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United States Coast Pilot 9

Pacific and Arctic Coasts Alaska: Cape Spencer to Beaufort Sea

1994 (Sixteenth) Edition

The last published amendment to the previous edition (15th/1992) was Amendment 18. Amendment 18 was published in Defense Mapping Agency Notice to Mariners 47 dated 11/20/93. Amendment 18 was published in Commander Seventeenth Coast Guard District Local Notice to Mariners 41 dated 10/12/93. Amendments 1 through 18 to the previous edition have been entered into this 1993 edition.

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Washington, DC 1994
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LIMITS OF UNITED STATES COAST PILOT

Atlantic Coast

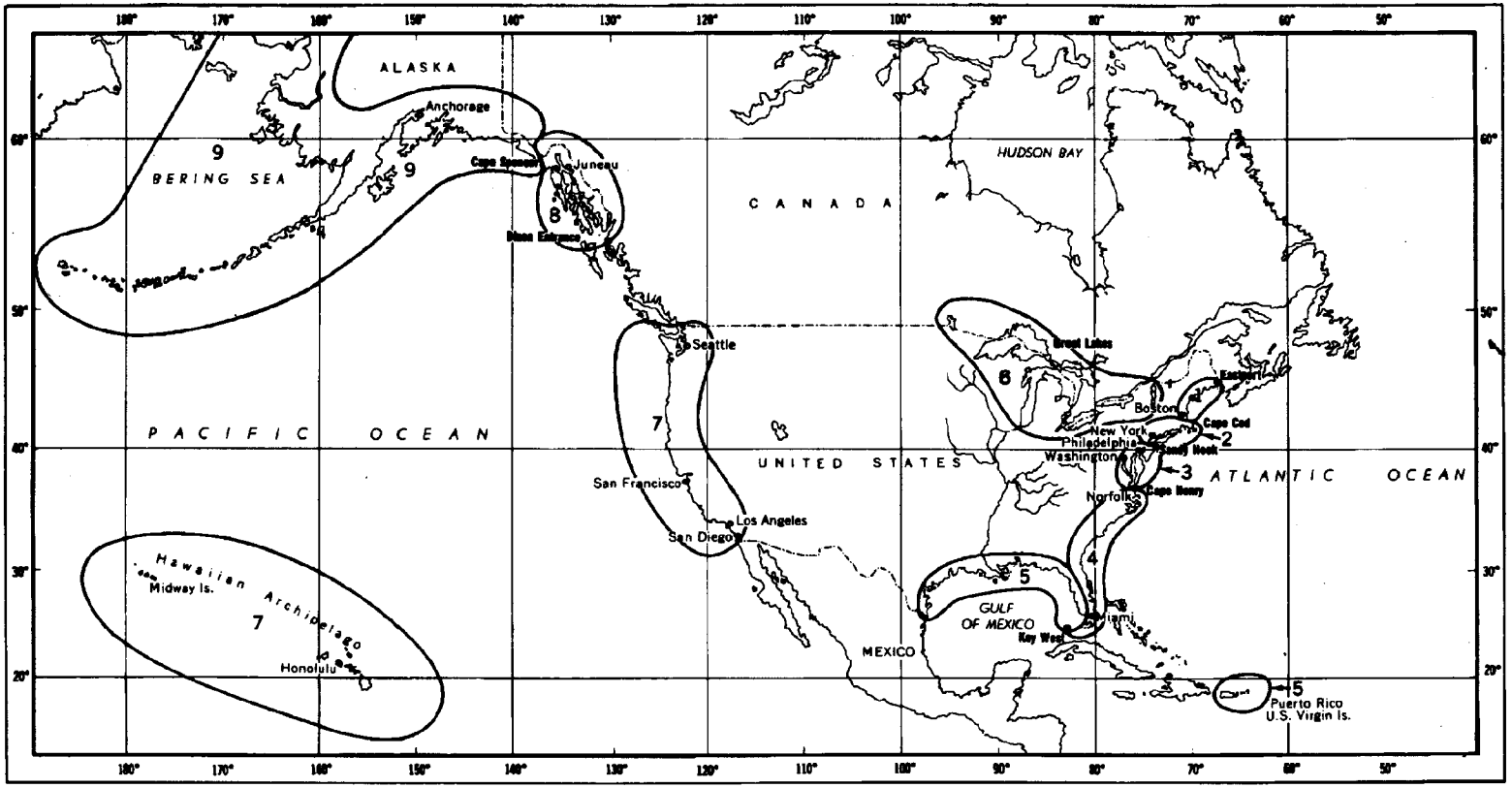
1 Eastport to Cape Cod
2 Cape Cod to Sandy Hook
3 Sandy Hook to Cape Henry
4 Cape Henry to Key West
5 Gulf of Mexico, Puerto Rico, and Virgin Islands

Pacific Coast

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

Great Lakes

6 The Lakes and their Connecting Waterways



Preface

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

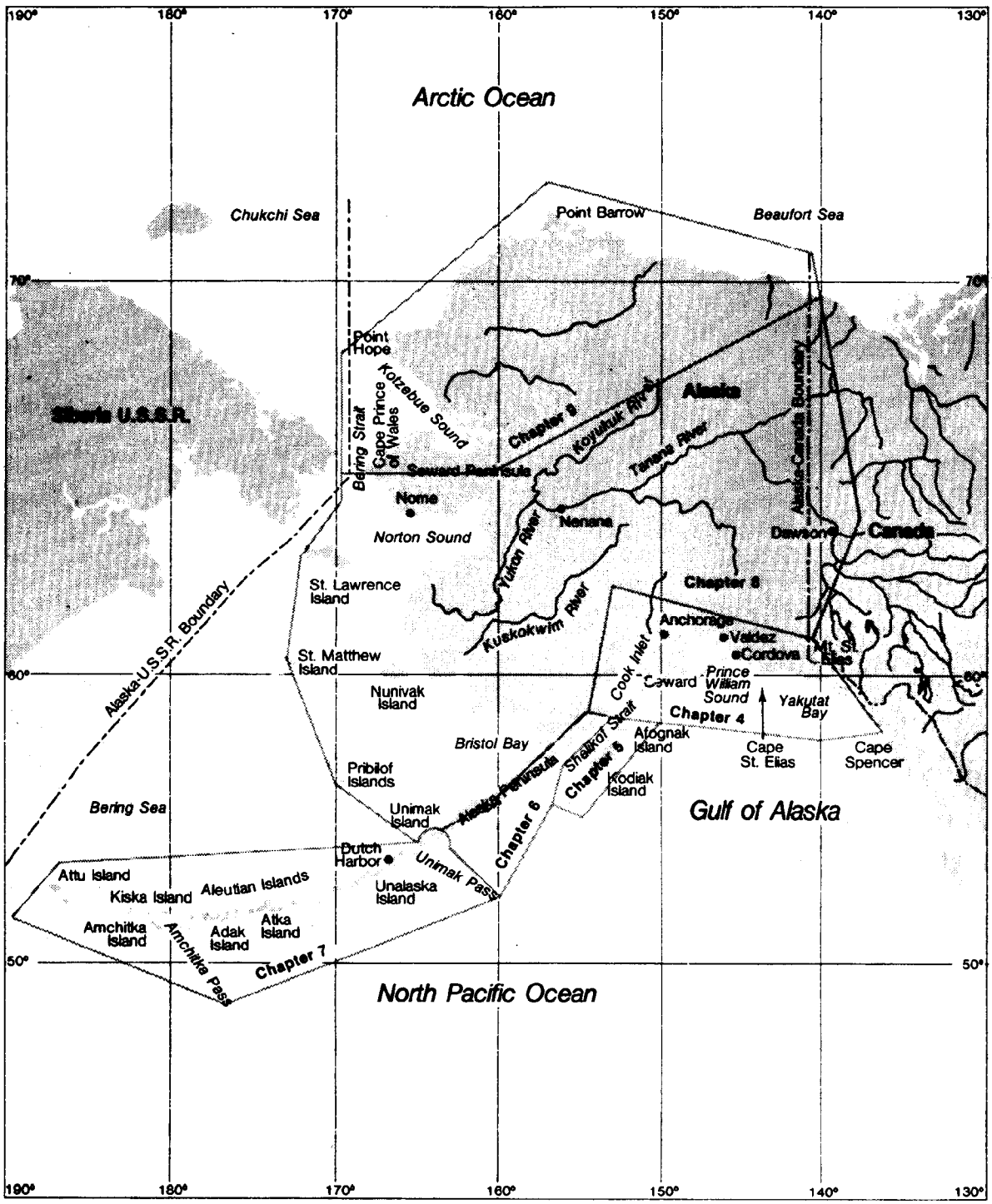
The Coast Pilot supplements the navigational information shown on the nautical charts. The sources for updating the Coast Pilot include but are not limited to field inspections conducted by NOAA, information published in Notices to Mariners, reports from NOAA Hydrographic vessels and field parties, information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

This volume of Coast Pilot 9, Pacific and Arctic Coasts, Cape Spencer to Beaufort Sea, cancels the 1992 (15th) Edition.

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

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

Director,
Coast and Geodetic Survey (N/CG2211),
National Ocean Service, NOAA,
1315 East-West Highway, Station 7317
Silver Spring, MD 20910-3233.



Graphic Chapter Index

RECORD OF CHANGES

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

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1. GENERAL INFORMATION

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

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

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

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

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

(6) **Courses.**–These are true and are expressed in the same manner as bearings. The directives "steer" or "make good" a course mean, without exception, to proceed from a point of origin along a track having the identical meridional angle as the designated course. Vessels following the directives must allow for every influence tending to cause deviation from such track, and navigate so that the designated course is continuously being made good.

(7) **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.

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

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

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

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

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

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

(14) Settlement causes the water level around the ship to be lower than would otherwise be the case. It will always cause echo soundings to be less than they would otherwise be. Settlement is appreciable when the depth is less than

seven times the draft of the ship, and increases as the depth decreases and the speed increases.

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

(16) **Distances.**–These are in nautical miles unless otherwise stated. A nautical mile is one minute of latitude, or approximately 2,000 yards, and is about 1.15 statute miles.

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

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

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

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

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

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

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

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

NOTICES TO MARINERS

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

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

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

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

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

(30) Vessels operating within the limits of the Coast Guard districts can obtain information affecting NOS charts and related publications from the Local Notices to Mariners. Small craft using the Intracoastal Waterway and other waterways and small harbors within the United States that are not normally used by oceangoing vessels will require the Local Notices to Mariners to keep charts and related publications up-to-date. Information for oceangoing vessels can be obtained from the Notice to Mariners published by the Defense Mapping Agency Hydrographic/Topographic Center.

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

U.S. GOVERNMENT AGENCIES PROVIDING MARITIME SERVICES

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

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

(34) **Customs Service,** Department of the Treasury.–The U.S. Customs Service administers certain laws relating to: entry and clearance of vessels and permits for certain vessel movements between points in the United States; prohibitions against coastwise transportation of passengers and merchandise; salvage, dredging and towing by foreign vessels; certain activities of vessels in the fishing trade; regular

and special tonnage taxes on vessels; the landing and delivery of foreign merchandise (including unlading, appraisement, lighterage, drayage, warehousing, and shipment in bond); collection of customs duties, including duty on imported pleasure boats and yachts and 50% duty on foreign repairs to American vessels engaged in trade; customs treatment of sea and ship's stores while in port and the baggage of crewmen and passengers; illegally imported merchandise; and remission of penalties or forfeiture if customs or navigation laws have been violated. The Customs Service also cooperates with many other Federal agencies in the enforcement of statutes they are responsible for. Customs districts and ports of entry, including customs stations, are listed in the appendix.

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

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

(37) **Sales agents** for Charts, the Coast Pilot, Tide Tables, Tidal Current Tables, and Tidal Current Charts of the National Ocean Service are located in many U.S. ports and in some foreign ports. A list of authorized sales agents and chart catalogs may be had free upon request from National Ocean Service, Distribution Branch (N/CG33). (See appendix for address.)

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

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

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

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

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

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

(44) The Coast Guard, with the cooperation of coast radio stations of many nations, operates the **Automated Mutual-assistance Vessel Rescue System (AMVER).** It is an international maritime mutual assistance program which provides important aid to the development and coordination of search and rescue (SAR) efforts in many offshore areas of the world. Merchant ships of all nations making offshore

passages are encouraged to voluntarily send movement (sailing) reports and periodic position reports to the AMVER Center at Coast Guard New York via selected radio stations. Information from these reports is entered into an electronic computer which generates and maintains dead reckoning positions for the vessels. Characteristics of vessels which are valuable for determining SAR capability are also entered into the computer from available sources of information.

(45) A worldwide communications network of radio stations supports the AMVER System. Propagation conditions, location of vessel, and traffic density will normally determine which station may best be contacted to establish communications. To ensure that no charge is applied, all AMVER reports should be passed through specified radio stations. Those stations which currently accept AMVER reports and apply no coastal station, ship station, or landline charge are listed in each issue of the "AMVER Bulletin" publication. Also listed are the respective International radio call signs, locations, frequency bands, and hours of operation. The "AMVER Bulletin" is available from AMVER Maritime Relations, U.S. Coast Guard, Building 110, Box 26, Governor's Island, NY 10004-5034, telephone: (212)668-7764. Although AMVER reports may be sent through nonparticipating stations, the Coast Guard cannot reimburse the sender for any charges applied.

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

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

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

(49) Instructions guiding participation in the AMVER System are available in the following languages: Chinese, Danish, Dutch, English, French, German, Greek, Italian, Japanese, Korean, Norwegian, Portuguese, Polish, Russian, Spanish and Swedish. The AMVER Users Manual is available from: AMVER Maritime Relations, U.S. Coast Guard, Building 110, Box 26, Governor's Island, NY 10004-5034, telephone: (212)668-7764; Commander, Atlantic Area, U.S. Coast Guard, Governors Island, NY 10004-5000; Commander, Pacific Area, U.S. Coast Guard, Coast Guard Island, Alameda, CA 94501-5100; and at U.S. Coast Guard District Offices, Marine Safety Offices, Marine Inspection Offices, and Captain of the Port Offices in major U.S. ports. Requests for instructions should state the language desired if other than English.

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

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

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

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

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

(55) **Light Lists,** published by the Coast Guard, describe aids to navigation, consisting of lights, fog signals, buoys, lightships, daybeacons, and electronic aids, in United States (including Puerto Rico and U.S. Virgin Islands) and contiguous Canadian waters. Light Lists are for sale by the Government Printing Office (See appendix for address.), and by sales agents in the principal seaports. Mariners should refer to these publications for detailed information regarding the characteristics and visibility of lights, and the descriptions of light structures, lightships, buoys, fog signals, and electronic aids.

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

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

(58) Information concerning the various ports, improvements, channel depths, navigable waters, and the condition

of the Intracoastal Waterways in the areas under their jurisdiction may be obtained direct from the District Engineer offices. (See appendix for addresses.)

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

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

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

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

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

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

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

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

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

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

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

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

(71) **Defense Mapping Agency Hydrographic/Topographic Center (DMAHTC),** Department of Defense.–The Defense Mapping Agency Hydrographic/Topographic Center provides hydrographic, navigational, topographic, and geodetic data, charts, maps, and related products and services to the Armed Forces, other Federal Agencies, the Merchant Marine and mariners in general. Publications include Sailing Directions, List of Lights, Distances Between Ports, Radio Navigational Aids, International Code of Signals, American Practical Navigator (Bowditch), and Notice to Mariners. (See Defense Mapping Agency Procurement Information in appendix.)

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

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

quarantine station at or nearest the port at which the vessel will arrive.

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

(75) "Ill person" means person who:

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

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

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

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

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

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

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

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

(84) The principal means of disseminating marine weather services and products in coastal areas is **NOAA Weather Radio.** This network of more than 350 stations nationwide is operated by the NWS and provides continuous broadcasts of weather information for the general public. These broadcasts repeat taped messages every 4–6 minutes. Tapes are updated periodically, usually every 2–3 hours and amended as required to include the latest information. When severe weather threatens, routine transmissions are interrupted and the broadcast is devoted to emergency warnings. (See appendix for NOAA Weather Radio Stations covered by this Coast Pilot.)

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

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

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

(88) Information on how ships, commercial fishermen, offshore industries, and others in the coastal zone may participate in the marine observation program is available from **National Weather Service Port Meteorological Officers (PMOs).** Port Meteorological Officers are located in major U.S. port cities and the Republic of Panama, where they visit ships in port to assist masters and mates with the

weather observation program, provide instruction on the interpretation of weather charts, calibrate barometers and other meteorological instruments, and discuss marine weather communications and marine weather requirements affecting the ships' operations. (See appendix for addresses of Port Meteorological Officers in or near the area covered by this Coast Pilot.)

(89) **National Environmental Satellite, Data, and Information Service** (NESDIS), National Oceanic and Atmospheric Administration (NOAA), Department of Commerce.–Among its functions, NESDIS archives, processes, and disseminates the non-realtime meteorological and oceanographic data collected by government agencies and private institutions. Marine weather observations are collected from ships at sea on a voluntary basis. About 1 million observations are received annually at NESDIS's National Climatic Center. They come from vessels representing every maritime nation. These observations, along with land data, are returned to the mariners in the form of climatological summaries and atlases for coastal and ocean areas. They are available in such NOAA publications as the **U.S. Coast Pilot, Mariners Weather Log,** and **Local Climatological Data, Annual Summary.** They also appear in the Defense Mapping Agency Hydrographic/Topographic Center's **Pilot Charts** and **Sailing Directions Planning Guides.**

DISTRESS SIGNALS AND COMMUNICATION PROCEDURES

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

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

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

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

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

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

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

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

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

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

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

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

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

(103) (12) The radiotelegraph alarm signal.

(104) (13) The radiotelephone alarm signal.

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

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

(107) (16) A dye marker.

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

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

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

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

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

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

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

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

(116) the distress signal MAYDAY:

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

(118) particulars of its position (latitude and longitude, or true bearing and distance from a known geographical position);

(119) the nature of the distress;

(120) the kind of assistance desired;

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

(122) present seaworthiness of vessel;

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

(124) any other information which might facilitate the rescue, such as display of a surface-to-air identification signal or a radar reflector;
(125) your listening frequency and schedule;
(126) THIS IS (call sign and name of vessel in distress). OVER.
(127) **(4) Acknowledgement of receipt of a distress message:** If a distress message is received from a vessel which is definitely in your vicinity, immediately acknowledge receipt. If it is not in your vicinity, allow a short interval of time to elapse before acknowledging, in order to permit vessels nearer to the vessel in distress to acknowledge receipt without interference. However, in areas where reliable communications with one or more shore stations are practicable, all vessels may defer this acknowledgement for a short interval so that a shore station may acknowledge receipt first. The acknowledgement of receipt of a distress is given as follows:
(128) the call sign or name of the vessel sending the distress (spoken three times);
(129) the words THIS IS;
(130) the call sign or name of acknowledging vessel (spoken three times);
(131) The words RECEIVED MAYDAY.
(132) After the above acknowledgement, allow a momentary interval of listening to insure that you will not interfere with another vessel better situated to render immediate assistance; if not, with the authority of the person in charge of the vessel, transmit:
(133) the word MAYDAY;
(134) the call sign and name of distressed vessel;
(135) the words THIS IS;
(136) the call sign and name of your vessel;
(137) your position (latitude and longitude, or true bearing and distance from a known geographical position);
(138) the speed you are proceeding towards, and the approximate time it will take to reach, the distressed vessel. OVER.
(139) **(5) Further distress messages and other communications:** Distress communications consist of all messages relating to the immediate assistance required by the distressed vessel. Each distress communication shall be preceded by the signal MAYDAY. The vessel in distress or the station in control of distress communications may **impose silence** on any station which interferes. The procedure is:–the words SEELONCE MAYDAY (Seelonce is French for silence). Silence also may be imposed by nearby mobile stations other than the vessel in distress or the station in control of distress communications. The mobile station which believes that silence is essential may request silence by the following procedure:–the word SEELONCE, followed by the word DISTRESS, and its **own** call sign.
(140) **(6) Transmission of the distress procedure by a vessel or shore station not itself in distress:** A vessel or a shore station which learns that a vessel is in distress shall transmit a distress message in any of the following cases:
(141) (a) When the vessel in distress is not itself able to transmit the distress message.
(142) (b) When a vessel or a shore station considers that further help is necessary.
(143) (c) When, although not in a position to render assistance, it has heard a distress message that has not been acknowledged.
(144) In these cases, the transmission shall consist of:
(145) the radiotelephone alarm signal (if available);
(146) the words MAYDAY RELAY (spoken three times);
(147) the words THIS IS;
(148) the call sign and name of vessel (or shore station), spoken three times.
(149) When a vessel transmits a distress under these conditions, it shall take all necessary steps to contact the Coast Guard or a shore station which can notify the Coast Guard.
(150) **(7) Termination of distress:** When distress traffic has ceased, or when silence is no longer necessary on the frequency used for the distress traffic, the station in control shall transmit on that frequency a message to all stations as follows:
(151) the distress signal MAYDAY;
(152) the call TO ALL STATIONS, spoken three times;
(153) the words THIS IS;
(154) the call sign and name of the station sending the message;
(155) the time;
(156) the name and call sign of the vessel in distress;
(157) the words SEELONCE FEENEE (French for silence finished).

