491	.75	Charleston Harbor Entrance	"	1:20,000	32X38
569	.75	Approaches to St. Johns River	Florida	1:40,000	35X41
		St. Johns River Entrance	"	1:10,000	
571	1.00	Port Royal Sound and inland passages	South Carolina	1:40,000	35X44
573	1.00	Ossabaw and St. Catherines Sounds	Georgia	1:40,000	34X44
574	1.00	Sapelo and Doboy Sounds	"	1:40,000	35X44
575	.50	Altamaha Sound	"	1:40,000	24X33
577	1.00	Nassau Sound to Jacksonville	Florida	1:40,000	35X40
680	1.00	Cooper River above Goose Creek	South Carolina	1:20,000	31X47
681	.25	Wando River—upper part	"	1:20,000	21X28
787	.75	Winyah Bay	"	1:40,000	30X37
792	1.00	Stono and North Edisto Rivers	"	1:40,000	36X42
793	1.00	St. Helena Sound	"	1:40,000	32X46
794	.50	Parts of Coosaw and Broad Rivers	"	1:40,000	24X38

Diagram No. 10

March 1954

COAST AND HARBOR CHARTS - ATLANTIC AND GULF COASTS

JACKSONVILLE TO CAPE SAN BLAS, FLORIDA



COAST AND HARBOR CHARTS—ATLANTIC AND GULF COAST
JACKSONVILLE TO CAPE SAN BLAS, FLORIDA

No.	Price	TITLE	State	Scale	Paper size (inches)
		COAST CHARTS			
1243	$1.00	Amelia Island to St. Augustine	Florida	1:80,000	34X47
1244	1.00	St. Augustine Light to Ponce de Leon Inlet Light	"	1:80,000	34X47
1245	1.00	Ponce de Leon Inlet to Cape Kennedy	"	1:80,000	36X45
1246	1.00	Cape Kennedy to Bethel Shoal	"	1:80,000	35X45
1247	1.00	Bethel Shoal to Jupiter Inlet	"	1:80,000	34X48
1248	1.00	Jupiter Inlet to Fowey Rocks	"	1:80,000	35X42
1249	1.00	Fowey Rocks to Alligator Reef	"	1:80,000	35X47
1250	1.00	Florida Keys—Alligator Reef to Sombrero Key	"	1:80,000	35X43
1251	1.00	Florida Keys—Sombrero Key to Sand Key	"	1:80,000	35X44
1252	1.00	Sand Key to Rebecca Shoal	"	1:80,000	34X43
1253	1.00	East Cape to Mormon Key	"	1:80,000	35X44
1254	1.00	Chatham River to Clam Pass Naples Bay Everglades Harbor	"	1:80,000 1:30,000 1:30,000	34X44
1255	1.00	Estero Bay to Lemon Bay, including Charlotte Harbor	"	1:80,000	34X44
1256	1.00	Lemon Bay to Passage Key Inlet	"	1:80,000	34X46
1257	1.00	Tampa Bay and St. Josephs Sound	"	1:80,000	34X43
1258	1.00	Anclote Keys to Crystal River	"	1:80,000	35X48
1259	1.00	Crystal River to Horseshoe Point	"	1:80,000	33X47
1260	1.00	Horseshoe Point to Rock Islands Horseshoe Beach	" "	1:80,000 1:20,000	35X44
1261	1.00	Apalachee Bay	"	1:80,000	35X45
1262	1.00	Apalachicola Bay to Cape San Blas	"	1:80,000	34X44
		HARBOR CHARTS			
291	.75	Lake Worth Inlet and Palm Beach	Florida	1:10,000	27X41
453	1.00	Fernandina Harbor to Kings Bay	Georgia & Florida	1:20,000	37X43
456	.25	Canaveral Harbor	Florida	1:10,000	21X29
484	.25	St. Marks River and approaches	"	1:15,000	25X30
546	.75	Port Everglades	"	1:5,000	35X39
547	.75	Miami Harbor	"	1:10,000	29X47
569	.75	Approaches to St. Johns River St. Johns River Entrance	"	1:40,000 1:10,000	35X41
576	.75	Key West Harbor	"	1:10,000	36X38
577	1.00	Nassau Sound to Jacksonville	"	1:40,000	35X40
582	.25	Fort Pierce Harbor	"	1:10,000	19X29
584	1.00	Key West Harbor and approaches	"	1:30,000	36X44
585	.75	Dry Tortugas Tortugas Harbor	"	1:30,000 1:10,000	30X36
586	1.00	Tampa Bay—southern part	"	1:40,000	34X44
587	.75	Tampa Bay—northern part St. Petersburg Tampa	"	1:40,000 1:20,000 1:20,000	35X37
598	.75	Everglades National Park—Whitewater Bay	"	1:50,000	29X42
599		Everglades National Park—Shark River to Lostmans River		1:50,000	
685	.75	St. Johns River—Jacksonville to Racy Pt.	"	1:40,000	36X36
686		St. Johns River—Racy Pt. to Crescent Lake	"	1:40,000	
687	.75	St. Johns River—Dunns Creek to Lake Dexter	"	1:40,000	36X38
688		St. Johns River—Lake Dexter to Lake Harney	"	1:40,000	
		INTRACOASTAL WATERWAY CHARTS (GULF COAST)			
858	.50	Tampa Bay to Anclote Anchorage	Florida	1:40,000	26X42
865	.50	St. George Sound to Apalachicola Bay	"	1:40,000	26X38
866		Apalachicola Bay to Lake Wimico	"	1:40,000	
867	.50	Lake Wimico to Overstreet and St. Joseph Bay Entrance	"	1:40,000	26X38
868		Overstreet to St. Andrew Bay			
		SMALL-CRAFT CHART			
141-SC*	2.00	Miami to Marathon and Florida Bay	Florida	1:80,000	
855-SC*	.75	Okeechobee Waterway—St Lucie Inlet to Fort Myers and Lake Okeechobee	"	1:40,000 1:80,000	
856-SC*	.50	Fort Myers to Charlotte Harbor	"	1:40,000	
857-SC*	.50	Charlotte Harbor to Tampa Bay	"	1:40,000	