DISTRESS ASSISTANCE AND COORDINATION PROCEDURES

(158) **Rescue Coordination Centers.**–There are four Rescue Coordination Centers in Alaska. The centers depend upon information from many sources in order to perform effectively. Mariners are requested to report any information to the nearest center concerning fire, collision or other emergencies, foreign fishing vessels, oil spills, possible illegal entry, submarine sighting, icebergs, foreign naval vessels, or any other unusual sightings. (See the appendix for the location of the centers.)
(159) **Surface ship procedures for assisting distressed surface vessels.**
(160) (1) The following immediate action should be taken by each ship on receipt of a distress message:
(161) (a) Acknowledge receipt and, if appropriate, retransmit the distress message;
(162) (b) Immediately try to take D/F bearings during the transmission of the distress message and maintain a D/F watch on 500 kHz and/or 2182 kHz;
(163) (c) Communicate the following information to the ship in distress:
(164) (i) identity;
(165) (ii) position;
(166) (iii) speed and estimated time of arrival (ETA);
(167) (iv) when available, true bearing of the ship in distress.
(168) (d) Maintain a continuous listening watch on the frequency used for the distress. This will normally be:
(169) (i) 500 kHz (radiotelegraphy) and/or
(170) (ii) 2182 kHz (radiotelephony).
(171) (e) Additionally, maintain watch on VHF-FM channel 16 (156.80 MHz) as necessary;
(172) (f) Operate radar continuously;
(173) (g) If in the vicinity of the distress, post extra lookouts.
(174) (2) The following action should be taken when proceeding to the area of distress:
(175) (a) Plot the position, course, speed, and ETA of other assisting ships.
(176) (b) Know the communication equipment with which other ships are fitted. This information may be obtained from the International Telecommunication Union's List of Ship Stations.
(177) (c) Attempt to construct an accurate "picture" of the circumstances attending the casualty. The important information needed is included under Distress Signals and

Communication Procedures, this chapter. Should the ship in distress fail to transmit this information, a ship proceeding to assist should request what information is needed.

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

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

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

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

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

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

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

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

(186) **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,

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

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

(189) (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.

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

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

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

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

(194) 2. There is liaison between Coast Radio Stations aeronautical units, and land–based search and rescue organizations. Merchant ships will ordinarily be informed of aircraft casualties at sea by broadcast messages from Coast Radio Stations, made on the international distress frequencies of 500 kHz and 2182 kHz. Ships may, however, become aware of the casualty by receiving:

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

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

(197) (c) A message from a SAR aircraft.

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

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

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

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

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

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

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

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

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

(207) (a) Wind direction and force.

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

(209) (c) Other pertinent weather information.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(224) (j) What caused the emergency?

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

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

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

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

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

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

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

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

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

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

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

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

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

(238) **Hoist operations:**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(254) Vessel's name and call sign.

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

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

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

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

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

(260) Any known history of similar illness.

(261) Location and type of pain.

(262) Medical supplies carried on board vessel.

(263) Medication given to patient.

(264) Weather.

(265) Communication schedule and frequency.

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

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

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

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

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

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

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

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

RADIO NAVIGATION WARNINGS AND WEATHER

(274) Marine radio warnings and weather are disseminated by many sources and through several types of transmissions. Morse code radiotelegraph broadcasts of navigational warnings and other advisories are not described, since these transmissions are normally copied only by professional radio operators. U.S. Coast Guard NAVTEX, high-frequency (HF) narrow-band direct printing (radio telex), HF radiofacsimile, and radiotelephone broadcasts of maritime safety information are summarized here. (For complete information on radio warnings and weather see DMAHTC Pub. 117 and the joint National Weather Service/Navy publication, Selected Worldwide Marine Weather Broadcasts.)

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

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

(277) **Urgent and safety radiotelephone broadcasts** of important Notice to Mariners items, storm warnings, and other vital marine information are transmitted upon receipt, and urgent broadcasts are repeated 15 minutes later; additional broadcasts are made at the discretion of the originator. **Urgent** broadcasts are preceded by the urgent signal PAN-PAN (PAHN-PAHN, spoken three times). **Both the urgent signal and message are transmitted on 2182 kHz and/or VHF-FM channel 16. Safety** broadcasts are preceded by the safety signal SECURITY (SAY-CURITAY, spoken three times.) **The safety signal is given on 2182 kHz and/or VHF-FM channel 16 (156.80 MHz), and the message is given on 2670 kHz and/or VHF-FM channel 22A (157.10 MHz).**

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

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

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

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

(282) Atlantic ice reports: 5320, 8502, and 12570 kHz.

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

(284) Pacific: 8710.5, 8714.5, 8718, 13077, 13084.5, 17203, 22567, and 22574.5 kHz.

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

(286) Atlantic: 3242, 7530, 8502 (ice only), 12750 (ice only) kHz.

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

(288) **National Standard Abbreviations for Broadcasts.** -A listing of Standard Abbreviations for Textual Maritime Safety Broadcasts is contained in tables T-31 through T-33. These abbreviations were jointly approved by the U.S. Coast Guard, National Weather Service, Defense Mapping Agency, and the Radio Technical Commission for Maritime Services. In addition to appearing in radio broadcasts of the U.S. Coast Guard and National Weather Service, they appear in Notices to Mariners of the U.S. Coast Guard and Defense Mapping Agency, and in NAVTEX.

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

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

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

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

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

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

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

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

(297) United States Coast Guard

(298) Washington, DC 20593-0001

(299) Telex: 89-2427 COMDT COGARD Washington, DC.

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

(301) **Commercial radiotelephone coast stations.**–Broadcasts of coastal weather and warnings are made by some commercial radiotelephone coast stations (marine operators) on the normal transmitting frequencies of the stations. Vessels with suitable receivers and desiring this service may determine the frequencies and schedules of these broadcasts from their local stations, from Worldwide Marine Weather Broadcasts, or from the series of Marine Weather Services Charts published by NWS.

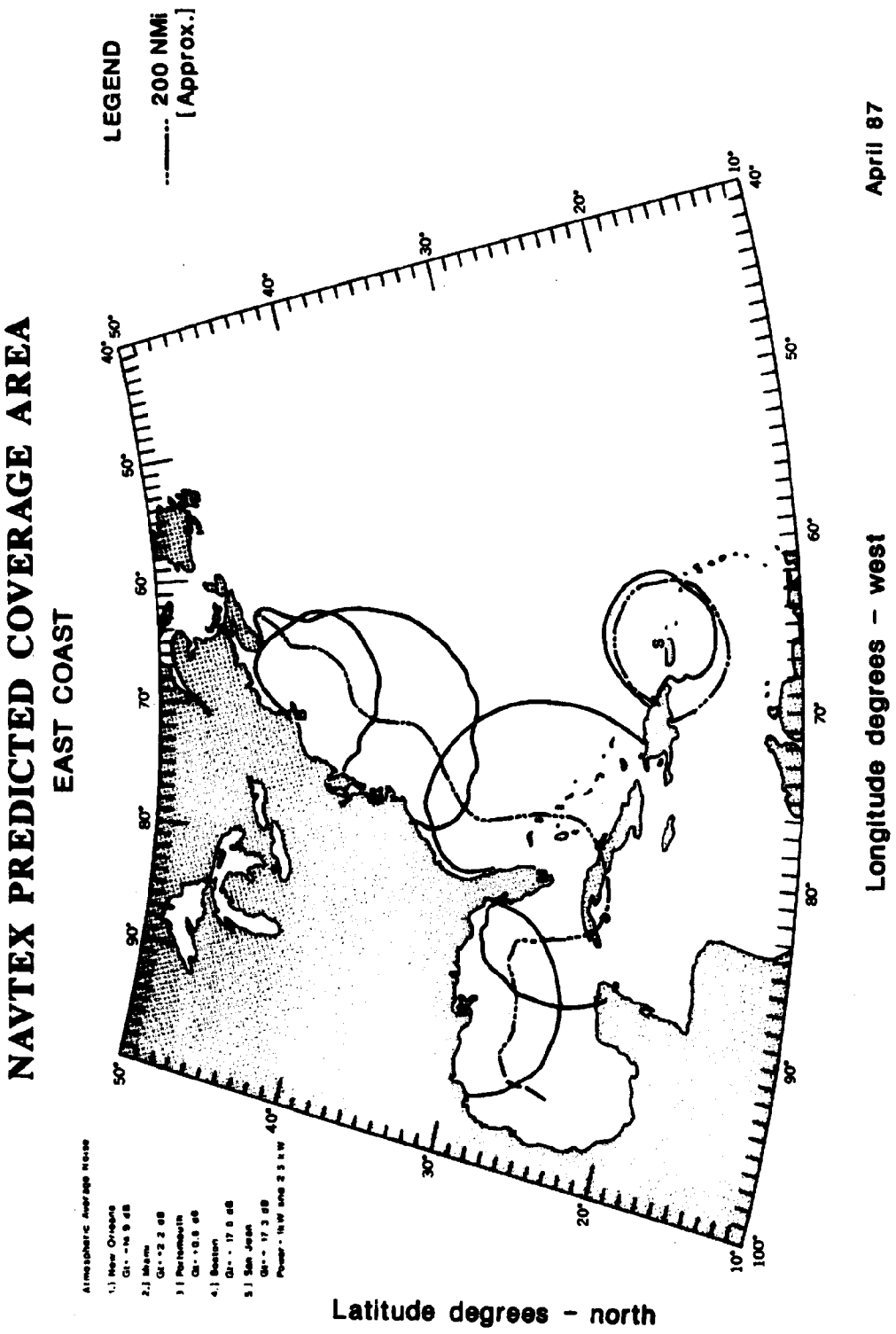
(302) **Local broadcast-band radio stations.**–Many local radio stations in the standard AM and FM broadcast band give local marine weather forecasts from NWS on a regular schedule. These stations are listed on the series of Marine Weather Services Charts published by NWS.

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

(304) 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 W of Central America and Mexico are urged to cooperate with NWS in furnishing these special reports in order that warnings to shipping and coastal areas may be issued.

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

(306) Time announcements are made every minute, commencing at 15 seconds before the minute by a female voice and at 7½ seconds before the minute by a male voice, from


NAVTEX PREDICTED COVERAGE AREA
EAST COAST
LEGEND
200 NMi
[Approx.]
April 87
Longitude degrees - west
Latitude degrees - north

WWVH and WWV, respectively. The time given is in Coordinated Universal Time (UTC) and referred to the time at Greenwich, England, i.e., Greenwich Mean Time.

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

NAUTICAL CHARTS

(308) **Reporting chart deficiencies.**–Users are requested to report all significant observed discrepancies in and desirable additions to NOS nautical charts, including depth information in privately maintained channels and basins; obstructions, wrecks, and other dangers; new landmarks or the nonexistence or relocation of charted ones; uncharted fixed private aids to navigation; and deletions or additions of small-craft facilities. All such reports should be sent to Director, Coast and Geodetic Survey (N/CG2211), National Ocean Service, NOAA, 1315 East-West Highway, Station 7317, Silver Spring, MD 20910-3233.

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

(310) On certain foreign charts reproduced by the United States, and on foreign charts generally, the symbols and abbreviations used may differ from U.S. approved standards. It is, therefore, recommended that navigators who acquire and use foreign charts and reproductions procure the symbol sheet or Chart No. 1 produced by the same foreign agency.

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

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

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

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

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

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

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

(318) The **date of a chart** is of vital importance to the navigator. When charted information becomes obsolete, further use of the chart for navigation may be dangerous. Announcements of new editions of nautical charts are usually published in notices to mariners. A quarterly list of the latest editions is distributed to sales agents; free copies may be obtained from the sales agents or by writing to Distribution Branch (N/CG33), National Ocean Service. (See appendix for address.)

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

(320) ● Survey technology employed (sounding and navigation equipment).

(321) ● Survey specifications in effect (prescribed survey line spacing and sounding interval).

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

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

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

sounder technologies obsolete in areas of complex bathymetry.

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

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

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

(328) 1940 to present: During this period sounding data has been collected using continuous recording single-beam echo sounders which yield a graphic record of the entire sounding line—not just isolated points. Using this graphic record, features which fall between the standard position fixes can be inserted into the data set. Positioning of the sounding vessel in this era has varied from horizontal sextant angles to modern Global Positioning System satellite fixes.

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

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

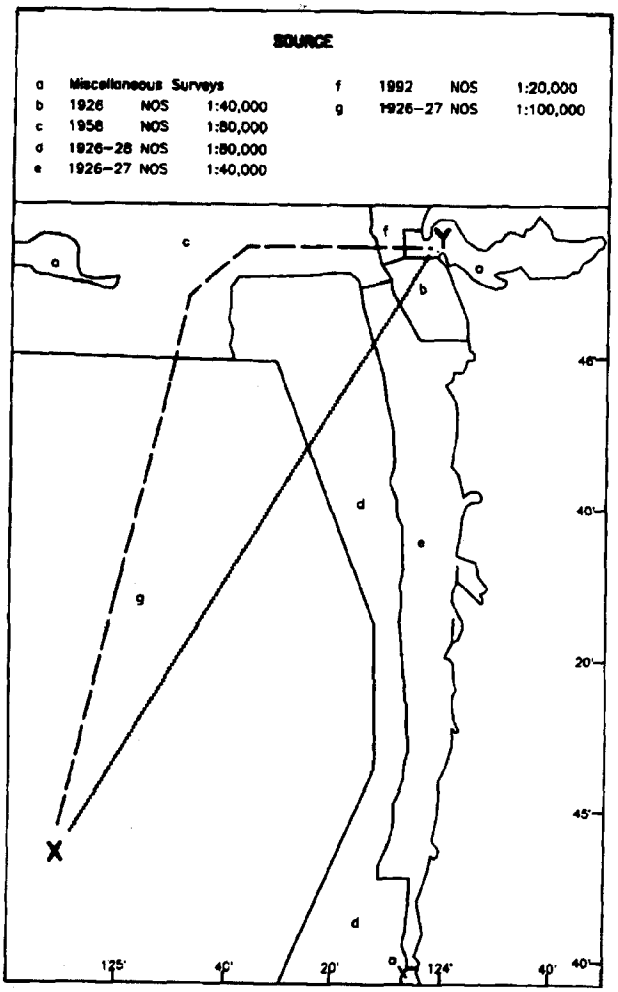
(331) The following table shows the various sounding technologies, line spacings, and areas or depths for each given period of hydrographic surveying. The terminology used to describe the different types of bottom in the table are derived from the first through fourth editions of the Hydrographic Manual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

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

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

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

SOURCE DIAGRAM



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(368) 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.

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

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

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

AIDS TO NAVIGATION

(371) **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.

(372) Radio messages should be prefixed "Coast Guard" and transmitted directly to any U.S. Government shore radio station for relay to the Coast Guard District Commander. If the radio call sign of the nearest U.S. Government radio shore station is not known, radiotelegraph communication may be established by the use of the general call "NCG" on the frequency of 500 kHz. Merchant ships may send messages relating to defects noted in aids to navigation through commercial facilities only when they are unable to contact a U.S. Government shore radio station. Charges for these messages will be accepted "collect" by the Coast Guard.

(373) **Lights.**–The range of visibility of lights as given in the Light Lists and as shown on the charts is the **Nominal range,** which is the maximum distance at which a light may be seen in clear weather (meteorological visibility of 10 nautical miles) expressed in nautical miles. The Light Lists give the Nominal ranges for all Coast Guard lighted aids except range and directional lights. **Luminous range** is the maximum distance at which a light may be seen under the existing visibility conditions. By use of the diagram in the Light Lists, Luminous range may be determined from the known Nominal range, and the existing visibility conditions. Both the Nominal and Luminous ranges do not take into account elevation, observer's height of eye, or the curvature of the earth. **Geographic range** is a function of only the curvature of the earth and is determined solely from the heights above sea level of the light and the observer's eye; therefore, to determine the actual Geographic range for a height of eye, the Geographic range must be corrected by a distance corresponding to the height difference, the distance correction being determined from a table of "distances of visibility for various heights above sea level." (See Light List or Coast Pilot table following appendix.) The maximum distances at which lights can be seen may at times be increased by abnormal atmospheric refraction and may be greatly decreased by unfavorable weather conditions, such as fog, rain, haze, or smoke. All except the most powerful lights are easily obscured by such conditions. In some conditions of the atmosphere white lights may have a reddish hue. During weather conditions which tend to reduce visibility, colored lights are more quickly lost to sight than are white lights. Navigational lights should be used with caution because of the following conditions that may exist:

(374) 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.

(375) 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.

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

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

(378) 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.

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

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

(381) 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.

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

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

(384) Lights of equal candlepower but of different colors may be seen at different distances. This fact should be considered not only in predicting the distance at which a light can be seen, but also in identifying it.

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

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

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

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

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

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

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

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

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

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

(395) 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.

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

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

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

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

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

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

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

(403) **Caution, channel markers.**–Lights, daybeacons, and buoys along dredged channels do not always mark the bottom edges. Due to local conditions, aids may be located inside or outside the channel limits shown by dashed lines on a chart. The Light List tabulates the offset distances for these aids in many instances.

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

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

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

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

(408) **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.

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

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

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

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

(413) 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.

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

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

(416) 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.

(417) **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 defintely 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.

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

EPIRB Types

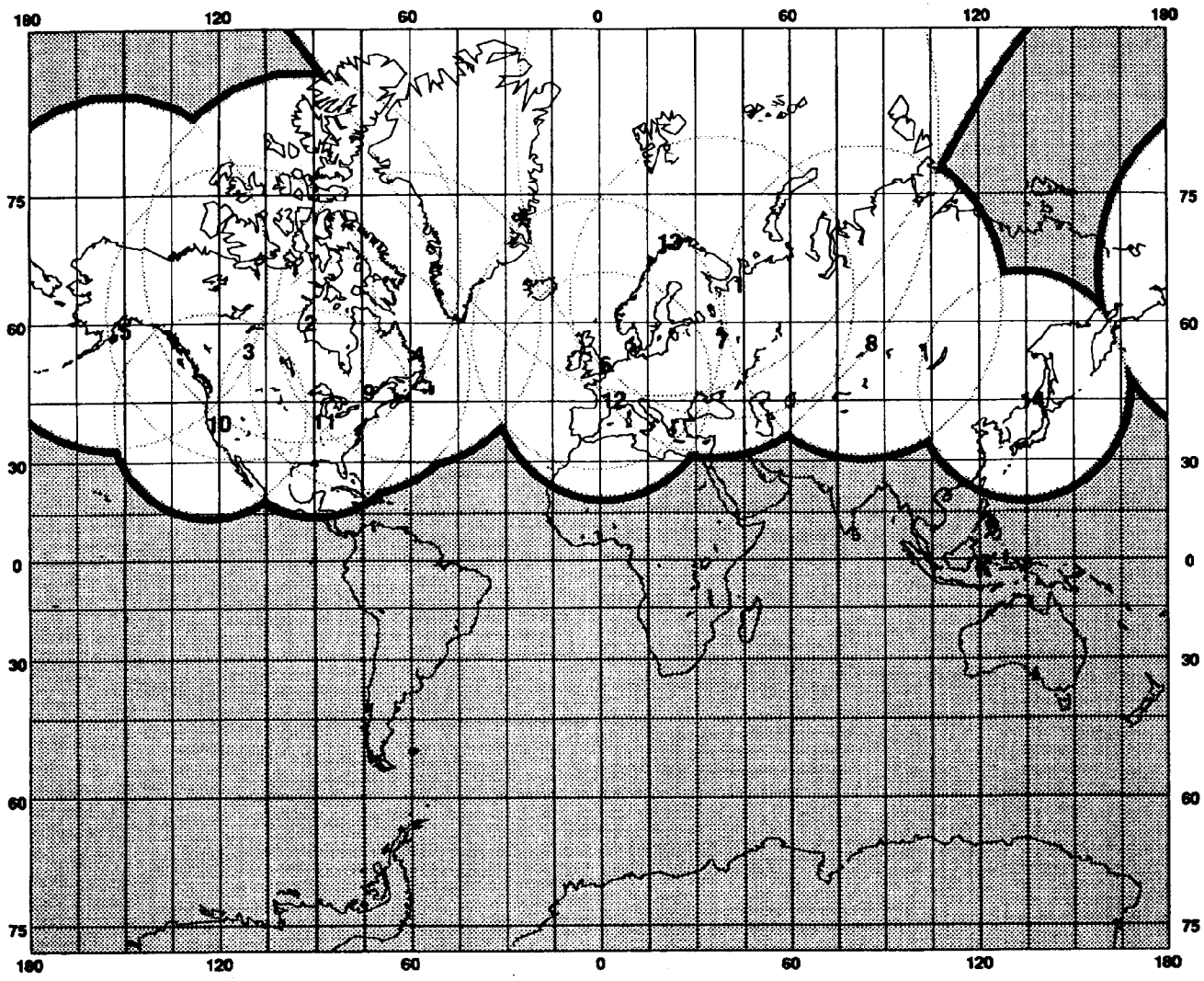
Type	Frequency	Description
Class A	121.5/243 MHz	Float-free, automatically-activating, detectable by aircraft and satellite. Coverage limited (see Chart).
Class B	121.5/243 MHz	Manually activated version of Class A.
Class C	VHF ch 15/16	Manually activated, operates on maritime channels only. Not detectable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

(419) **121.5/243 MHz EPIRBs.**
These are the most common and least expensive type of EPIRB, designed to be detected by overflying commercial or military aircraft. Satellites were designed to detect these EPIRBs, but are limited for the following reasons:

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

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

(422) (iii) EPIRBs manufactured before October 1989 may have design or construction problems (e.g. some models will



Notes

LUTs

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

SARSAT satellite

Altitude	850 km
Elevation Angle	5 deg

1988 Satellite Visibility Area of SARSAT LUTs

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

leak and cease operating when immersed in water), or may not be detectable by satellite.

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

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

(425) **406 MHz EPIRBs.**-The 406 MHz EPIRB was designed to operate with satellites. Its signal allows a satellite local user terminal to accurately locate the EPIRB (much more accurately than 121.5/243 MHz devices), and identify the vessel (the signal is encoded with the vessel's identity) anywhere in the world (there is no range limitation). These devices also include a 121.5 MHz homing signal, allowing aircraft and rescue craft to quickly find the vessel in distress. These are the only type of EPIRB which must be certified by Coast Guard approved independent laboratories before they can be sold in the United States.

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

(427) NOAA/NESDIS

(428) SARSAT Operations Division, E/SP3

(429) Federal Office Building 4

(430) Washington, DC 20233

(431) For additional information on registering these EPIRBs, call (301)763-4680 or fax (301)568-8649.

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

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

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

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

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

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

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

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

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

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

(442) **CAUTION: The latitude/longitude computation on some models is based upon an all seawater propagation path. This may lead to error if the LORAN-C signals from the various stations involve appreciable overland propagation paths. These errors may put the mariner at risk in areas requiring precise positioning if the proper correctors (ASF) are not applied. Therefore, it is recommended that mariners using Coordinate Converters check the manufacturer's operating manual to determine if and how corrections are to be applied to compensate for the discontinuity caused by the overland paths.**

(443) There are two types of LORAN-C accuracy: absolute and repeatable. Absolute accuracy is a measure of the navigator's ability to determine latitude and longitude position from the LORAN-C time differences measured. Repeatable accuracy is a measure of the LORAN-C navigator's ability

to return to a position where readings have been taken before.

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

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

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

(447) **LORAN-C Interference**

(448) Interference to LORAN-C may result from radio transmissions by public or private sources operating near the LORAN-C band of 90-110 kHz. Anyone using the LORAN-C system, who observes interference to LORAN-C, should promptly report it to one of the Coast Guard commands listed below. Include in such reports information regarding the date, time, identifying characteristics, strength of the interfering signals and your own vessel's position. These interference reports are very important and cooperation from users of LORAN-C will assist the Coast Guard in improving LORAN-C service.

(449) **Atlantic Ocean and Gulf of Mexico**
(450) Commander (Atl)
(451) Atlantic Area, U.S. Coast Guard
(452) Governors Island
(453) New York, NY 10004-5000
(454) **Pacific Ocean**
(455) Commander (Ptl)
(456) Pacific Area, U.S. Coast Guard
(457) Coast Guard Island
(458) Alameda, CA 94501-5100
(459) **All areas**
(460) Commandant (G-NRN)
(461) U.S. Coast Guard
(462) Washington, DC 20593-0001

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

(464) Navigational charts overprinted with LORAN-C lines of position are published by the National Ocean Service (NOS), Distribution Branch (N/CG33), 6501 Lafayette Avenue, Riverdale, MD 20737-1199 and the Defense Mapping Agency (DMA), Combat Support Center, Code: PMSR, Washington, DC 20315-0010, and may be purchased directly from NOS or DMA, or through local chart sales agents.

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

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

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

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

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

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

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

(472) **Tsunamis (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.

(473) 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.

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

(475) 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.

(476) Improvements have been made in the quick determination and reporting of earthquake epicenters, but no method has yet been perfected for determining whether a sea wave will result from a given earthquake. The Pacific Tsunami Warning Center, Oahu, Hawaii, of the National Oceanic and Atmospheric Administration is headquarters of a warning system which has field reporting stations (seismic and tidal) in most countries around the Pacific. When a warning is broadcast, waterfront areas should be vacated for higher ground, and ships in the vicinity of land should head for the deep water of the open sea.

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

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

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

SPECIAL SIGNALS FOR CERTAIN VESSELS

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

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

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

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

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

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

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

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

(488) **Inland waters (Inland Rules):**

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

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

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

(492) **High seas (International Rules):**

(493) DAY, three black shapes in a vertical line at least 5 feet (1.5 meters) apart, the highest and lowest being globular shapes and the middle being a diamond shape, each not less than 2 feet (0.6 meter) in diameter. On vessels of less than 65 feet (20 meters) in length, the size of the shapes and the distance between them may be reduced in correspondence with the size of the vessel.

(494) NIGHT, three lights in a vertical line not less than 6 feet (2 meters) apart, the highest and lowest being red and the middle being white in color. On vessels of less than 65 feet (20 meters) in length, the lights shall be not less than 3 feet (1 meter) apart.

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

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

(497) Vessels or formations showing these signals indicate that it is dangerous for another vessel to approach within 1,000 meters (3,280 feet) of the mineclearance vessel. Under no circumstances is a vessel to pass through a formation of minesweepers. Minesweepers should be prepared to warn merchant vessels which persist in approaching too close by means of any of the appropriate signals from the International Code of Signals. In fog, mist, falling snow, heavy rainstorms, or any other condition similarily restricting visibility, whether by day or night, minesweepers while towing sweeps when in the vicinity of other vessels will sound whistle signals for a vessel towing (one prolonged blast followed by two short blasts).

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

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

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

(501) **Submarine emergency identification signals.**–U.S. submarines are equipped with signal ejectors submarines are equipped with signal ejectors which may be used to launch identification signals, including emergency signals. Two general types of signals may be used: smoke floats and flares or stars. The smoke floats, which burn on the surface, produce a dense colored smoke for a period of 15 to 45 seconds. The flares or stars are propelled to a height of 300 to 400 feet from which they descend by small parachute. The flares or stars burn for about 25 seconds. The color of the smoke or flare/star has the following meaning:

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

(503) **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.

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

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

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

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

NAVIGATION RESTRICTIONS AND REQUIREMENTS

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

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

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

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

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

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

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

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

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

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

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

(519) (iii) normally join or leave a traffic lane at the termination of the lane, but when joining or leaving from either

side shall do so at as small an angle to the general direction of traffic flow as practicable.

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

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

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

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

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

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

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

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

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

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

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

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

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

(533) 7. The signal "YG" meaning "You appear not to be complying with the traffic separation scheme" is provided in the International Code of Signals for appropriate use.

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

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

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

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

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

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

(540) **Other requirements for the protection of navigable waters.**–It is not lawful to tie up or anchor vessels or to float lograft 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.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(555) **U.S. Fishery Conservation Zone.**– The United States exercises exclusive fishery management authority over all species of fish, except tuna, within the fishery conservation zone, whose seaward boundary is 200 miles from the baseline from which the U.S. territorial sea is measured; all anadromous species which spawn in the United States throughout their migratory range beyond the fishery conservation zone, except within a foreign country's equivalent fishery zone as recognized by the United States; all U.S. Continental Shelf fishery resources beyond the fishery conservation zone. Such resources include American lobster and species of coral, crab, abalone, conch, clam, and sponge, among others.

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

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

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

(559) The Vessel Bridge-to-Bridge Radiotelephone Regulations, effective January 1, 1973, require vessels subject to the Act while navigating to be equipped with at least one single channel transceiver capable of transmitting and receiving on VHF-FM channel 13 (156.65 MHz), the Bridge-to-Bridge

Radiotelephone frequency. Vessels with multichannel equipment are required to have an additional receiver so as to be able to guard VHF-FM channel 13 (156.65 MHz), the Bridge-to-Bridge Radiotelephone frequency, in addition to VHF-FM channel 16 (156.80 MHz), the National Distress, Safety and Calling frequency required by Federal Communications Commission regulations. (See 26.01 through 26.10, chapter 2, for Vessel Bridge-to-Bridge Radiotelephone Regulations.)

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

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

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

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

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

Channel	Ship Frequency (MHz) Transmit	Receive	Channel Usage
1A	156.050	156.050	Port operations and commercial
5A	156.250	156.250	Port operations
6	156.300	156.300	Intership safety
7A	156.350	156.350	Commercial
8	156.400	156.400	Commercial (ship-to-ship only)
9	156.450	156.450	Non-commercial
10	156.500	156.500	Commercial
11	156.550	156.550	Commercial
12	156.600	156.600	Port operations (traffic advisories, including VTS in some ports)
13	156.650	156.650	Navigational (ship-to-ship), also used at locks and bridges
14	156.700	156.700	Port operations (traffic advisories, including VTS in some ports)
16	156.800	156.800	Distress, safety and calling
17	156.850	156.850	State or local government control
18A	156.900	156.900	Commercial
19A	156.950	156.950	Commercial
20	157.000	161.600	Port operations (traffic advisories)
22A	157.100	157.100	Coast Guard Liaison
24	157.200	161.800	Public correspondence (ship-to-coast)
25	157.250	161.850	Public correspondence (ship-to-coast)
26	157.300	161.900	Public correspondence (ship-to-coast)
27	157.350	161.950	Public correspondence (ship-to-coast)
28	157.400	162.000	Public correspondence (ship-to-coast)
63A	156.175	156.175	VTS New Orleans
65A	156.275	156.275	Port operations (traffic advisories)
66A	156.325	156.325	Port operations (traffic advisories)
67	156.375	156.375	Commercial (ship-to-ship only) (used in New Orleans VTS for ship-to-ship navigational purposes)
68	156.425	156.425	Non-commercial
69	156.475	156.475	Non-commercial
71	156.575	156.575	Non-commercial
72	156.625	156.625	Non-commercial (ship-to-ship only)
73	156.675	156.675	Port operations (traffic advisories)
74	156.725	156.725	Port operations (traffic advisories)
77	156.875	156.875	Port operations (ship-to-ship, to and from pilots docking ships)
78A	156.925	156.925	Non-commercial
79A	156.975	156.975	Commercial
80A	157.025	157.025	Commercial
84	157.225	161.825	Public correspondence (ship-to-coast)
85	157.275	161.875	Public correspondence (ship-to-coast)

Channel	Ship Frequency (MHz) Transmit	Receive	Channel Usage
86	157.325	161.925	Public correspondence (ship-to-coast)
87	157.375	161.975	Public correspondence (ship-to-coast)
88	157.425	162.025	Public correspondence in Puget Sound and parts of Great Lakes
88A	157.425	157.425	Commercial, fishing (ship-to-ship) (except in parts of Great Lakes)

2. NAVIGATION REGULATIONS

(1) This chapter contains sections from the **Code of Federal Regulations** that are of most importance in the areas covered by Coast Pilot 9. Included from **Title 33, Navigation and Navigable Waters (33 CFR),** are

(2) Part 26, Vessel Bridge-to-Bridge Radiotelephone Regulations;

(3) Part 67, Aids to Navigation on Artificial Islands and Fixed Structures (in part);

(4) Part 80, COLREGS Demarcation Lines;

(5) Part 110, Anchorage Regulations;

(6) Part 160, Ports and Waterways Safety-General;

(7) Part 161, Vessel Traffic Management;

(8) Part 162, Inland Waterways Navigation Regulations;

(9) Part 164, Navigation Safety Regulations (in part);

(10) Part 165, Regulated Navigation Areas and Limited Access Areas;

(11) Part 166, Shipping Safety Fairways;

(12) Part 334, Danger Zones and Restricted Area Regulations.

(13) Included from **Title 50, Wildlife and Fisheries (50 CFR),** are

(14) Part 227–Threatened Fish and wildlife.

(15) **Note.**–These regulations can only be amended by the enforcing agency or other authority cited in the regulations. Accordingly, requests for changes to these regulations should be directed to the appropriate agency for action. In those regulations where the enforcing agency is not cited or is unclear, recommendations for changes should be directed to the following Federal agencies for action: U.S. Coast Guard (33 CFR 26, 67, 80, 110, 160, 161, 162, 164, 165, and 166); U.S. Army Corps of Engineers (33 CFR 334); National Oceanic and Atmospheric Administration (50 CFR 227).

Part 26–Vessel Bridge-to-Bridge Radiotelephone Regulations

(16) **§26.01 Purpose.**

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

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

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

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

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

(22) **§26.02 Definitions.**

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

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

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

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

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

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

(29) **§26.03 Radiotelephone required.**

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

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

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

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

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

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

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

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

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

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

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

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

(42) **§26.04 Use of the designated frequency.**

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

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

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

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

(47) **§26.05 Use of radiotelephone.** Section 5 of the Act states–

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

(49) **§26.06 Maintenance of radiotelephone; failure of radiotelephone.** Section 6 of the Act states–

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

(51) **§26.07 English language.** No person may use the services of, and no person may serve as a person required to maintain a listening watch under section 5 of the Act, 33 U.S.C. 1204 unless he can speak the English language.

(52) **§26.08 Exemption procedures.**

(53) (a) Any person may petition for an exemption from any provision of the Act or this part:

(54) (b) Each petition must be submitted in writing to U.S. Coast Guard Office of Navigation Safety and Waterway Services, 2100 Second Street SW., Washington, DC 20593-0001, and must state-

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

(56) (2) The reasons why marine navigation will not be adversely affected if the exemption is granted and if the exemption relates to a local communication system how that system would fully comply with the intent of the concept of the Act but would not conform in detail if the exemption is granted.

(57) **§26.09 List of exemptions.** (a) All vessels navigating on those waters governed by the navigation rules for Great Lakes and their connecting and tributary waters (33 U.S.C. 241 et seq.) are exempt from the requirements of the Vessel Bridge-to-Bridge Radiotelephone Act and this part until May 6, 1975.

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

(59) **§26.10 Penalties.** Section 9 of the Act states–

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

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

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

PART 67–AIDS TO NAVIGATION ON ARTIFICIAL ISLANDS AND FIXED STRUCTURES (in part)

SUBPART 67.01–GENERAL REQUIREMENTS

(63) **§67.01–1 Scope.**

(64) (a) The regulations in this part prescribe the obstruction lights and fog signals to be operated as privately maintained maritime aids to navigation on the artificial islands and structures which are erected on or over the seabed and subsoil of the Outer Continental Shelf and in the waters under the jurisdiction of the United States, for the purpose of exploring for, developing, removing and transporting resources therefrom.

(65) (b) Subpart 66.01 in Part 66 of this subchapter shall be applicable to all private aids to navigation erected on or over the Outer Continental Shelf in the same manner and to the same extent as they are applicable to private aids to navigation established, erected, or maintained in the waters under the jurisdiction of the United States.

(66) **§67.01–5 Definitions.**

(67) (a) Structures. The term "structures" as used in this part shall include all fixed structures, temporary or permanent, for which a Corps of Engineers' permit is issued. It shall include, but is not necessarily limited to, all drilling platforms, production platforms, quarters platforms, pipe line riser platforms, manifold platforms, loading platforms, boat landings, caissons, well protective structures, tank battery barges submerged on station, drilling barges submerged on location, breakwater barges submerged on location, artificial islands and all other piles, pile clusters, pipes, or structures erected in the waters.

(68) (b) Class "A", "B", or "C" structures. The term "Class A, B, or C structures" refers to the classification assigned to structures erected in areas in which corresponding requirements for marking are prescribed.

(69) (c) Line of demarcation. The term "line of demarcation" means the dividing line used administratively to distinguish between the areas in which structures shall conform to Class "A" and Class "B" or "C" requirements.

(70) (d) Outer Continental Shelf. The term "Outer Continental Shelf" means all submerged lands lying seaward and outside the area of lands beneath navigable waters as defined in the Submerged Lands Act (sec. 2, 67 Stat. 29, 43 U. S. C. 1301), and of which the subsoil and seabed appertain to the United States and are subject to its jurisdiction and control.

(71) (e) Reliable operation. The term "reliable" as used in this part shall mean that dependability which will insure to

the highest degree reasonably possible the uninterrupted operation of lights and fog signals as private aids to navigation for safety of marine commerce.

(72) (f) Fog signal. The term "fog signal" as used in this part shall mean the audible sound signal, authorized as a private aid to navigation, to mark a structure for the safety of marine commerce whenever the visibility has been reduced by fog, mist, rain, falling snow, smoke, dust, or other phenomena.

(73) **§67.01–10 Authority to regulate and delegation of functions.**

(74) (a) Regulatory authority. By virtue of the Department of Transportation Act (Pub. L. 89-670, 80 Stat. 931-950, 49 U. S. C. 1651-1659), establishing the Department of Transportation, the U.S. Coast Guard together with its functions and duties under the Secretary of the Treasury was transferred to the new department. The Secretary of Transportation thereby became the "head of the Department in which the Coast Guard is operating," including the authority to promulgate and enforce regulations under the Outer Continental Shelf Lands Act (43 U.S.C. 1333). By a rule in 49 CFR 1.9 the Secretary continued in effect actions taken prior to April 1, 1967. By rules in 49 CFR 1.4 (a) (2) and (f) the Secretary of Transportation authorized the Commandant, U.S. Coast Guard, with respect to his own organization, to exercise the authority granted to the Secretary as Executive head of that department by any statute, Executive order or regulation. Section 1657 (e) of Title 49 U. S. C. provides for delegation and redelegation of powers and functions vested in the Secretary. By a rule in 49 CFR 1.4 (g) the Commandant is authorized to redelegate and authorize successive redelegations within the organization under his jurisdiction.

(75) (b) Delegation of functions. The Coast Guard District Commander is hereby delegated responsibility for performing, or having performed the inspections, enforcement, and administration of such regulations, which are or may be required. He may redelegate this authority as necessary to any person from the civilian or military branch of the Coast Guard.

(76) **§67.01–15 Classification of structures.**

(77) (a) The varied depths of water and marine commerce traffic routes which exist in the waters over the Outer Continental Shelf, and in other waters, permit the classification of structures according to their location in such waters. Those structures in the area seaward of the line of demarcation, prescribed by the regulations in this part, are designated as Class "A" structures. All structures shoreward of the line of demarcation, prescribed by the regulations in this part, are designated as either Class "B" or Class "C" structures.