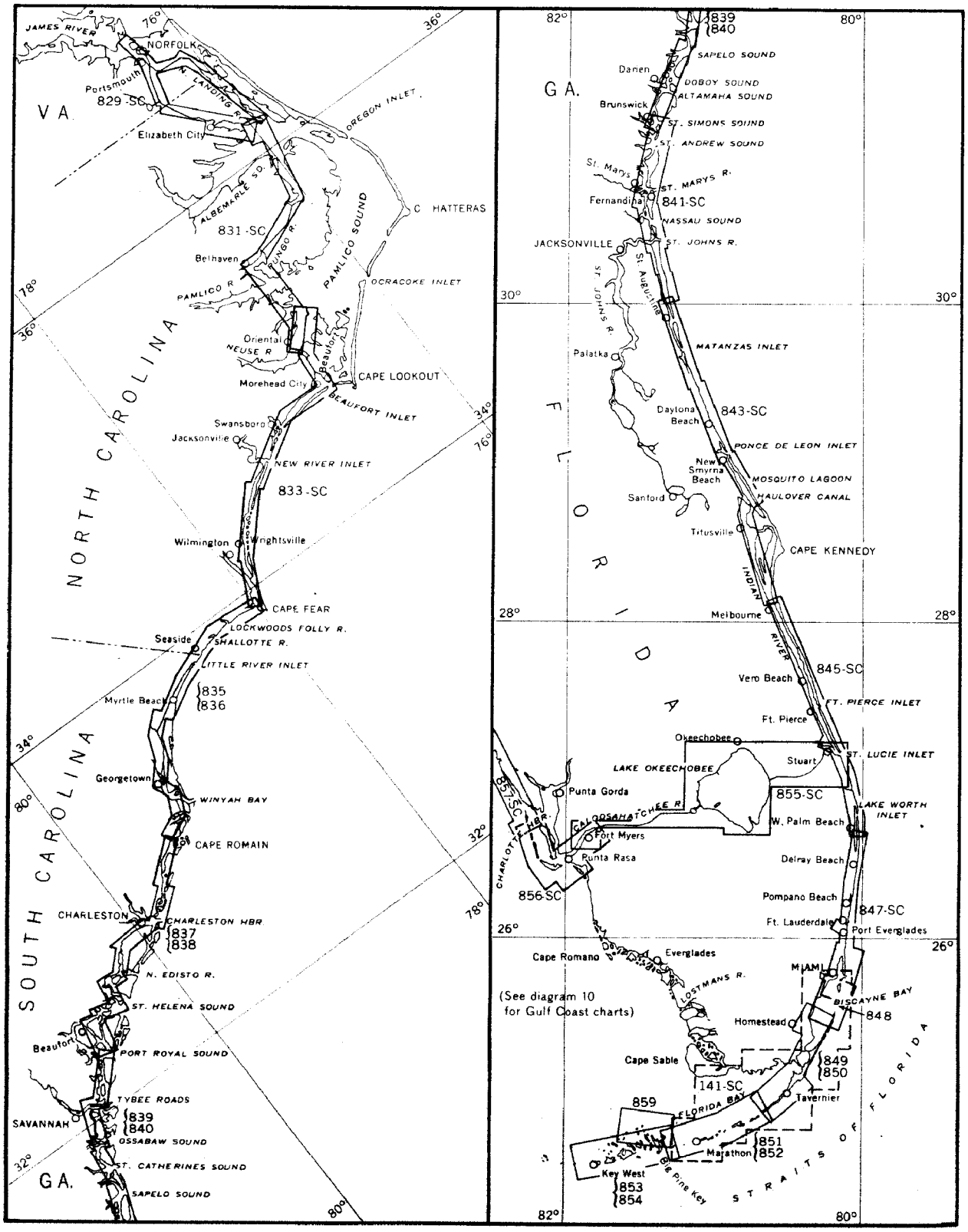
Numbers in brackets represent charts printed back to back.