(78) (b) In the event a line of demarcation is not prescribed, the District Commander shall designate a structure "A", "B", or "C" as he deems appropriate.

(79) **§67.01–20 Prescribing lines of demarcation.**

(80) In those areas where lines of demarcation are not prescribed, or where they have been prescribed and require modification, the District Commander shall submit his recommendations thereon to the Commandant for establishment or changes as required. When approved by the Commandant, and upon publication in the Federal Register, such additions or changes in lines of demarcation shall be effective for the purposes of this part.

(81) **§67.01–30 Equivalents.**

(82) The use of alternate equipment, apparatus, or installation arrangements specified in this part may be permitted by the District Commander to such extent and under such conditions as will result in achieving a degree of safety or compliance with these regulations equivalent to or above the minimum requirements set forth in this part.

SUBPART 67.05–GENERAL REQUIREMENTS FOR LIGHTS

(83) **§67.05–1 Arrangement of obstruction lights.**

(84) (a) Structures having a maximum horizontal dimension of 30 feet or less on any one side, or in diameter, shall be required to have one obstruction light visible for 360°.

(85) (b) Structures having a maximum horizontal dimension of over 30 feet, but not in excess of 50 feet, on any one side, or in diameter, shall be required to have two obstruction lights installed on diagonally opposite corners, 180° apart, or as prescribed by the District Commander, each light to have a 360° lens.

(86) (c) Structures having a horizontal dimension of over 50 feet on any one side, or in diameter, shall be required to have an obstruction light on each corner, or 90° apart in the case of circular structures, or as prescribed by the District Commander, each light to have a 360° lens.

(87) (d) Where the overall dimensions of a structure require the installation of two or more obstruction lights, the lights shall all be mounted on the same horizontal plane within the limitations of height specified in §67.20–5, §67.25–5, or §67.30–5, as applicable.

(88) (e) Lesser structures and piles, pile clusters or flare templates, etc., will not normally be required to be marked by obstruction lights, when they are located within 100 yards of a Class "A", "B" or "C" structure marked by established obstruction lights, but they shall be marked with red or white retro-reflective material, installed as prescribed by the District Commander.

(89) (f) All obstruction lights shall be installed in a manner which will permit at least one of them to be carried in sight of the mariner, regardless of the angle of approach, until he is within 50 feet of the structure visibility permitting.

(90) **§67.05–5 Multiple obstruction lights.**

(91) When more than one obstruction light is required by this part to mark a structure, all such lights shall be operated to flash in unison.

(92) **§67.05–10 Characteristics of obstruction lights.**

(93) All obstruction lights required by this part shall be powered from a reliable power source, including auxiliary power sources as necessary. They shall display a quick-flash characteristic of approximately 60 flashes per minute, unless prescribed otherwise in the permit issued by the District Commander. Their color shall be white when marking Class "A" and "B" structures, and either white or red, as prescribed by the District Commander, when marking Class "C" structures. In determining whether white or red lights shall be authorized, the District Commander shall take into consideration matters concerning, but not necessarily limited to, the dimensions of the structure and the depth of water in which it is located; the proximity of the structure to vessel routes; the nature and amount of vessel traffic; and the effect of background lighting.

(94) **§67.05–15 Operating periods of obstruction lights.**

(95) Obstruction lights shall be displayed at all times between the hours of sunset and sunrise, local time, commencing at the time the construction of a structure is begun. During construction and until such time as a platform capable of supporting the obstruction lights is completed, the fixed lights on an attending vessel shall be used. In addition, when lights are in use for general illumination to facilitate the construction or operation of a structure, and can be seen from any angle of approach at a distance equal to that prescribed for the obstruction lights for the class of structure, the actual operation of obstruction lights also will not be required.

(96) **§67.05–20 Minimum lighting requirements.**

(97) The obstruction lighting requirements prescribed in this part are the minimum requirements only and shall not preclude the maintainer from making application for authorization to establish more lights, or lights of greater intensity than required to be visible at the distances prescribed: provided, that the prescribed characteristics of color and flash duration are adhered to.

(98) **§67.05–25 Special lighting requirements.**

(99) Whenever a structure is erected in a position on or adjacent to the edges of navigable channels and fairways, or lines of demarcation, the District Commander is authorized to require the structure to be marked by the lights which in his judgment are necessary for the safety of marine commerce, and without regard to the fact that the structure may be located in an area in which either Class "B" or Class "C" requirements are otherwise applicable. The requirements for the lights in any of these cases, shall not exceed those established for structures in the Class "A" areas.

SUBPART 67.10–GENERAL REQUIREMENTS FOR FOG SIGNALS

(100) **§67.10–1 Apparatus requirements.**

(101) The fog signal required by §§67.20–10, 67.25–10, and 67.30–10 must:

(102) (a) Have its maximum intensity at a frequency between 100 and 1,100 Hertz;

(103) (b) Sound a 2-second blast every 20 seconds (2 seconds sound, 18 seconds silence) unless otherwise authorized by the District Commander;

(104) (c) Have the range required by §67.20–10, §67.25–10, or §67.30–10;

(105) (d) Have a height not exceeding 25 feet;

(106) (e) Have not more than eight sound sources;

(107) (f) Be approved by the Coast Guard under §67.10–15; and

(108) (g) Be permanently marked with:

(109) (1) The date of Coast Guard approval;

(110) (2) The manufacturer and date of manufacture;

(111) (3) A model designation;

(112) (4) The approved range; and

(113) (5) The power necessary to comply with the provisions of paragraph (c) of this section.

(114) **§67.10–5 Location requirements.**

(115) The fog signal required by §§67.20–10, 67.25–10, and 67.30–10 must:

(116) (a) Be located on the structure so that the sound signal produced is audible over 360° in a horizontal plane at all ranges up to and including the required range; and

(117) (b) Be located at least 10 feet but not more than 150 feet above mean high water.

(118) **§67.10–10 Operating requirements.**

(119) (a) Fog signals required by §§67.20–10, 67.25–10 and 67.30–10 must be operated continuously, regardless of visibility, unless the fog signal is controlled:

(120) (1) By an attendant on the structure;

(121) (2) Remotely by an attendant on a nearby structure; or

(122) (3) By a fog detection device capable of activating the fog signal when the visibility in any direction is reduced to the range at which fog signal operation is required by this part.

(123) (b) During construction and until such time as a fog signal is installed and operating on a platform, the whistle of an attending vessel moored alongside the platform may be used to sound the signal required for the structure by this part.

(124) **§67.10–15 Approval of fog signals.**

(125) (a) The Coast Guard approves a fog signal if:

(126) (1) It meets the requirements for fog signals in §67.10–1(a), (b), (c), (d), and (e) when tested under §67.10–20; or

(127) (2) It is similar to a fog signal which was tested and approved under the provisions of this section and the Coast Guard has approved all variations in design, construction, production, and manufacture from the fog signal tested.

(128) (b) A fog signal that is an identical production model of a fog signal which has been approved under paragraph (a) of this section is a Coast Guard approved fog signal.

Part 80–COLREGS Demarcation Lines

(129) **§80.01 General basis and purpose of demarcation lines.** (a) The regulations in this part establish the lines of demarcation delineating those waters upon which mariners shall comply with the International Regulations for Preventing Collisions at Sea, 1972 (72 COLREGS) and those waters upon which mariners shall comply with the Inland Navigation Rules.

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

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

(132) **§80.1705 Alaska**

(133) The 72 COLREGS shall apply on all the sounds, bays, harbors, and inlets of Alaska.

Part 110.–Anchorage Regulations

(134) **§110.1 General.** (a) The areas described in Subpart A of this part are designated as special anchorage areas pursuant to the authority contained in an act amending laws for preventing collisions of vessels approved April 22, 1940 (54 Stat. 150); Article 11 of section 1 of the act of June 7, 1897, as amended (30 Stat. 98; 33 U.S.C. 180), Rule 9 of section 1 of the act of February 8, 1895, as amended (28 Stat. 647; 33 U.S.C. 258), and Rule Numbered 13 of section 4233 of the Revised Statutes as amended (33 U.S.C. 322). Vessels not more than 65 feet in length, when at anchor in any special anchorage area, shall not be required to carry or exhibit the white anchor lights required by the Navigation Rules.

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

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

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

Subpart A–Special Anchorage Areas (None applicable to this Coast Pilot.)

Subpart B–Anchorage Grounds

(138) **§110.233 Prince William Sound, Alaska.** (a) The anchorage grounds. In Prince William Sound, Alaska, beginning at a point at latitude 60°40′00″N., longitude 146°40′00″W.; thence south to

(139) 60°38′00″N., 146°40′00″W.; thence east to

(140) 60°38′00″N., 146°30′00″W.; thence north to

(141) 60°39′00″N., 146°30′00″W.; thence northwesterly to the beginning point.

(142) (b) The regulations. (1) This anchorage area is for the temporary use of vessels during:

(143) (i) Adverse weather or tidal conditions;

(144) (ii) Vessel equipment failure; or

(145) (iii) Delays at Port Valdez;

(146) (2) No vessel may anchor in this anchorage without notifying the vessel traffic center in Valdez; and

(147) (3) Each vessel anchored shall notify the vessel traffic center in Valdez when it weighs anchor.

Part 160–Ports and Waterways Safety-General

Subpart A–General

(148) **§160.1 Purpose.**

(149) (a) This subchapter contains regulations implementing the Ports and Waterways Safety Act (33 U.S.C. 1221) and related statutes.

(150) **§160.3 Definitions.**

(151) (a) For the purposes of this subchapter:

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

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

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

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

(156) (5) "State" means each of the several States of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Trust Territories of the Pacific Islands, the Commonwealth of the Northern Marianas Islands, and any other commonwealth, territory, or possession of the United States.

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

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

(159) **§160.5 Delegations.**

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

(161) (b) Under the provisions of 33 CFR 6.04-1 and 6.04-6, District Commanders and Captains of the Ports have been delegated authority to establish security zones.

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

(163) **§160.7 Appeals.**

(164) (a) Any person directly affected by a safety zone or an order or direction issued under this subchapter (33 CFR Subchapter P) may request reconsideration by the official who issued it or in whose name it was issued. This request may be made orally or in writing, and the decision of the official receiving the request may be rendered orally or in writing.

(165) (b) Any person directly affected by the establishment of a safety zone or by an order or direction issued by, or on behalf of, a Captain of the Port may appeal to the District Commander through the Captain of the Port. The appeal must be in writing, except as allowed under paragraph (d) of this section, and shall contain complete supporting documentation and evidence which the appellant wishes to have considered. Upon receipt of the appeal, the District Commander may direct a representative to gather and submit documentation or other evidence which would be necessary or helpful to a resolution of the appeal. A copy of this documentation and evidence is made available to the appellant. The appellant is afforded five working days from the date of receipt to submit rebuttal materials. Following submission of all materials, the District Commander issues a ruling, in writing, on the appeal. Prior to issuing the ruling, the District Commander may, as a matter of discretion, allow oral presentation on the issues.

(166) (c) Any person directly affected by the establishment of a safety zone or by an order or direction issued by a District Commander, or who receives an unfavorable ruling on an appeal taken under paragraph (b) of this section, may appeal through the District Commander to the Chief, Office of Marine Safety, Security and Environmental Protection, U.S. Coast Guard, Washington, D.C. 20593. The appeal must be in writing, except as allowed under paragraph (d) of this section. The District Commander forwards the appeal, all the documents and evidence which formed the record upon which the order or direction was issued or the ruling under paragraph (b) of this section was made, and any comments which might be relevant, to the Chief, Office of Marine Safety, Security and Environmental Protection. A copy of this documentation and evidence is made available to the appellant. The appellant is afforded five working days from the date of receipt to submit rebuttal materials to the Chief, Office of Marine Safety, Security and Environmental Protection. The decision of the Chief, Office of Marine Safety, Security and Environmental Protection is based upon the materials submitted, without oral argument or presentation. The decision of the Chief, Office of Marine Safety, Security and Environmental Protection is issued in writing and constitutes final agency action.

(167) (d) If the delay in presenting a written appeal would have significant adverse impact on the appellant, the appeal under paragraphs (b) and (c) of this section may initially be presented orally. If an initial presentation of the appeal is made orally, the appellant must submit the appeal in writing within five days of the oral presentation to the Coast Guard official to whom the presentation was made. The written appeal must contain, at a minimum, the basis for the appeal and a summary of the material presented orally. If requested, the official to whom the appeal is directed may stay the effect of the action while the ruling is being appealed.

Subpart B–Control of Vessel and Facility Operations

(168) **§160.101 Purpose.**

(169) This subpart describes the authority exercised by District Commanders and Captains of the Ports to insure the safety of vessels and waterfront facilities, and the protection of the navigable waters and the resources therein. The controls described in this subpart are directed to specific situations and hazards.

(170) **§160.103 Applicability.**

(171) (a) This subpart applies to any-

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

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

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

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

(176) (c) Except pursuant to international treaty, convention, or agreement, to which the United States is a party, this subpart does not apply to any foreign vessel that is not destined for, or departing from, a port or place subject to the jurisdiction of the United States and that is in-

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

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

(179) **§160.105 Compliance with orders.**

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

(181) **§160.107 Denial of entry.**

(182) Each District Commander or Captain of the Port, subject to recognized principles of international law, may deny entry into the navigable waters of the United States or to any port or place under the jurisdiction of the United States, and within the district or zone of that District Commander or Captain of the Port, to any vessel not in compliance with the provisions of the Port and Tanker Safety Act (33 U.S.C. 1221-1232) or the regulations issued thereunder.

(183) **§160.109 Waterfront facility safety.**

(184) (a) To prevent damage to, or destruction of, any bridge or other structure on or in the navigable waters of the United States, or any land structure or shore area immediately adjacent to those waters, and to protect the navigable waters and the resources therein from harm resulting from vessel or structure damage, destruction, or loss, each District Commander or Captain of the Port may-

(185) (1) Direct the handling, loading, unloading, storage, stowage, and movement (including the emergency removal, control, and disposition) of explosives or other dangerous articles and substances, including oil or hazardous material as those terms are defined in Section 4417a of the Revised Statutes, as amended, (46 U.S.C. 391a) on any structure on or in the navigable waters of the United States, or any land structure or shore area immediately adjacent to those waters; and

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

(187) **§160.111 Special orders applying to vessel operations.**

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

(189) (a) The District Commander or Captain of the Port has reasonable cause to believe that the vessel is not in compliance with any regulation, law or treaty;

(190) (b) The District Commander or Captain of the Port determines that the vessel does not satisfy the conditions for vessel operation and cargo transfers specified in §160.113; or

(191) (c) The District Commander or Captain of the Port has determined that such order is justified in the interest of safety by reason of weather, visibility, sea conditions, temporary port congestion, other temporary hazardous circumstances, or the condition of the vessel.

(192) **§160.113 Prohibition of vessel operation and cargo transfers.**

(193) (a) Each District Commander or Captain of the Port may prohibit any vessel subject to the provisions of section 4417a of the Revised Statutes (46 U.S.C. 391a) from operating in the navigable waters of the United States, or from transferring cargo or residue in any port or place under the jurisdiction of the United States, and within the district or zone of that District Commander or Captain of the Port, if the District Commander or the Captain of the Port determines that the vessel's history of accidents, pollution incidents, or serious repair problems creates reason to believe that the vessel may be unsafe or pose a threat to the marine environment.

(194) (b) The authority to issue orders prohibiting operation of the vessels or transfer of cargo or residue under paragraph (a) of this section also applies if the vessel:

(195) (1) Fails to comply with any applicable regulation;

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

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

(198) (4) While underway, does not have at least one licensed deck officer on the navigation bridge who is capable of communicating in the English language.

(199) (c) When a vessel has been prohibited from operating in the navigable waters of the United States under paragraphs (a) or (b) of this section, the District Commander or Captain of the Port may allow provisional entry into the navigable waters of the United States, or into any port or place under the jurisdiction of the United States and within the district or zone of that District Commander or Captain of the Port, if the owner or operator of such vessel proves to the satisfaction of the District Commander or Captain of the Port, that the vessel is not unsafe or does not pose a threat to the marine environment, and that such entry is necessary for the safety of the vessel or the persons on board.

(200) (d) A vessel which has been prohibited from operating in the navigable waters of the United States, or from transferring cargo or residue in a port or place under the jurisdiction of the United States under the provisions of paragraph (a) or (b)(1), (2) or (3) of this section, may be allowed provisional entry if the owner or operator proves, to the satisfaction of the District Commander or Captain of the Port that has jurisdiction, that the vessel is no longer unsafe or a threat to the environment, and that the condition which gave rise to the prohibition no longer exists.

(201) **§160.115 Withholding of clearance.**

(202) (a) Each District Commander or Captain of the Port may request the Secretary of the Treasury, or the authorized representative thereof, to withhold or revoke the clearance required by 46 U.S.C. 91 of any vessel, the owner or operator of which is subject to any penalties under 33 U.S.C. 1232.

Subpart C–Notifications of Arrivals, Departures, Hazardous Conditions, and Certain Dangerous Cargoes

(203) **§160.201 Applicability and exceptions to applicability.**

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

(205) (b) This part does not apply to recreational vessels under 46 U.S.C. 4301 et seq. and, except §160.215, does not apply to passenger and supply vessels when they are employed in the exploration for or in the removal of oil, gas, or mineral resources on the continental shelf.

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

(207) (1) Each vessel of less than 1600 gross tons, except foreign vessels of less than 1600 gross tons entering ports or places in the Miami Captain of the Port Zone as described in §3.35-10(b) of this chapter.
(208) (2) Each vessel operating exclusively within a Captain of the Port zone.
(209) (3) Each vessel operating upon a route that is described in a schedule that is submitted to the Captain of the Port for each port or place of destination listed in the schedule at least 24 hours in advance of the first date and time of arrival listed on the schedule and contains–
(210) (i) Name, country of registry, and call sign or official number of the vessel;
(211) (ii) Each port or place of destination; and
(212) (iii) Dates and times of arrivals and departures at those ports or places.
(213) (4) Each vessel arriving at a port or place under force majeure.
(214) (5) Each vessel entering a port of call in the United States in compliance with the Automated Mutual Assistance Vessel Rescue System (AMVER).
(215) (6) Each vessel entering a port of call in the United States in compliance with the U.S. Flag Merchant Vessel Locator Filing System (USMER).
(216) (7) Each barge.
(217) (8) Each public vessel.
(218) (9) United States or Canadian flag vessels, except tank vessels or vessels carrying certain dangerous cargo, which operate solely on the Great Lakes.
(219) (d) Sections 160.207, 160.211, and 160.213 apply to each vessel upon the waters of the Mississippi River between its mouth and mile 235, Lower Mississippi River, above Head of Passes. Sections 160.207, 160.211, and 160.213 do not apply to each vessel upon the waters of the Mississippi River between its sources and mile 235, above Head of Passes, and all the tributaries emptying thereinto and their tributaries, and that part of the Atchafalaya River above its junction with the Plaquemine-Morgan City alternate waterway, and the Red River of the North.
(220) **§160.203 Definitions.**
(221) As used in this subpart:
(222) "Agent" means any person, partnership, firm, company or corporation engaged by the owner or charterer of a vessel to act in their behalf in matters concerning the vessel.
(223) "Carried in bulk" means a commodity that is loaded or carried on board a vessel without containers or labels and received and handled without mark or count.
(224) "Certain dangerous cargo" includes any of the following:
(225) (a) Class A explosives, as defined in 46 CFR 146.20–7 and 49 CFR 173.53.
(226) (b) Oxidizing materials or blasting agents for which a permit is required under 49 CFR 176.415.
(227) (c) Highway route controlled quantity radioactive material, as defined in 49 CFR 173.403(l), or Fissile Class III shipments of fissile radioactive material, as defined in 49 CFR 173.455(a)(3).
(228) (d) Each cargo under Table 1 of 46 CFR Part 153 when carried in bulk.
(229) (e) Any of the following when carried in bulk:
(230) Acetaldehyde
(231) Ammonia, anhydrous
(232) Butadiene
(233) Butane
(234) Butene
(235) Butylene Oxide
(236) Chlorine
(237) Ethane
(238) Ethylene
(239) Ethylene Oxide
(240) Methane
(241) Methyl Acetylene, Propadiene Mixture, Stablized
(242) Methyl Bromide
(243) Methyl Chloride
(244) Phosphorous, elemental
(245) Propane
(246) Propylene
(247) Sulfur Dioxide
(248) Vinyl Chloride
(249) "Great Lakes" means Lakes Superior, Michigan, Huron, Erie, and Ontario, their connecting and tributary waters, the Saint Lawrence River as far east as Saint Regis, and adjacent port areas.
(250) "Hazardous condition" means any condition that could adversely affect the safety of any vessel, bridge, structure, or shore area or the environmental quality of any port, harbor, or navigable water of the United States. This condition could include but is not limited to, fire, explosion, grounding, leakage, damage, illness of a person on board, or a manning shortage.
(251) "Port or place of departure" means any port or place in which a vessel is anchored or moored.
(252) "Port or place of destination" means any port or place to which a vessel is bound to anchor or moor.
(253) "Public vessel" means a vessel owned by and being used in the public service of the United States. This definition does not include a vessel owned by the United States and engaged in a trade or commercial service or a vessel under contract or charter to the United States.
(254) **§160.205 Waivers.**
(255) The Captain of the Port may waive, within that Captain of the Port's designated zone, any of the requirement of this subpart for any vessel or class of vessels upon finding that the vessel, route, area of operations, conditions of the voyage, or other circumstances are such that application of this subpart is unnecessary or impractical for purposes of safety, environmental protection, or national security.
(256) **§160.207 Notice of arrival: vessels bound for ports or places in the United States.**
(257) (a) The owner, master, agent or person in charge of a vessel on a voyage of 24 hours or more shall report under paragraph (c) of this section at least 24 hours before entering the port or place of destination.
(258) (b) The owner, master, agent, or person in charge of a vessel on a voyage of less than 24 hours shall report under paragraph (c) of this section before departing the port or place of departure.
(259) (c) The Captain of the Port of the port or place of destination in the United States must be notified of:
(260) (1) The name, country of registry, and call sign or official number of the vessel;
(261) (2) The name of the port or place of departure.
(262) (3) The name of the port or place of destination; and
(263) (4) The estimated time of arrival at the port or place.
(264) If the estimated time of arrival changes by more than six hours from the latest reported time, the Captain of the port must be notified of the correction as soon as the change is known.
(265) **§160.209 [Reserved]**
(266) **§160.211 Notice of arrival: vessels carrying certain dangerous cargo.**
(267) (a) The owner, master, agent, or person in charge of a vessel, except a barge, bound for a port or place in the United States carrying certain dangerous cargo shall notify the Captain of the Port of the port or place of destination at least 24 hours before entering that port or place of–

(268) (1) The name, country of registry, and call sign or official number of the vessel;
(269) (2) The location of the vessel at the time of the report;
(270) (3) The name of each certain dangerous cargo carried;
(271) (4) The amount of each certain dangerous cargo carried;
(272) (5) The stowage location of each certain dangerous cargo;
(273) (6) The operational condition of the equipment under 33 CFR 164.35;
(274) (7) The name of the port or place of destination; and
(275) (8) The estimated time of arrival at that port or place. If the estimated time of arrival changes by more than six hours from the latest reported time, the Captain of the port must be notified of the correction as soon as the change is known.
(276) (b) The owner, master, agent or person in charge of a barge bound for a port or place in the United States carrying certain dangerous cargo shall report the information required in paragraph (a)(1) through (a)(8) of this section to the Captain of the Port of the port or place of destination at least 4 hours before entering that port or place.
(277) **§160.213 Notice of departure; vessels carrying certain dangerous cargo.**
(278) (a) The owner, master, agent, or person in charge of a vessel, except a barge, departing from a port or place in the United States for any other port or place and carrying certain dangerous cargo shall notify the Captain of the Port or place of departure at least 24 hours before departing, unless this notification was made within 2 hours after the vessel's arrival, of–
(279) (1) The name, country of registry, and call sign or official number of the vessel;
(280) (2) The name of each certain dangerous cargo carried;
(281) (3) The amount of each certain dangerous cargo carried;
(282) (4) The stowage location of each certain dangerous cargo carried;
(283) (5) The operational condition of the equipment under 33 CFR 164.35;
(284) (6) The name of the port or place of departure; and
(285) (7) The estimated time of departure from the port or place.
(286) If the estimated time of departure changes by more than six hours from the latest reported time, the Captain of the Port must be notified of the correction as soon as the change is known.
(287) (b) The owner, master, agent, or person in charge of a barge departing from a port or place in the United States for any other port or place and carrying certain dangerous cargo shall report the information required in paragraph (a)(1) through (a)(7) of this section to the Captain of the Port of the port or place of departure at least 4 hours before departing, unless this report was made within 2 hours after the barge's arrival.
(288) **§160.215 Notice of hazardous conditions.**
(289) Whenever there is a hazardous condition on board a vessel, the owner, master, agent or person in charge shall immediately notify the Captain of the Port of the port or place of destination and the Captain of the Port of the port or place in which the vessel is located of the hazardous condition.

Part 161 Vessel Traffic Management

Subpart A–(Reserved)

Subpart B–Vessel Traffic Services

Prince William Sound Vessel Traffic Service

(290) **GENERAL RULES**
(291) **§161.301 Purpose and applicability.** (a) Sections 161.301 through 161.387 prescribe rules for vessel operation in the Prince William Sound Vessel Traffic Service Area (VTS Area) to prevent collisions and groundings and to protect the navigable waters of the VTS Area from environmental harm resulting from collisions and groundings.
(292) (b) The General Rules in §§161.301 through 161.311 excepting §161.306 and the Traffic Separation Scheme (TSS) Rules in §§161.350 through 161.354 and 161.356(b) and (c) apply to the operation of all vessels.
(293) (c) General Rule §161.306, the Communication Rules in §161.320 through §161.332, the Vessel Movement Reporting Rules in §§161.334 through 161.342, the TSS Rules in §§161.348 and 161.356(a), and the Valdez Narrows Rules in §161.372 and §161.374 apply only to the operation of:
(294) (1) Each vessel of 300 or more gross tons that is propelled by machinery;
(295) (2) Each vessel of 100 or more gross tons that is carrying one or more passengers for hire;
(296) (3) Each commercial vessel of 26 feet (8 meters) or over in length engaged in towing another vessel astern, alongside, or by pushing ahead; and
(297) (4) Each dredge and floating plant.
(298) (d) Geographic coordinates expressed in terms of latitude or longitude, or both, are not intended for plotting on maps or charts whose referenced horizontal datum is the North American Datum of 1983 (NAD 83), unless such geographic coordinates are expressly labeled NAD 83. Geographic coordinates without the NAD 83 reference my be plotted on maps or charts referenced to NAD 83 only after application of the appropriate corrections that are published on the particular map or chart being used.
(299) **§161.303 Definitions.**
(300) As used in §§161.301 through 161.387:
(301) "ETA" means estimated time of arrival.
(302) "Person" includes an individual, firm, corporation, association, partnership, and governmental entity.
(303) "Separation zone" means an area of the TSS that is located between two traffic lanes to keep vessels proceeding in opposite directions a safe distance apart.
(304) "Traffic lane" means an area of the TSS in which all vessels ordinarily proceed in the same direction.
(305) "Traffic separation scheme" (TSS) means the network of traffic lanes and separation zones in the VTS Area.
(306) "Vessel Traffic Center" (VTC) means the shore based facility that operates the Prince William Sound Vessel Traffic Service.
(307) "Vessel Traffic Service Area" (VTS Area) means the area described in §161.380.
(308) "Tank Vessel" means any vessel specially constructed or converted to carry oil or other hazardous substances in bulk in the cargo spaces.
(309) "Laden Tank Vessel" means a tank vessel having cargo on board in excess of normal clingage or residual.
(310) **§161.304 Vessel operation in the VTS Area.**
(311) No person may cause or authorize the operation of a vessel in the VTS Area contrary to the rules in §§161.301 through 161.387.
(312) **§161.305 Laws and regulations not affected.**

(313) Nothing in §161.301 through §161.387 is intended to relieve any person from complying with:

(314) (a) International Regulations for Preventing Collisions at Sea, 1972;

(315) (b) Vessel Bridge-to-Bridge Radiotelephone Regulations (33 CFR 26);

(316) (c) The Federal Boat Safety Act of 1971 (46 U.S.C. 1451 through 1489); and

(317) (d) Any other law or regulation.

(318) **§161.306 VTS Operating Manual.**

(319) The master of a vessel listed in §161.301(c) shall ensure that a copy of the current edition of the Prince William Sound Vessel Traffic Service Operating Manual is available on board the vessel when it is in the VTS Area.

(320) **Note.**–The Prince William Sound VTS Operating Manual includes VTS regulations, navigation information, and guidelines for the efficient operation of the VTS system. The manual may be obtained in person or writing: Prince William Sound Vessel Traffic Service, c/o USCG Marine Safety Office, P.O. Box 486, Valdez, Alaska 99686; or Commander, Seventeenth Coast Guard District, Federal Building, P.O. Box 3–5000, Juneau, Alaska 99802. Temporary changes to the operating manual are promulgated by the Commander, Seventeenth Coast Guard District, in local notices to mariners.

(321) **§161.307 VTC directions.** (a) During conditions of vessel congestion, adverse weather, reduced visibility, or other hazardous circumstances in the VTS Area, the VTC may issue directions specifying times when vessels may enter, move within or through, or depart from ports, harbors, or other waters in the VTS Area.

(322) (b) The master of a vessel in the VTS Area shall comply with each direction issued to the vessel under this section.

(323) **§161.309 Authorization to deviate from these rules.** (a) The Commander, Seventeenth Coast Guard District may, upon written request, issue an authorization to deviate from any rule in §161.301 through §161.387 if he finds that the proposed operation under the authorization can be done safely. An application for an authorization must state the need for the authorization and describe the proposed operations.

(324) (b) The VTC may, upon request, issue an authorization to deviate from any rule in §161.301 through §161.387 for a voyage or part of a voyage on which a vessel is embarked or about to embark.

(325) **§161.311 Emergencies.**

(326) In an emergency, any master may deviate from any rule in §161.301 through §161.387 to the extent necessary to avoid endangering persons, property, or the environment.

(327) **COMMUNICATIONS RULES**

(328) **§161.320 Radio listening watch.**

(329) The master of a vessel in the VTS Area shall continuously monitor the radio frequency designated in the current edition of the Prince William Sound VTS Operating Manual for the sector of the VTS Area in which the vessel is operating, except when transmitting on that frequency.

(330) **§161.322 Radiotelephone equipment.**

(331) Each report required by the Prince William Sound VTS rules to be made by radiotelephone must be made using a radiotelephone that is capable of operating on the navigational bridge of the vessel, or in the case of a dredge, at its main control station.

(332) **§161.324 English language.**

(333) Each report required by the Prince William Sound VTS rules must be made in the English language.

(334) **§161.326 Time.**

(335) Each report required by the Prince William Sound VTS rules must specify time using:

(336) (a) The zone time in effect in the VTS Area; and

(337) (b) The 24-hour clock system.

(338) **§161.328 Radio failure.**

(339) Whenever a vessel's radiotelephone equipment fails:

(340) (a) Before entering or while underway in the VTS Area-

(341) (1) Compliance with §161.320 and §161.338 is not required; and

(342) (2) Compliance with §161.334, §161.336, and §161.342 is not required unless the reports can be made by other means;

(343) (b) Before getting underway in the VTS Area permission to get underway must be obtained from the VTC;

(344) (c) The master shall restore the radiotelephone to operating condition as soon as possible.

(345) **§161.330 Report of emergency or radio failure.**

(346) Whenever the master of a vessel deviates from any rule in §161.301 to §161.387 because of an emergency or radio failure, he shall report the deviation to the VTC as soon as possible.

(347) **§161.332 Report of impairment to the operation of the vessel.**

(348) The master of a vessel in the VTS Area shall report to the VTC as soon as possible:

(349) (a) Any condition on the vessel that may impair its navigation, such as fire, defective steering equipment, or defective propulsion machinery; and

(350) (b) Any tow that the towing vessel is unable to control, or can control only with difficulty.

(351) **VESSEL MOVEMENT REPORTING RULES**

(352) **§161.334 Initial Report.**

(353) Three hours before a vessel enters or begins to navigate in the VTS Area through Hinchinbrook Entrance or at least 30 minutes before a vessel enters or begins to navigate in the VTS Area from other points, the master of the vessel shall report to the VTC:

(354) (a) Name, type, and draft of the vessel;

(355) (b) Position of the vessel;

(356) (c) Estimated time and place of entering or beginning to navigate in the VTS Area;

(357) (d) Estimated vessel speed to transit the VTS Area;

(358) (e) ETA to the destination in the VTS Area and name of the destination;

(359) (f) If the vessel is a towing vessel, the overall length of the tow, including the towing vessel;

(360) (g) Whether or not any dangerous cargo listed in §161.3 of this chapter is on board the vessel or its tow;

(361) (h) Any impairment to the operation of the vessel as described in §161.332;

(362) (i) Alternate communications, if any;

(363) (j) Any other information requested by the VTC.

(364) **§161.336 Follow-up report.**

(365) At least 60 minutes before a vessel enters or begins to navigate in the VTS Area through Hinchinbrook entrance the master of the vessel shall report the following information to the VTC:

(366) (a) Name of the vessel;

(367) (b) Position of the vessel;

(368) (c) Course and speed of the vessel;

(369) (d) ETA at Hinchinbrook Entrance;

(370) (e) ETA of the vessel at its destination if changed from the preliminary report.

(371) **§161.338 Movement reports.** (a) While navigating in the VTS Area the master of a vessel shall report the following information to the VTC by radiotelephone:

(372) (1) Any increase or decrease in speed of more than 1 knot.

(373) (2) The intent to cross through the TSS at least 10 minutes (for vessels with a tow at least 30 minutes) before beginning to cross the TSS.

(374) (3) When the vessel clears the TSS after crossing.

(375) (b) When the vessel passes a reporting point listed in §161.340, the master of a vessel shall report the following information to the VTC by radiotelephone:

(376) (1) The name of the vessel;

(377) (2) The reporting point.

(378) **§161.340 Reporting points.**

(379) The reporting points are:

(380) (a) When entering or departing the VTS Area at Hinchinbrook Entrance; and

(381) (b) When abeam of Naked Island.

(382) **§161.342 Final report.**

(383) Whenever a vessel anchors, moors in, or departs from the VTS Area, the master shall report the place and time of anchoring, mooring, or departing to the VTC, except:

(384) (a) When mooring or anchoring in Port Valdez, unless requested to do so by the VTC; or

(385) (b) When departing the VTS Area at Hinchinbrook Entrance and the movement report for the reporting point in §161.340(a) is made.

(386) **TRAFFIC SEPARATION SCHEME RULES**

(387) **§161.348 Vessels required to use the TSS.**

(388) All vessels described in §161.301(c) must use the TSS when en route to or from Valdez via Hinchinbrook Entrance or navigating any portion of that route.

(389) **§161.350 Vessel operation in the TSS.**

(390) (a) The master of a vessel shall operate the vessel in accordance with the TSS rules prescribed in §§161.352, 161.354 and 161.356(b) and (c).

(391) (b) The master of a vessel described in §161.301(c) shall, in addition to paragraph (a), operate the vessel in accordance with §161.356(a).

(392) **§161.352 Direction of traffic.**

(393) A vessel proceeding in a traffic lane must keep the separation zone to port.

(394) **§161.354 Anchoring in the TSS.**

(395) No vessel may anchor in the TSS.

(396) **§161.356 Joining, leaving, and crossing a traffic lane.** (a) A vessel described in §161.301(c) may join, cross, or leave a traffic lane only after the VTC has been notified of the point at which the vessel will join, cross, or leave the traffic lane.

(397) (b) A vessel crossing a traffic lane shall, to the extent possible, maintain a course that is perpendicular to the direction of the flow of traffic in the traffic lane.

(398) (c) A vessel joining or leaving a traffic lane shall steer a course to converge on or diverge from the direction of traffic flow in the traffic lane at as small an angle as possible.

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

(400) (e) A vessel of less than 65 feet (20 meters) in length or a sailing vessel shall not impede the safe passage of a power-driven vessel following a traffic lane.

(401) **VALDEZ NARROWS RULES**

(402) **§161.370 One-way traffic in Valdez Narrows.** (a) The area described in §161.387 is designated the Valdez Narrows One-way Traffic Area and is restricted to one-way traffic whenever a tank vessel of 20,000 deadweight tons (DWT) or more is navigating therein.

(403) (b) A tank vessel of 20,000 DWT or more may enter Valdez Narrows One-Way Traffic Area unless:

(404) (1) It complies with §161.372; and

(405) (2) It complies with §161.376(a) (1), (3), and (4).

(406) **§161.372 Entering Valdez Narrows.**

(407) A vessel described in §161.301(c), may not enter the Valdez Narrows One-Way Traffic Area, unless:

(408) (a) Permission to enter is obtained from the VTC;

(409) (b) Any directions from the VTC to remain separated from another vessel are complied with;

(410) (c) The radio equipment on the vessel that is used to transmit the reports required by the Prince William Sound VTS rules is in operation;

(411) (d) The radar on a vessel equipped with radar is in operation and manned; and

(412) (e) The vessel is free of any condition that may impair its navigation, such as fire, defective steering equipment, or defective propulsion machinery.

(413) **§161.374 Communications in Valdez Narrows.**

(414) Before a vessel meets, overtakes, or crosses ahead of any vessel in Valdez Narrows One-Way Traffic Area, the master or the person designated by the master to pilot or direct the movement of the vessel shall transmit the intentions of his vessel to the master or the person designated by the master to pilot or direct the movement of the other vessel on the frequency designated under the Bridge-to-Bridge Radiotelephone Act for the purpose of arranging safe passage.

(415) **SPECIAL REQUIREMENTS FOR TANK VESSELS**

(416) **§161.376 Tank vessels in the VTS Area.** (a) Each tank vessel of 20,000 DWT or more operating in the VTS Area must:

(417) (1) Have two separate marine radar systems for surface navigation, one of which is operating and the other either operating or capable of immediate operation;

(418) (2) Have an operating Loran-C receiver;

(419) (3) Have an operating rate of turn indicator; and

(420) (4) Have at least two radiotelephones capable of operating on the designated VTS frequency, one of which is capable of battery operation.

(421) (5) Not later than July 1, 1994, have an operating Automated Dependent Surveillance Shipborne Equipment (ADSSE) consisting of a 12 channel all-in-view Differential Global Positioning System (DCPS) receiver, a marine band Non-Directional Beacon receiver capable of receiving differential GPS error correction messages, a VHF/FM transceiver using Digital Selective Calling (DSC) on channel 70 (156.525 MHz), and a control unit.

(422) (i) The ADSSE must have the following capabilities:

(423) (A) Using differential GPS, sense the position of the tank vessel and determine time of the position, Universal Coordinated Time (UTC).

(424) (B) Fully utilize the broadcast type 1,2,3,5,6,7,9, and 16 messages as specified in RTCM Recommended Standards for Differential NAVSTAR GPS Service, Version 2.0, dated January 1, 1990, in determining the required information;

(425) (C) Achieve a position error which is less than 10 meters (32.8 feet) 2 distance root mean square (2 drms) from the true North American Datum of 1983 (NAD 83) position as transmitted to the VTC;

(426) (D) Achieve a course error which is less than 0.5 degrees from true course over ground as transmitted to the VTC and a speed error which is less than 0.05 knots from true speed over ground as transmitted to the VTC.

(427) (E) Receive and act upon commands from the VTC broadcast as DSC messages on channel 70 (156.525 MHz);

(428) (F) Transmit the vessel's position, which is tagged with the UTC at position, solution, and the vessel's course

over ground, speed over ground, and vessel's Lloyd's identification number to the VTC;

(429) (G) Receive and act upon the RTCM messages which are broadcast as minimum shift keying modulated medium frequency signals in the marine radiobeacon band and supply the messages to the DGPS receiver;

(430) (H) Display a visual alarm to indicate to shipboard personnel when a failure to receive or utilize the RTCM messages occurs;

(431) (I) Display a separate visual alarm which is triggered by the VTC utilizing a DSC message to indicate to shipboard personnel when the VTS cannot provide the required system accuracy; and

(432) (J) Display two RTCM type 16 messages, one of which must display the position error when it is broadcast.