* SC designates Small-craft Folded Charts with marine service and supply information.

Diagram No. 14

March 1964

CHARTS OF THE ATLANTIC INTRACOASTAL WATERWAY
NORFOLK TO KEY WEST



CHARTS COVERING THE ATLANTIC INTRACOASTAL WATERWAY (INSIDE ROUTE)—NEW YORK TO KEY WEST

Arranged in order of progression southward

NEW YORK TO NORFOLK

No.	Price	TITLE	State	Scale	Paper size (inches)
		The following coast and harbor charts, listed with others on pp. 4 to 7 inclusive are relisted here as those best suited for this section of the route.			
369-SC*	$1.00	New York Harbor	N.Y. & N.J.	1:40,000	
824-SC*	.75	Sandy Hook to Little Egg Harbor	New Jersey	1:40,000	
826-SC*	.75	Little Egg Harbor to Cape May	"	1:40,000	
1218	1.00	Delaware Bay	N.J. & Del.	1:80,000	35X40
294	1.00	Delaware River—Smyrna River to Wilmington	"	1:40,000	31X47
570	.50	Chesapeake and Delaware Canal	Md. & Del.	1:20,000	27X36
1226	1.00	Chesapeake Bay—Sandy Point to Head of Bay	Maryland	1:80,000	36X40
1225	1.00	Chesapeake Bay—Cove Point to Sandy Point	"	1:80,000	36X40
1224	1.00	Chesapeake Bay—Smith Point to Cove Point	Md. & Va.	1:80,000	32X43
1223	1.00	Chesapeake Bay—Wolf Trap to Smith Point	Virginia	1:80,000	34X41
1222	1.00	Chesapeake Bay Entrance	"	1:80,000	35X45

NORFOLK TO KEY WEST

No.	Price	TITLE	State	Scale	Paper size (inches)
829-SC*	$0.50	Norfolk to Albemarle Sound via North Landing River or Dismal Swamp Canal	Va. & N.C.	1:40,000	
831-SC*	.50	Albemarle Sound to Neuse River	North Carolina	1:40,000	
833-SC*	.75	Neuse River to Myrtle Sound	"	1:40,000	
{835	.50	Southport to Socastee Cr.	N.C. & S.C.	1:40,000	24X39
{836		Socastee Cr. to McClellanville	South Carolina	1:40,000	
{837	.50	McClellanville to Wadmalaw River	"	1:40,000	24X39
{838		Wadmalaw River to Port Royal Sound	"	1:40,000	
{839	.50	Port Royal Sound to Johnson Creek	S.C. & Ga.	1:40,000	24X39
{840		Johnson Creek to Brunswick River	Georgia	1:40,000	
841-SC*	.75	St. Simons Sound to Tolomato River	Ga. & Fla.	1:40,000	
843-SC*	.75	Tolomato River to Eau Gallie	Florida	1:40,000	
845-SC*	.50	Eau Gallie to West Palm Beach	"	1:40,000	
847-SC*	.75	West Palm Beach to Miami	"	1:40,000	
848	.25	Miami to Elliott Key	"	1:40,000	25X39
141-SC*	$2.00	Miami to Marathon and Florida Bay	"	1:80,000	
{849	.50	Elliott Key to Tarpon Basin	"	1:40,000	25X40
{850		Tarpon Basin to Matecumbe	"	1:40,000	
{851	.50	Matecumbe to Grassey Key	"	1:40,000	26X40
{852		Grassey Key to Bahia Honda Key	"	1:40,000	
{853	.50	Bahia Honda Key to Sugarloaf Key	"	1:40,000	27X39
{854		Sugarloaf Key to Key West	"	1:40,000	
859	.50	Big Spanish Channel to Johnson Key	"	1:40,000	27X39
		ST. LUCIE INLET TO TAMPA BAY			
855-SC*	.75	Okeechobee Waterway—St. Lucie Inlet to Fort Myers and Lake Okeechobee	" "	1:40,000 1:80,000	
856-SC*	.50	Fort Myers to Charlotte Harbor	"	1:40,000	
857-SC*	.50	Charlotte Harbor to Tampa Bay	"	1:40,000	

Numbers in brackets represent charts printed back to back.
*SC designates Small-craft Folded Charts with marine service and supply information.

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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