(433) (ii) The ADSSE will be considered to be non-operational should it fail to:

(434) (A) Respond to required VTS commands;

(435) (B) Utilize broadcast messages; or

(436) (C) Provide the VTS with the required information at the required accuracies.

(437) (iii) ADSSE equipped vessels will not be required to make vessel position reports by voice radio as indicated in §161.338(b). All other reports required by §161.338 must be made unless otherwise indicated by the VTC.

(438) (iv) Whenever a vessel's ADSSE equipment becomes non-operational, before entering or while underway in the VTS Area, the master shall:

(439) (A) Notify the VTC;

(440) (B) Make the required position reports in accordance with §161.338; and

(441) (C) Restore the ADSSE to operating condition as soon as possible.

(442) (v) Whenever a vessel's ADSSE becomes non-operational due to loss of the position correction information, the master shall make the required position reports in accordance with §161.338.

(443) (vi) Whenever a vessel's ADSSE equipment becomes non-operational before getting underway in the VTS Area, permission to get underway must be obtained from the VTC.

(444) (b) No laden tank vessel of 20,000 DWT or more may transit that portion of Valdez Narrows between Middle Rock and Potato Point at a speed in excess of 6 knots.

(445) (c) No tank vessel of 20,000 DWT or more may transit the Valdez Narrows One-Way Traffic Area in excess of 12 knots.

(446) (d) While in the VTS Area, if a tank vessel of 20,000 DWT or more is unable to comply with paragraph (a) the master shall immediately notify the VTC.

(447) **§161.378 Tug assistance for tank vessels.** (a) For the purposes of this section, tug assistance means the use of a sufficient number of tugs properly manned and positioned, with enough power and maneuverability to enable the vessel to accomplish the intended maneuvers safely. Factors to be considered in determining the amount of tug assistance needed are:

(448) (1) Existing and expected conditions of wind, tide, and current; and

(449) (2) Size, displacement, and maneuvering capability of the vessel.

(450) (b) No laden tank vessel of 20,000 DWT or more may transit the Valdez Narrows One-Way Traffic Area unless:

(451) (1) A sufficient number of tugs, as determined by the VTS, are standing by the northern entrance to Valdez Narrows; and

(452) (2) Tug assistance is utilized when directed by the VTC.

(453) (c) The master of any tank vessel required to use tug assistance shall insure that there are sufficient persons positioned on the vessel to handle lines to tugs as needed.

(454) **DESCRIPTIONS AND GEOGRAPHIC COORDINATES**

(455) **§161.380 VTS Area.**

(456) The VTS Area consists of the navigable waters of the United States north of a line drawn from Cape Hinchinbrook Light to Schooner Rock Light, comprising that portion of Prince William Sound between longitudes 146°30'W. and 147°20'W.; and includes Valdez Arm, Valdez Narrows and Port Valdez.

(457) **§161.383 Separation zone.**

(458) The separation zone is 2,000 yards (1,830 meters) wide from Hinchinbrook Entrance to Valdez Arm west to Bligh Reef and decreases in width from 2,000 yards (1,830 meters) to 1,000 yards (915 meters) from the entrance to Valdez Arm to where it terminates and is bounded by lines connecting the following latitudes and longitudes:

(459) (a) 60°58'43"N., 146°47'50"W.

(460) (b) 60°49'47"N., 147°02'06"W.

(461) (c) 60°34'43"N., 147°05'16"W.

(462) (d) 60°17'05"N., 146°49'18"W.

(463) (e) 60°16'20"N., 146°46'28"W.

(464) (f) 60°34'53"N., 147°03'14"W.

(465) (g) 60°49'23"N., 147°00'08"W.

(466) (h) 60°58'26"N., 146°47'02"W.

(467) **§161.385 Traffic lanes.**

(468) The traffic lanes are 1,500 yards (1,375 meters) wide from Hinchinbrook Entrance to Valdez Arm west of Bligh Reef, and decrease in width from 1,500 yards (1,375 meters) to 1,000 yards (915 meters) from the entrance to Valdez Arm to where they terminate. The traffic lanes are as follows:

(469) (a) The inward bound traffic lane is between the separation zone and a line connecting the following latitudes and longitudes:

(470) (1) 60°58'09"N., 146°46'16"W.

(471) (2) 60°49'07"N., 146°58'42"W.

(472) (3) 60°35'00"N., 147°01'42"W.

(473) (4) 60°15'45"N., 146°44'20"W.

(474) (b) The outward bound traffic lane is between the separation zone and a line connecting the following latitudes and longitudes:

(475) (1) 60°59'01"N., 146°48'37"W.

(476) (2) 60°50'04"N., 147°03'35"W.

(477) (3) 60°34'36"N., 147°06'48"W.

(478) (4) 60°17'38"N., 146°51'20"W.

(479) **§161.387 Valdez Narrows One-way Traffic Area.**

(480) The Valdez Narrows One-way Traffic Area consists of the navigable waters of the United States in Valdez Arm, Valdez Narrows, and Port Valdez northeast of a line bearing 307° true from Tongue Point at 61°02'06"N., 146°40'00"W., and southwest of a line bearing 307° true from Entrance Island Light at 61°05'06"N., 146°36'42"W.

Part 162–Inland Waterways Navigation Regulations

(481) **§162.1 General.**

(482) Geographic coordinates expressed in terms of latitude or longitude, or both, are not intended for plotting on maps or charts whose referenced horizontal datum is the North American Datum of 1983 (NAD 83), unless such geographic coordinates are expressly labeled NAD 83. Geographic coordinates without the NAD 83 reference may be plotted on maps or charts referenced to NAD 83 only after

application of the appropriate corrections that are published on the particular map or chart being used.

(483) **§162.245 Kenai River, Kenai, Alaska; use, administration, and navigation.** (a) The area. The main channel area of the river, having a width of 150 feet, beginning at a point directly offshore from the centerline of the city dock and extending about 2,200 feet upstream to a point 200 feet upstream from the Inlet Co. dock.

(484) (b) The regulations. (1) Vessels may navigate, anchor, or moor within the area until such times as notification is received or observation is made of intended passage to or from the docking areas.

(485) (2) Notice of anticipated passage of towboats and barges shall be indicated 24 hours in advance by display of a red flag by the Inlet Co. from its warehouse.

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

(486) **§164.01 Applicability.**

(487) (a) This part (except as specifically limited herein) applies to each self-propelled vessel of 1600 or more gross tons (except foreign vessels described in §164.02) when it is operating in the navigable waters of the United States except the St. Lawrence Seaway.

(488) **§164.02 Applicability exception for foreign vessels.**

(489) (a) This part (including §§ 164.38 and 164.39) does not apply to vessels that:

(490) (1) Are not destined for, or departing from, a port or place subject to the jurisdiction of the United States; and

(491) (2) Are in:

(492) (i) Innocent passage through the territorial sea of the United States; or

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

(494) **§164.03 Incorporation by reference.**

(495) (a) Certain material is incorporated by reference into this part with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in paragraph (b) of this section, the Coast Guard must publish notice of change in the Federal Register and the material must be available to the public. All approved material is on file at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, DC, and at the U.S. Coast Guard, Marine Environmental Protection Division (G-MEP), room 2100, 2100 Second Street, SW., Washington, DC 20593-0001 and is available from the sources indicated in paragraph (b) of this section.

(496) (b) The material approved for incorporation by reference in this part and the sections affected are as follows:

(497) Radio Technical Commission for Maritime Services (RTCM), P.O. Box 19087, Washington, DC 20036, Paper 12-78/DO-100, Minimum Performance Standards, Loran C Receiving Equipment, 12/20/77-164.41.

(498) International Maritime Organization (IMO), 4 Albert Embankment, London SE1 7SR, U.K., IMO Resolution A.342(IX), Recommendation on Performance Standards for Automatic Pilots, adopted November 12, 1975-164.13.

(499) **§164.11 Navigation underway: General.**

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

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

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

(503) (2) Fix the vessel's position;

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

(505) (c) The position of the vessel at each fix is plotted on a chart of the area and the person directing the movement of the vessel is informed of the vessel's position;

(506) (d) Electronic and other navigational equipment, external fixed aids to navigation, geographic reference points, and hydrographic contours are used when fixing the vessel's position;

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

(508) Note: Buoys are aids to navigation placed in approximate positions to alert the mariner to hazards to navigation or to indicate the orientation of a channel. Buoys may not maintain an exact position because strong or varying currents, heavy seas, ice, and collisions with vessels can move or sink them or set them adrift. Although buoys may corroborate a position fixed by other means, buoys cannot be used to fix a position: however, if no other aids are available, buoys alone may be used to establish an estimated position.

(509) (f) The danger of each closing visual or each closing radar contact is evaluated and the person directing the movement of the vessel knows the evaluation;

(510) (g) Rudder orders are executed as given;

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

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

(513) (j) A person whom he has determined is competent to steer the vessel is in the wheelhouse at all times (See also 46 U.S.C. 8702(d), which requires an able seaman at the wheel on U.S. vessels of 100 gross tons or more in narrow or crowded waters during low visibility);

(514) (k) If a pilot other than a member of the vessel's crew is employed, the pilot is informed of the draft, maneuvering characteristics, and peculiarities of the vessel and of any abnormal circumstances on the vessel that may affect its safe navigation.

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

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

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

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

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

(520) (1) The prevailing visibility and weather conditions;

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

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

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

(524) (5) The density of marine traffic;

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

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

(527) (8) Any local vessel speed limit;

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

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

(530) (s) Upon entering U.S. waters, the steering wheel or lever on the navigating bridge is operated to determine if the

steering equipment is operating properly under manual control, unless the vessel has been steered under manual control from the navigating bridge within the preceding 2 hours, except when operating on the Great Lakes and their connecting and tributary waters.

(531) (t) At least two of the steering gear power units on the vessel are in operation when such units are capable of simultaneous operation, except when operating on the Great Lakes and their connecting and tributary waters.

(532) **§164.13 Navigation underway: tankers.**

(533) (a) As used in this section, "tanker" means a self-propelled tank vessel, including integrated tug barge combinations, constructed or adapted primarily to carry oil or hazardous material in bulk in the cargo spaces and inspected and certificated as a tanker.

(534) (b) Each tanker must have an engineering watch capable of monitoring the propulsion system, communicating with the bridge, and implementing manual control measures immediately when necessary. The watch must be physically present in the machinery spaces or in the main control space and must consist of at least a licensed engineer.

(535) (c) Each tanker must navigate with at least two licensed deck officers on watch on the bridge, one of whom may be a pilot. In waters where a pilot is required, the second officer, must be an individual licensed and assigned to the vessel as master, mate, or officer in charge of a navigational watch, who is separate and distinct from the pilot.

(536) (d) Except as specified in paragraph (e) of this section, a tanker may operate with an auto pilot engaged only if all of the following conditions exist:

(537) (1) The operation and performance of the automatic pilot conforms with the standards recommended by the International Maritime Organization in IMO Resolution A.342(IX).

(538) (2) A qualified helmsman is present at the helm and prepared at all times to assume manual control.

(539) (3) The tanker is not operating in any of the following areas:

(540) (i) The areas of the traffic separation schemes specified in subchapter P of this chapter.

(541) (ii) The portions of a shipping safety fairway specified in part 166 of this chapter.

(542) (iii) An anchorage ground specified in part 110 of this chapter.

(543) (iv) An area within one-half nautical mile of any U.S. shore.

(544) **§164.15 Navigation bridge visibility.**

(545) (a) The arrangement of cargo, cargo gear, and trim of all vessels entering or departing from U.S. ports must be such that the field of vision from the navigation bridge conforms as closely as possible to the following requirements:

(546) (1) From the conning position, the view of the sea surface must not be obscured by more than the lesser of two ship lengths or 500 meters (1640 feet) from dead ahead to 10 degrees on either side of the vessel. Within this arc of visibility and blind sector caused by cargo, cargo gear, or other permanent obstruction must not exceed 5 degrees.

(547) (2) From the conning position, the horizontal field of vision must extend over an arc from at least 22.5 degrees abaft the beam on one side of the vessel, through dead ahead, to at least 22.5 degrees abaft the beam on the other side of the vessel. Blind sectors forward of the beam caused by cargo, cargo gear, or other permanent obstruction must not exceed 10 degrees each, nor total more than 20 degrees, including any blind sector within the arc of visibility described in paragraph (a)(1) of this section.

(548) (3) From each bridge wing, the field of vision must extend over an arch from at least 45 degree on the opposite bow, through dead ahead, to at least dead astern.

(549) (4) From the main steering position, the field of vision must extend over an arc from dead ahead to at least 60 degrees on either side of the vessel.

(550) (b) A clear view must be provided through at least two front windows at all times regardless of weather conditions.

(551) **§164.19 Requirements for vessels at anchor.**

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

(553) (a) A proper anchor watch is maintained;

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

(555) (c) Whenever weather, tide, or current conditions are likely to cause the vessel's anchor to drag, action is taken to ensure the safety of the vessel, structures, and other vessels, such as being ready to veer chain, let go a second anchor, or get underway using the vessel's own propulsion or tug assistance.

(556) **§164.25 Tests before entering or getting underway.**

(557) (a) Except as provided in paragraphs (b) and (c) of this section no person may cause a vessel to enter into or get underway on the navigable waters of the United States unless no more than 12 hours before entering or getting underway, the following equipment has been tested:

(558) (1) Primary and secondary steering gear. The test procedure includes a visual inspection of the steering gear and its connecting linkage, and, where applicable, the operation of the following:

(559) (i) Each remote steering gear control system.

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

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

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

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

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

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

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

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

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

(569) (5) Main propulsion machinery, ahead and astern.

(570) (b) Vessels navigating on the Great Lakes and their connecting and tributary waters, having once completed the test requirements of this sub-part, are considered to remain in compliance until arriving at the next port of call on the Great Lakes.

(571) (c) Vessels entering the Great Lakes from the St. Lawrance Seaway are considered to be in compliance with this sub-part if the required tests are conducted preparatory to or during the passage of the St. Lawrence Seaway or within one hour of passing Wolfe Island.

(572) (d) No vessel may enter, or be operated on the navigable waters of the United States unless the emergency steering drill described below has been conducted within 48 hours prior to entry and logged in the vessel logbook, unless the drill is conducted and logged on a regular basis at least

once every three months. This drill must include at a minimum the following:

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

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

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

(576) **§164.30 Charts, publications, and equipment: General.**

(577) No person may operate or cause the operation of a vessel unless the vessel has the marine charts, publications, and equipment as required by §§164.33 through 164.41 of this part.

(578) **§164.33 Charts and publications.**

(579) (a) Each vessel must have the following:

(580) (1) Marine charts of the area to be transited, published by the National Ocean Service, U.S. Army Corps of Engineers, or a river authority that–

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

(582) (ii) Are currently corrected.

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

(584) (i) U.S. Coast Pilot.

(585) (ii) Coast Guard Light List.

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

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

(588) (ii) Tidal current tables published by the National Ocean Service, or river current publication issued by the U.S. Army Corps of Engineers, or a river authority.

(589) (b) As an alternative to the requirements for paragraph (a) of this section, a marine chart or publication, or applicable extract, published by a foreign government may be substituted for a U.S. chart and publication required by this section. The chart must be of large enough scale and have enough detail to make safe navigation of the area possible, and must be currently corrected. The publication, or applicable extract, must singly or in combination contain similar information to the U.S. Government publication to make safe navigation of the area possible. The publication, or applicable extract must be currently corrected, with the exceptions of tide and tidal current tables, which must be the current editions.

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

(591) **§164.35 Equipment: All vessels.**

(592) Each vessel must have the following:

(593) (a) A marine radar system for surface navigation.

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

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

(596) (d) A gyrocompass.

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

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

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

(600) (1) A turning circle diagram to port and starboard that shows the time and distance and advance and transfer required to alter course 90 degrees with maximum rudder angle and constant power settings, for either full and half speeds, or for full and slow speeds. For vessels whose turning circles are essentially the same for both directions, a diagram showing a turning circle in one direction, with a note on the diagram stating that turns to port and starboard are essentially the same, may be substituted.

(601) (2) The time and distance to stop the vessel from either full and half speeds, or from full and slow speeds, while maintaining approximately the initial heading with minimum application of rudder.

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

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

(604) (5) For each vessel that is fitted with an auxiliary device to assist in maneuvering, such as a bow thruster, a table of vessel speeds at which the auxiliary device is effective in maneuvering the vessel.

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

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

(607) (ii) No current;

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

(609) (iv) Clean hull.

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

(611) **Warning.**

(612) The response of the (name of the vessel) may be different from that listed above if any of the following conditions, upon which the maneuvering information is based, are varied:

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

(614) (2) No current;

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

(616) (4) Clean hull; and

(617) (5) Intermediate drafts or unusual trim.

(618) (h) An echo depth sounding device.

(619) (i) A device that can continuously record the depth readings of the vessel's echo depth sounding device, except when operating on the Great Lakes and their connecting and tributary waters.

(620) (j) Equipment on the bridge for plotting relative motion.

(621) (k) Simple operating instructions with a block diagram, showing the changeover procedures for remote steering gear control systems and steering gear power units, permanently displayed on the navigating bridge and in the steering gear compartment.

(622) (l) An indicator readable from the centerline conning position showing the rate of revolution of each propeller, except when operating on the Great Lakes and their connecting and tributary waters.

(623) (m) If fitted with controllable pitch propellers, an indicator readable from the centerline conning position showing the pitch and operational mode of such propellers, except when operating on the Great Lakes and their connecting and tributary waters.

(624) (n) If fitted with lateral thrust propellers, an indicator readable from the centerline conning position showing the direction and amount of thrust of such propellers, except when operating on the Great Lakes and their connecting and tributary waters.

(625) **§164.37 Equipment: Vessels of 10,000 gross tons or more.**

(626) (a) Each vessel of 10,000 gross tons or more must have, in addition to the radar system under §164.35(a), a second marine radar system that operates independently of the first.

(627) Note: Independent operation means two completely separate systems, from separate branch power supply circuits or distribution panels to antennas, so that failure of any component of one system will not render the other system inoperative.

(628) (b) On each tanker of 10,000 gross tons or more that is subject to Section 5 of the Port and Tanker Safety Act of 1978 (46 U.S.C. 391a), the dual radar system required by this part must have a short range capability and a long range capability and each radar must have true north features consisting of a display that is stabilized in azimuth.

(629) **§164.38 Automatic radar plotting aids (ARPA).** (See 33 CFR 164.)

(630) **§164.39 Steering gear: Tankers.** (See 33 CFR 164.)

(631) **§164.40 Devices to indicate speed and distance.**

(632) (a) Each vessel required to be fitted with an Automatic Radar Plotting Aid (ARPA) under §164.38 must be fitted with a device to indicate speed and distance of the vessel either through the water, or over the ground. Vessels constructed prior to September 1, 1984, must have this equipment according to the following schedule:

(633) (1) Each tank vessel constructed before September 1, 1984, operating on the navigable waters of the United States-

(634) (i) If of 40,000 gross tons or more, by January 1, 1985;

(635) (ii) If of 10,000 gross tons or more but less than 40,000 gross tons, by January 1, 1986.

(636) (2) Each self-propelled vessel constructed before September 1, 1984, that is not a tank vessel, operating on the navigable waters of the United States-

(637) (i) If of 40,000 gross tons or more, by September 1, 1986;

(638) (ii) If of 20,000 gross tons or more, but less than 40,000 gross tons, by September 1, 1987;

(639) (iii) If of 15,000 gross tons or more, but less than 20,000 gross tons, by September 1, 1988.

(640) (b) The device must meet the following specifications:

(641) (1) The display must be easily readable on the bridge by day or night.

(642) (2) Errors in the indicated speed, when the vessel is operating free from shallow water effect, and from the effects of wind, current, and tide, should not exceed 5 percent of the speed of the vessel, or 0.5 knot, whichever is greater.

(643) (3) Errors in the indicated distance run, when the vessel is operating free from shallow water effect, and from the effects of wind, current, and tide, should not exceed 5 percent of the distance run of the vessel in one hour or 0.5 nautical mile in each hour, whichever is greater.

(644) **§164.41 Electronic position fixing devices.**

(645) (a) Each vessel calling at a port in the continental United States, including Alaska south of Cape Prince of Wales, except each vessel owned or bareboat chartered and operated by the United States, or by a state or its political subdivision, or by a foreign nation, and not engaged in commerce, must have one of the following:

(646) (1) A Type I or II LORAN C receiver as defined in Section 1.2(e), meeting Part 2 (Minimum Performance Standards) of the Radio Technical Commission for Marine Services (RTCM) Paper 12-78/D0-100 dated December 20, 1977, entitled "Minimum Performance Standards (MPS) Marine Loran-C Receiving Equipment". Each receiver installed on or after June 1, 1982, must have a label with the information required under paragraph (b) of this section. If the receiver is installed before June 1, 1982, the receiver must have the label with the information required under paragraph (b) by June 1, 1985.

(647) (2) A satellite navigation receiver with:

(648) (i) Automatic acquisition of satellite signals after initial operator settings have been entered; and

(649) (ii) Position updates derived from satellite information during each usable satellite pass.

(650) (3) A system that is found by the Commandant to meet the intent of the statements of availability, coverage, and accuracy for the U.S. Coastal Confluence Zone (CCZ) contained in the U.S. "Federal Radionavigation Plan" (Report No. DOD-NO 4650.4-P, I or No. DOT-TSC-RSPA-80-16, I). A person desiring a finding by the Commandant under this subparagraph must submit a written application describing the device to the Office of Navigation Safety and Waterway Services, 2100 Second Street SW., Washington, DC 20593-0001. After reviewing the application, the Commandant may request additional information to establish whether or not the device meets the intent of the Federal Radionavigation Plan.

(651) **Note.**–The Federal Radionavigation Plan is available from the National Technical Information Service, Springfield, Va. 22161, with the following Government Accession Numbers:

(652) Vol 1, ADA 116468

(653) Vol 2, ADA 116469

(654) Vol 3, ADA 116470

(655) Vol 4, ADA 116471

(656) (b) Each label required under paragraph (a)(1) of this section must show the following:

(657) (1) The name and address of the manufacturer.

(658) (2) The following statement by the manufacturer:

(659) This receiver was designed and manufactured to meet Part 2 (Minimum Performance Standards) of the RTCM MPS for Marine Loran-C Receiving Equipment.

(660) **§164.42 Rate of turn indicator.**

(661) Each vessel of 100,000 gross tons or more constructed on or after September 1, 1984, shall be fitted with a rate of turn indicator.

(662) **§164.51 Deviations from rules: Emergency.**

(663) Except for the requirements of §164.53(b), in an emergency, any person may deviate from any rule in this part to the extent necessary to avoid endangering persons, property, or the environment.

(664) **§164.53 Deviations from rules and reporting: Nonoperating equipment.**

(665) (a) If during a voyage any equipment required by this part stops operating properly, the person directing the movement of the vessel may continue to the next port of call, subject to the directions of the District Commander or the Captain of the Port, as provided by 33 CFR 160.

(666) (b) If the vessel's radar, radio navigation receivers, gyrocompass, echo depth sounding device, or primary steering gear stops operating properly, the person directing the movement of the vessel must report or cause to be reported that it is not operating properly to the nearest Captain of the Port, District Commander, or, if participating in a Vessel Traffic Service, to the Vessel Traffic Center, as soon as possible.

(667) **§164.55 Deviations from rules: Continuing operation or period of time.**

(668) The Captain of the Port, upon written application, may authorize a deviation from any rule in this part if he determines that the deviation does not impair the safe navigation of the vessel under anticipated conditions and will not result in a violation of the rules for preventing collisions at sea. The authorization may be issued for vessels operating in the waters under the jurisdiction of the Captain of the Port for any continuing operation or period of time the Captain of the Port specifies.

(669) **§164.61 Marine casualty reporting and record retention.**

(670) When a vessel is involved in a marine casualty as defined in 46 CFR 4.03–1, the master or person in charge of the vessel shall–

(671) (a) Ensure compliance with 46 CFR 4.05, "Notice of Marine Casualty and Voyage Records," and

(672) (b) Ensure that the voyage records required by 46 CFR 4.05–15 are retained for–

(673) (1) 30 days after the casualty if the vessel remains in the navigable waters of the United States; or

(674) (2) 30 days after the return of the vessel to a United States port if the vessel departs the navigable waters of the United States within 30 days after the marine casualty.

Part 165–Regulated Navigation Areas and Limited Access Areas

Subpart A–General

(675) **§165.1 Purpose of part.**

(676) The purpose of this part is to–

(677) (a) Prescribe procedures for establishing different types of limited or controlled access areas and regulated navigation areas;

(678) (b) Prescribe general regulations for different types of limited or controlled access areas and regulated navigation areas;

(679) (c) Prescribe specific requirements for established areas; and

(680) (d) List specific areas and their boundaries.

(681) **§165.5 Establishment procedures.**

(682) (a) A safety zone, security zone, or regulated navigation area may be established on the initiative of any authorized Coast Guard official.

(683) (b) Any person may request that a safety zone, security zone, or regulated navigation area be established. Except as provided in paragraph (c) of this section, each request must be submitted in writing to either the Captain of the Port or District Commander having jurisdiction over the location as described in 33 CFR 3, and include the following:

(684) (1) The name of the person submitting the request;

(685) (2) The location and boundaries of the safety zone, security zone, or regulated navigation area;

(686) (3) The date, time, and duration that the safety zone, security zone, or regulated navigation area should be established;

(687) (4) A description of the activities planned for the safety zone, security zone, or regulated navigation area;

(688) (5) The nature of the restrictions or conditions desired; and

(689) (6) The reason why the safety zone, security zone, or regulated navigation area is necessary.

(690) (Requests for safety zones, security zones, and regulated navigation areas are approved by the Office of Management and Budget under control numbers 2115–0076, 2115–0219, and 2115–0087.)

(691) (c) Safety Zones and Security Zones. If, for good cause, the request for a safety zone or security zone is made less than 5 working days before the zone is to be established, the request may be made orally, but it must be followed by a written request within 24 hours.

(692) **§165.7 Notification.**

(693) (a) The establishment of these limited access areas and regulated navigation areas is considered rulemaking. The procedures used to notify persons of the establishment of these areas vary depending upon the circumstances and emergency conditions. Notification may be made by marine broadcasts, local notice to mariners, local news media, distribution in leaflet form, and on-scene oral notice, as well as publication in the **Federal Register.**

(694) (b) Notification normally contains the physical boundaries of the area, the reasons for the rule, its estimated duration, and the method of obtaining authorization to enter the area, if applicable, and special navigational rules, if applicable.

(695) (c) Notification of the termination of the rule is usually made in the same form as the notification of its establishment.

(696) **§ 165.8 Geographic coordinates.**

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

Subpart B–Regulated Navigation Areas

(698) **§165.10 Regulated navigation area.**

(699) A regulated navigation area is a water area within a defined boundary for which regulations for vessels navigating within the area have been established under this part.

(700) **§165.11 Vessel operating requirements (regulations).**

(701) Each District Commander may control vessel traffic in an area which is determined to have hazardous conditions, by issuing regulations–

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

(703) (b) Establishing vessel size, speed, draft limitations, and operating conditions; and

(704) (c) Restricting vessel operation, in a hazardous area or under hazardous conditions, to vessels which have particular operating characteristics or capabilities which are considered necessary for safe operation under the circumstances.

(705) **§165.13 General regulations.**

(706) (a) The master of a vessel in a regulated navigation area shall operate the vessel in accordance with the regulations contained in Subpart F.

(707) (b) No person may cause or authorize the operation of a vessel in a regulated navigation area contrary to the regulations in this Part.

Subpart C–Safety Zones

(708) **§165.20 Safety zones.**

(709) A Safety Zone is a water area, shore area, or water and shore area to which, for safety or environmental purposes, access is limited to authorized persons, vehicles, or vessels. It may be stationary and described by fixed limits or it may be described as a zone around a vessel in motion.

(710) **§165.23 General regulations.**

(711) Unless otherwise provided in this part–
(712) (a) No person may enter a safety zone unless authorized by the COTP or the District Commander.
(713) (b) No person may bring or cause to be brought into a safety zone any vehicle, vessel, or object unless authorized by the COTP or the District Commander.
(714) (c) No person may remain in a safety zone or allow any vehicle, vessel, or object to remain in a safety zone unless authorized by the COTP or the District Commander; and
(715) (d) Each person in a safety zone who has notice of a lawful order or direction shall obey the order or direction of the COTP or District Commander issued to carry out the purposes of this subpart.

Subpart D–Security Zones
(716) **§165.30 Security zones.**
(717) (a) A security zone is an area of land, water, or land and water which is so designated by the Captain of the Port or District Commander for such time as is necessary to prevent damage or injury to any vessel or waterfront facility, to safeguard ports, harbors, territories, or waters of the United States or to secure the observance of the rights and obligations of the United States.
(718) (b) The purpose of a security zone is to safeguard from destruction, loss, or injury from sabotage or other subversive acts, accidents, or other causes of a similar nature–
(719) (1) Vessels,
(720) (2) Harbors,
(721) (3) Ports and
(722) (4) Waterfront facilities– in the United States and all territory and water, continental or insular, that is subject to the jurisdiction of the United States.
(723) **§165.33 General regulations.**
(724) Unless otherwise provided in the special regulations in Subpart F of this part–
(725) (a) No person or vessel may enter or remain in a security zone without the permission of the Captain of the Port;
(726) (b) Each person and vessel in a security zone shall obey any direction or order of the Captain of the Port;
(727) (c) The Captain of the Port may take possession and control of any vessel in the security zone;
(728) (d) The Captain of the Port may remove any person, vessel, article, or thing from a security zone;
(729) (e) No person may board, or take or place any article or thing on board, any vessel in a security zone without the permission of the Captain of the Port; and
(730) (f) No person may take or place any article or thing upon any waterfront facility in a security zone without the permission of the Captain of the Port.

Subpart E–Restricted Waterfront Areas
(731) **§165.40 Restricted Waterfront Areas.**
(732) The Commandant, may direct the COTP to prevent access to waterfront facilities, and port and harbor areas, including vessels and harbor craft therein. This section may apply to persons who do not possess the credentials outlined in 33 CFR 125.09 when certain shipping activities are conducted that are outlined in 33 CFR 125.15.

Subpart F–Specific Regulated Navigation Areas and Limited Access Areas
(733) **§165.1701 Port Valdez, Valdez, Alaska-safety zone.**
(734) The waters within the following boundaries are a safety zone-The area within 200 yards of any waterfront facility at the Trans-Alaska Pipeline Valdez Terminal complex or vessels moored or anchored at the Trans-Alaska Pipeline Valdez Terminal complex and the area within 200 yards of any tank vessel manuevering to approach, moor, unmoor, or depart the Trans-Alaska Pipeline Valdez Terminal complex.
(735) **§ 165.1703 Ammunition Island, Port Valdez, Alaska.**
(736) (a) The waters within the following boundaries is a safety zone-the area within 1330 yards of Ammunition Island, latitude 61°07.5'N., longitude 146°18'W., and the vessel moored or anchored at Ammunition Island.
(737) (b) The area 200 yards off the vessel navigating the Vessel Traffic System from abeam of Naked Island, maneuvering to approach, moor, unmoor at Ammunition Island, or the departure of the Vessel from Ammunition Island.
(738) (c) Special regulation. (1) §165.2312 does not apply to paragraph (a) of this section, except when the vessel is moored to Ammunition Island.
(739) (d) Effective August 25, 1987 Notice of vessels arrival will be made in the Notice to Mariners, Local Notice to Mariners and in the Local Valdez newspaper, prior to the vessel arrival.

Part 166-Shipping Safety Fairways

Subpart A-General
(740) **§166.100 Purpose**. The purpose of these regulations is to establish and designate shipping safety fairways and fairway anchorages to provide unobstructed approaches for vessels using U.S. ports.
(741) **§166.103 Geographic Coordinates**.
(742) Geographic coordinates expressed in terms of latitude or longitude, or both, are not intended for plotting on maps or charts whose referenced horizontal datum is the North American Datum of 1983 (NAD 83), unless such geographic coordinates are expressly labeled NAD 83. Geographic coordinates without the NAD 83 reference may be plotted on maps or charts referenced to NAD 83 only after application of the appropriate corrections that are published on the particular map or chart being used.
(743) **§166.105 Definitions**. (a) "Shippings safety fairway" or "fairway" means a lane or corridor in which no artificial island or fixed structure, whether temporary or permanent, will be permitted. Temporary underwater obstacles may be permitted under certain conditions described for specific areas in Subpart B. Aids to navigation approved by the U.S. Coast Guard may be established in a fairway.
(744) (b) "Fairway anchorage" means an anchorage area contiguous to and associated with a fairway, in which fixed structures may be permitted within certain spacing limitations, as described for specific areas in Subpart B.
(745) **§166.110 Modification of areas.** Fairways are subject to modification in accordance with 33 U.S.C. 1223(c); 92 Stat. 1473. Subpart B-Designations of Fairways
(746) **§166.400 Areas along the coast of Alaska.**
(747) (a) Purpose. Fairways, as described in this section, are established to control the erection of structures therein to provide safe vessel routes along the coast of Alaska.
(748) **(b) Designated Areas. (1) Prince William Sound Safety Fairway**. (i) Hinchinbrook Entrance Safety Fairway. The area enclosed by rhumb lines joining points at:
(749) 59°59'00"N., 145°27'24"W.
(750) 60°13'18"N., 146°38'06"W.
(751) 60°11'24"N., 146°47'00"W.
(752) 59°55'00"N., 145°42'00"W.
(753) (ii) Gulf to Hinchinbrook Safety Fairway (recommended for inbound vessel traffic). The area enclosed by rhumb lines joining points at:
(754) 59°15'42"N., 144°02'07"W.
(755) 59°59'00"N., 145°27'24"W.

(756) 59°58'00"N., 145°32'12"W.
(757) 59°14'18"N., 144°04'53"W.
(758) (iii) Hinchinbrook to Gulf Safety Fairway (recommended for outbound vessel traffic). The area enclosed by rhumb lines joining points at:
(759) 59°15'41"N., 144°23'35"W.
(760) 59°56'00"N., 145°37'39"W.
(761) 59°55'00"N., 145°42'00"W.
(762) 59°14'19"N., 144°26'25"W.
(763) **(2) Unimak Pass Safety Fairway.** (i) East/West Safety Fairway. The area enclosed by rhumb lines joining points at:
(764) 54°25'58"N., 165°42'24"W.
(765) 54°22'50"N., 165°06'54"W.
(766) 54°22'10"N., 164°59'29"W.
(767) 54°07'58"N., 162°19'25"W.
(768) 54°04'02"N., 162°20'35"W.
(769) 54°22'02"N., 165°43'36"W.
(770) (ii) North/South Safety Fairway. The area enclosed by rhumb lines joining points at:
(771) 54°42'28"N., 165°16'19"W.
(772) 54°43'32"N., 165°09'41"W;
(773) 54°22'50"N., 165°06'54"W.
(774) 54°22'10"N., 164°59'29"W.

Part 334-Danger Zones and Restricted Area Regulations

(775) **§334.1 Purpose.**
(776) The purpose of this part is to:
(777) (a) Prescribe procedures for establishing, amending and disestablishing danger zones and restricted area;
(778) (b) List the specific danger zones and restricted areas and their boundaries; and
(779) (c) Prescribe specific requirements, access limitations and controlled activities within the danger zones and restricted areas.
(780) **§334.2 Definitions**
(781) (a) Danger zone. A defined water area (or areas) used for target practice, bombing, rocket firing or other especially hazardous operations, normally for the armed forces. The danger zones may be closed to the public on a full-time or intermittent basis, as stated in the regulations.
(782) (b) Restricted area. A defined water area for the purpose of prohibiting or limiting public access to the area. Restricted areas generally provide security for Government property and/or protection to the public from the risks of damage or injury arising from the Government's use of that area.
(783) **§334.3 Special policies.**
(784) (a) General. The general regulatory policies stated in 33 CFR part 320 will be followed as appropriate. In addition, danger zone and restricted area regulations shall provide for public access to the area to the maximum extent practicable.
(785) (b) Food fishing industry. The authority to prescribe danger zone and restricted area regulations must be exercised so as not to unreasonably interfere with or restrict the food fishing industry. Whenever the proposed establishment of a danger zone or restricted area may affect fishing operations, the District Engineer will consult with the Regional Director, U.S. Fish and Wildlife Service, Department of the Interior and the Regional Director, National Marine Fisheries Service, National Oceanic & Atmospheric Administration (NOAA),
(786) (c) Temporary, occasional or intermittent use. If the use of the water area is desired for a short period of time, not exceed thirty days in duration, and that planned operations can be conducted safely without imposing unreasonable restrictions on navigation, and without promulgating restricted area regulations in accordance with the regulations in this section, applicants may be informed that formal regulations are not required. Activities of this type shall not reoccur more often than biennially (every other year), unless danger zone/restricted area rules are promulgated under this Part. Proper notices for mariners requesting that vessels avoid the area will be issued by the Agency requesting such use of the water area, or if appropriate, by the District Engineer, to all known interested persons. Copies will also be sent to appropriate State agencies, the Commandant, U.S. Coast Guard, Washington, DC 20590, and Director, Defense Mapping Agency, Hydrographic Center, Washington, DC 20390, ATTN: Code NS 12. Notification to all parties and Agencies shall be made at least two weeks prior to the planned event, or earlier, if required for distribution of Local Notice to Mariners by the Coast Guard.
(787) **§334.4 Establishment and amendment procedures.**
(788) (a) Application. Any request for the establishment, amendment or revocation of a danger zone or restricted area must contain sufficient information for the District Engineer to issue a public notice, and as a minimum must contain the following:
(789) (1) Name, address and telephone number of requestor including the identity of the command and DoD facility and the identity of a point of contact with phone number.
(790) (2) Name of waterway and if a small tributary, the name of a larger connecting waterbody.
(791) (3) Name of closest city or town, county/parish and state.
(792) (4) Location of proposed or existing danger zone or restricted area with a map showing the location, if possible.
(793) (5) A brief statement of the need for the area, its intended use and detailed description of the times, dates and extent of restriction.
(794) (b) Public notice. (1) The Corps will normally publish public notices and **Federal Register** documents concurrently. Upon receipt of a request for the establishment, amendment or revocation of a danger zone or restricted area, the District Engineer should forward a copy of the request with his/her recommendation, a copy of the draft public notice and a draft **Federal Register** document to the Office of the Chief of Engineers, ATTN: CECW-OR. The Chief of Engineers will publish the proposal in the **Federal Register** concurrent with the public notice issued by the District Engineer.
(795) (2) Content. The public notice and **Federal Register** documents must include sufficient information to give a clear understanding of the proposed action and should include the following items of information:
(796) (i) Applicable statutory authority or authorities; (40 Stat. 266; 33 U.S.C. 1) and (40 Stat. 892; 33 U.S.C. 3)
(797) (ii) A reasonable comment period. The public notice should fix a limiting date within which comments will be received, normally a period not less than 30 days after publication of the notice.
(798) (iii) The address of the District Engineer as the recipient of any comments received.
(799) (iv) The identity of the applicant/proponent;
(800) (v) The name or title, address and telephone number of the Corps employee from whom additional information concerning the proposal may be obtained;
(801) (vi) The location of the proposed activity accompanied by a map of sufficient detail to show the boundaries of the area(s) and its relationship to the surrounding area.

(802) (3) Distribution. Public notice will be distributed in accordance with 33 CFR 325.3(d)(1). In addition to this general distribution, public notices will be sent to the following Agencies:

(803) (i) The Federal Aviation Administration (FAA) where the use of airspace is involved.

(804) (ii) The Commander, Service Force, U.S. Atlantic Fleet, if a proposed action involves a danger zone off the U.S. Atlantic coast.

(805) (iii) Proposed danger zones on the U.S. Pacific coast must be coordinated with the applicable commands as follows:

(806) Alaska, Oregon and Washington:

(807) Commander, Naval Base, Seattle

(808) California:

(809) Commander, Naval Base, San Diego

(810) Hawaii and Trust Territories:

(811) Commander, Naval Base, Pearl Harbor

(812) (c) Public hearing. The District Engineer may conduct a public hearing in accordance with 33 CFR part 327.

(813) (d) Environmental documentation. The District Engineer shall prepare environmental documentation in accordance with appendix B to 33 CFR part 325.

(814) (e) District Engineer's recommendation. After closure of the comment period, and upon completion of the District Engineer's review he/she shall forward the case through channels to the Office of the Chief of Engineers, ATTN: CECW-OR with a recommendation of whether or not the danger zone or restricted area regulation should be promulgated. The District Engineer shall include a copy of environmental documentation prepared in accordance with appendix B to 33 CFR part 325, the record of any public hearings, if held, a summary of any comments received and a response thereto, and a draft of the regulation as it is to appear in the **Federal Register.**

(815) (f) Final decision. The Chief of Engineers will notify the District Engineer of the final decision to either approve or disapprove the regulations. The District Engineer will notify the applicant/proponent and publish a public notice of the final decision. Concurrent with issuance of the public notice the Office of the Chief of Engineers will publish the final decision in the **Federal Register** and either withdraw the proposed regulation or issue the final regulation as appropriate. The final rule shall become effective no sooner than 30 days after publication in the **Federal Register** unless the Chief of Engineers finds that sufficient cause exists and publishes that rationale with the regulations.

(816) **§334.5 Disestablishment of a danger zone.**

(817) (a) Upon receipt of a request from any agency for the disestablishment of a danger zone, the District Engineer shall notify that agency of its responsibility for returning the area to a condition suitable for use by the public. The agency must either certify that it has not used the area for a purpose that requires cleanup or that it has removed all hazardous materials and munitions, before the Corps will disestablish the area. The agency will remain responsible for the enforcement of the danger zone regulations to prevent unauthorized entry into the area until the area is deemed safe for use by the public and the area is disestablished by the Corps.

(818) (b) Upon receipt of the certification required in paragraph (a) of this section, the District shall forward the request for disestablishment of the danger zone through channels to CECW-OR, with its recommendations. Notice of proposed rulemaking and public procedures as outlined in §334.4 are not normally required before publication of the final rule revoking a restricted area or danger zone regulation. The disestablishment/revocation of the danger zone or restricted area regulation removes a restriction on a waterway.

(819) **§334.1280 Bristol Bay, Alaska; air-to-air weapon range, Alaskan Air Command, U.S. Air Force.** (a) The danger zone. An area in Bristol Bay beginning at latitude 58°24'N., longitude 159°10'W.; thence to latitude 57°58'N., longitude 158°30'W.; thence to latitude 57°07'N., longitude 160°20'W.; thence to latitude 58°02'N., longitude 161°40'W.; and thence to the point of beginning.

(820) (b) The regulations. (1) Intermittent firing will be conducted over two to three day periods about 2 hours a day between the hours of 10:00 a.m. and 4:00 p.m. during the months of May through August.

(821) (2) The fact that practice firing is to take place over the designated area shall be advertised to the public 72 hours in advance through the usual media for the dissemination of such information. Notice to the U.S. Coast Guard and NOTAM shall be issued at least 48 hours before firing is to be conducted on the range. Information as to the dates, time, and characteristics of the firing shall be advertised in advance of each session of firing.

(822) (3) Prior to conducting each practice firing, the danger zone shall be patrolled by aircraft to note the location of all vessels within the area. The practice firing exercise shall be conducted in the portion of the danger zone not occupied by surface craft.

(823) (4) This section shall be enforced by the Commander, Alaskan Air Command, U.S. Air Force, Seattle, Washington, or such agencies as he may designate.

(824) **§334.1290 In Bering Sea, Shemya Island Area, Alaska; meteorological rocket launching facility, Alaskan Air Command, U.S. Air Force.** (a) The danger zone. An arc of a circle with a 45-nautical-mile radius of the launch point centered at latitude 52°43'30"N., longitude 174°06'05"E. extending clockwise from 110° true bearing to 200° true bearing.

(825) (b) The regulation. (1) Rockets will normally be launched one each day Monday through Friday between 9 a.m. and 3 p.m. Rocket hardware will discharge into the sea 22.5 to 37.5 nautical miles off the launchsite. The instrument package with parachute will impact about 1½ hours later at an undetermined area, depending on weather conditions.

(826) (2) All mariners entering the area will do so at their own risk and are cautioned to take evasive action as necessary.

(827) (3) The regulation in this section shall be enforced by the Department of the Air Force, Headquarters 6th Weather Wing (MAC), Andrews Air Force Base, Washington, D.C. 20331.

(828) **§334.1300 Blying Sound area, Gulf of Alaska, Alaska; air-to-air gunnery practice area, Alaskan Air Command, U.S. Air Force.** (a) The danger zone. A rhomboidal area beginning at

(829) 59°51'30"N., 148°42'00"W.; thence to

(830) 59°22'30"N., 147°00'00"W.; thence to

(831) 58°52'00"N., 148°03'00"W.; thence to

(832) 59°20'00"N., 149°45'00"W., and thence to point of beginning.

(833) (b) The regulations. (1) 20-mm. cannon will be fired at towed targets in the air. One firing mission will be conducted every 2 weeks during daylight hours only and weather permitting.

(834) (2) The fact that practice firing is to take place over the designated area shall be advertised to the public 7 days in advance through the usual media for the dissemination of such information. Notice to the U.S. Coast Guard and NOTAM shall be issued at least 48 hours before firing is to

be conducted on the range. Information as to the dates, time, and characteristics of the firing shall be advertised in advance of each session of firing.

(835) (3) Prior to conducting each practice firing, the danger zone shall be patrolled by aircraft to note the location of all vessels within the area. The practice firing exercise shall be conducted in the portion of the danger zone not occupied by surface craft.

(836) (4) The regulations in this section shall be enforced by the Commander, Alaskan Air Command, U.S. Air Force, Anchorage, Alaska, or such agencies as he may designate.

(837) **§334.1320 Kuluk Bay, Adak, Alaska; naval restricted area.**

(838) (a) The area. The northwest portion of Kuluk Bay bounded as follows: Beginning on shore at

(839) 51°55'00"N., 176°33'09"W.; thence due east to

(840) 51°55'00"N., 176°33'09"W.; thence due south to

(841) 51°51'55"N., 176°31'09"W.; thence due west to the shore at

(842) 51°51'00"N., 176°37'43"W.; thence along the shoreline to the point of beginning.

(843) (b) The regulations. (1) Except in great emergency, no vessel shall anchor in the restricted area described above.

(844) (2) The dragging of anchors in or across the restricted area is prohibited and no object attached to a vessel shall be placed on or near the bottom.

(845) (3) Fishing and trawling activities in the restricted area are prohibited.

(846) (4) The regulation of this restricted area shall be enforced by the Commander, Patrol Wing, U.S. Pacific Fleet, Naval Air Station Moffett Field, California, and such agencies and he/she may designate.

(847) **§334.1330 Bering Strait, Alaska; naval restricted area off Cape Prince of Wales.** (a) The area. An area 2,000 feet wide extending from a point on Cape Prince of Wales marked by a triangular cable marker located approximately midway between the village of Wales and Cape Prince of Wales Light to a point four statute miles due west of the cable marker with the axis of the area passing through the two points.

(848) (b) The regulations. (1) No vessel shall anchor in the restricted area described in paragraph (a) of this section.

(849) (2) Dragging of anchors in or across the restricted area is prohibited and no object attached to a vessel shall be placed on or near the bottom.

(850) (3) The regulations in this section shall be enforced by the Commander, Third Fleet, Pearl Harbor, Hawaii, and such agencies as he may designate.

(851) **Title 50, Wildlife and Fisheries**

(852) **Part 227–Threatened Fish and Wildlife**

(853) **Subpart B–Threatened Marine Mammals**

(854) **§227.12 Steller sea lion.**

(855) (a) Prohibitions-(1) No discharge of firearms. Except as provided in paragraph (b) of this section, no person subject to the jurisdiction of the United States may discharge a firearm at or within 100 yards (91.4 meters) of a Steller sea lion. A firearm is any weapon, such as a pistol or rifle, capable of firing a missile using an explosive charge as a propellant.

(856) (2) No approach in buffer areas. Except as provided in paragraph (b) of this section:

(857) (i) No owner or operator of a vessel may allow the vessel to approach within 3 nautical miles (5.5 kilometers) of a Steller sea lion rookery site listed in paragraph (a)(3) of this section;

(858) (ii) No person may approach on land not privately owned within one-half statutory miles (0.8 kilometers) or within sight of a Steller sea lion rookery site listed in paragraph (a)(3) of this section, whichever is greater, except on Marmot Island; and

(859) (iii) No person may approach on land not privately owned within one and one-half statutory miles (2.4 kilometers) or within sight of the eastern shore of Marmot Island, including the Steller sea lion rookery site listed in paragraph (a)(3) of this section, whichever is greater.

(860) (3) Listed sea lion rookery sites. Listed Steller sea lion rookery sites consist of the rookeries in the Aleutian Islands and the Gulf of Alaska listed in Table 1.

(861) (4) Quota. If the Assistant Administrator determines and publishes notice that 675 Steller sea lions has been killed incidentally in the course of commercial fishing operations in Alaskan waters and adjacent areas of the U.S. Exclusive Economic Zone (EEZ) west of 141°W longitude during any calendar year, then it will be unlawful to kill any additional Steller sea lions in this area. In order to monitor this quota, the Director, Alaska Region, National Marine Fisheries Service, may require the placement of an observer on any fishing vessel. If data indicate that the quota is being approached, the Assistant Administrator will issue emergency rules to establish closed areas, allocate the remaining quota among fisheries, or take other action(s) to ensure that commercial fishing operations do not exceed the quota.

(862) (b) Exceptions-(1) Permits. The Assistant Administrator may issue permits authorizing activities that would otherwise be prohibited under paragraph (a) of this section in accordance with and subject to the provisions of 50 CFR part 222, subpart C-Endangered Fish or Wildlife Permits.

(863) (2) Official activities. Paragraph (a) of this section does not prohibit or restrict a Federal, state or local government official, or his or her designee, who is acting in the course of official duties from:

(864) (i) Taking a Steller sea lion in a humane manner, if the taking is for the protection or welfare of the animal, the protection of the public health and welfare, or the nonlethal removal of nuisance animals; or

(865) (ii) Entering the buffer areas to perform activities that are necessary for national defense, or the performance of other legitimate governmental activities.

(866) (3) Subsistence takings by Alaska natives. Paragraph (a) of this section does not apply to the taking of Steller sea lions for subsistence purposes under section 10(e) of the Act.

(867) (4) Emergency situations. Paragraph (a)(2) of this section does not apply to an emergency situation in which compliance with that provision presents a threat to the health, safety, or life of a person or presents a significant threat to the vessel or property.

(868) (5) Exemptions. Paragraph (a)(2) of this section does not apply to any activity authorized by a prior written exemption from the Director, Alaska Region, National Marine Fisheries Service. Concurrently with the issuance of any exemption, the Assistant Administrator will publish notice of the exemption in the FEDERAL REGISTER. An exemption may be granted only if the activity will not have a significant adverse affect on Steller sea lions, the activity has been conducted historically or traditionally in the buffer zones, and there is not readily available and acceptable alternative to or site for the activity.

(869) (c) Penalties. (1) Any person who violates this section or the Act is subject to the penalties specified in section 11 of the Act, and any other penalties provided by law.

(870) (2) Any vessel used in violation of this section or the Endangered Species Act is subject to forfeiture under section 11(e)(4)(B) of the Act.

50 CFR 227.12

Table 1. Listed Steller Sea Lion Rookery Sites[1]

Island	From		To		NOAA chart	Notes
	Lat.	Long.	Lat.	Long.		
1. Outer I	59°20.5 N	150°23.0 W	59°21.0 N	150°24.5 W	16681	S quadrant.
2. Sugarloaf I	58°53.0 N	150°02.0 W			16580	Whole island.
3. Marmot I	58°14.5 N	151°47.5 W	58°10.0 N	151°51.0 W	16580	SE quadrant.
4. Chirikof I	55°46.5 N	155°39.5 W	55°46.5 N	155°43.0 W	16580	S quadrant.
5. Chowiet I	56°00.5 N	156°41.5 W	56°00.5 N	156°42.0 W	16013	S quadrant.
6. Atkins I	55°03.5 N	159°18.5 W			16540	Whole island.
7. Chernabura I	54°47.5 N	159°31.0 W	54°45.5 N	159°35.5 W	16540	SE corner.
8. Pinnacle Rock	54°46.0 N	161°46.0 W			16540	Whole island.
9. Clubbing Rks (N)	54°43.0 N	162°26.5 W			16540	Whole island.
Clubbing Rks (S)	54°42.0 N	162°26.5 W			16540	Whole island.
10. Sea Lion Rks	55°28.0 N	163°12.0 W			16520	Whole island.
11. Ugamak I	54°14.0 N	164°48.0 W	54°13.0 N	164°48.8 W	16520	E end of island.
12. Akun I	54°17.5 N	165°34.0 W	54°18.0 N	165°31.0 W	16520	Billings Head Bight.
13. Akutan I	54°03.5 N	166°00.0 W	54°05.5 N	166°05.0 W	16520	SW corner, Cape Morgan.
14. Bogoslof I	53°56.0 N	168°02.0 W			16500	Whole island.
15. Ogchul I	53°00.0 N	168°24.0 W			16500	Whole island.
16. Adugak I	52°55.0 N	169°10.5 W			16500	Whole island.
17. Yunaska I	52°42.0 N	170°38.5 W	52°41.0 N	170°34.5 W	16500	NE end.
18. Seguam I	52°21.0 N	172°35.0 W	52°21.0 N	172°33.0 W	16480	N coast, Saddleridge Pt.
19. Agligadak I	52°06.5 N	172°54.0 W			16480	Whole island.
20. Kasatochi I	52°10.0 N	175°31.0 W	52°10.5 N	175°29.0 W	16480	N half of island.
21. Adak I	51°36.5 N	176°58.5 W	51°38.0 N	176°59.5 W	16460	SW point, Lake Point.
22. Gramp rock	51°29.0 N	178°20.5 W			16460	Whole island.
23. Tag I	51°33.5 N	178°34.5 W			16460	Whole island.
24. Ulak I	51°20.0 N	178°57.0 W	51°18.5 N	178°59.5 W	16460	SE corner, Hasgox Pt.
25. Semisopochnoi	51°58.5 N	179°45.5 E	51°47.0 N	179°46.0 E	16440	E quadrant, Pochnoi Pt.
Semsopochnoi	52°01.5 N	179°37.5 E	52°01.5 N	179°39.0 E	16440	N quadrant, Petrel Pt.
26. Amchitka I	51°22.5 N	179°28.0 E	51°22.0 N	179°25.0 E	16440	East Cape.
27. Amchitka I	51°32.5 N	178°50.0 E			16440	Column Rocks
28. Ayugadak Pt	51°45.5 N	178°24.5 E			16440	SE coast of Rat island.
29. Kiska I	51°57.5 N	177°21.0 E	51°56.5 N	177°20.0 E	16640	W central, Lief Cove.
30. Kiska I	51°52.5 N	177°13.0 E	51°53.5 N	177°12.0 E	16440	Cape St. Stephen.
31. Walrus I	57°11.0 N	169°56.0 W			16380	Whole island.
32. Buldir I	52°20.5 N	175°57.0 E	52°23.5 N	175°51.0 E	16420	SE point to NW point.
33. Agattu I	52°24.0 N	173°21.5 E			16420	Gillion Point.
34. Agattu I	52°23.5 N	173°43.5 E	52°22.0 N	173°41.0 E	16420	Cape Sabak.
35. Attu I	52°57.5 N	172°31.5 E	52°54.5 N	172°28.5 E	16420	Cape Wrangell.

[1]Each site extends in a clockwise direction from the first set of geographic coordinates along the shoreline at mean lower low water to the second set of coordinates; or, if only one set of geographic coordinates is listed, the site extends around the entire shoreline of the island at mean lower low water

3. CAPE SPENCER TO BEAUFORT SEA

(1) **Alaska,** the largest of the United States, occupies the NW part of the North American continent. The State is bordered on the E and S by Canada and on the W and N by the Pacific and Arctic Oceans. The northernmost point of Alaska is Point Barrow (71°23'N., 156°28'W.); the westernmost point is Cape Wrangell (52°55'N., 172°26'E.) on Attu Island; and the southernmost point is Nitrof Point (51°13.0'N., 179°07.7'W.), on Amatignak Island. Cape Muzon (54°40'N., 132°41'W.) is on the historic parallel which is the coastal boundary between Alaska and Canada's British Columbia. Cape Muzon is on the N side of Dixon Entrance and is 480 miles NW of Cape Flattery, Washington; between the two United States capes is the coastal area of British Columbia.

(2) Alaska was purchased from Russia in 1867 and became an organized territory of the United States in 1912. By Presidential proclamation of January 3, 1959, Alaska officially became the 49th of the United States. Principal resources are oil, timber, fish, and coal. Alaska has a general ocean coastline of 5,770 nautical miles and a tidal shoreline of 29,462 miles. The State is so huge that its description requires two complete volumes of the National Ocean Service's nine-volume series of United States Coast Pilots.

(3) Coast Pilot 9 deals with the Pacific and Arctic coasts of Alaska from Cape Spencer to Beaufort Sea; general ocean coastline totals 5,520 nautical miles, and tidal shoreline totals 18,377 miles. Included are the Gulf of Alaska coast and islands, the Alaska Peninsula, the Aleutian Islands, and the United States coasts and islands of the Bering Sea, Chukchi Sea, and Beaufort Sea.

(4) Between Cape Spencer and Cape St. Elias, the coast is fairly regular. Along this stretch are Lituya Bay, Yakutat Bay, and Icy Bay. The great Malaspina Glacier comes to within 3 miles of the ocean W of Yakutat Bay.

(5) From Cape St. Elias to Cook Inlet, the characteristic formation is generally rocky; the waters are mostly deep, but there are also great variations in depth. The visible topographic features, such as the mountains and the rugged islands, probably are duplicated underwater.

(6) In Cook Inlet, the characteristic formation is the result of glacial action. The shores are strewn with boulders, some of great size, and soundings indicate the existence underwater of similar boulders, particularly in areas of hard bottom where the boulders have not been buried by silt.

(7) W from Cook Inlet, and throughout the islands off the SE side of the Alaska Peninsula, rock formation is again found. The principal harbors are Kodiak on Kodiak Island, Sand Point in the Shumagin Islands, and King Cove and False Pass on the SE side of the Peninsula.

(8) The Aleutian Islands are rugged and mountainous, with numerous off-lying islets, rocks, and reefs. Some of the larger islands provide more or less sheltered anchorage.

(9) The Bering Sea is characterized in general by shallow waters, with extensive sand and mud flats along the shores, particularly in the approaches to the various bays and rivers. There is little rock formation, and its occurrence, where found, is limited in area.

(10) The Arctic coast is mostly low, especially to the N of Cape Lisburne. The principal landing places are Kotzebue and Barrow.

(11) **Disposal Sites** and **Dumping Grounds.**–These areas are rarely mentioned in the Coast Pilot, but are shown on the nautical charts. (See Disposal Sites and Dumping Grounds, chapter 1, and charts for limits.)

(12) **Aids to navigation.**–Lights, although infrequent along much of this coast, do mark the important headlands and passages; fog signals are at most of the principal lights. Many of the buoys in the important passages are equipped with radar reflectors, which greatly increase the range at which the buoys may be detected. Many of the aids to navigation in Alaska are seasonal. There are aerolights in Alaska that are useful for navigation purposes, but these should not be confused with marine lights. (See the Light List for a complete description of navigational aids.)

(13) **Electronic navigation.**–Radar, loran, radar beacons (Racons), and the radio direction finder have given the navigator means of determining his position in any weather. The mariner should, however, appreciate the limitations and sources of error of the various systems. Radar should be properly calibrated and tuned. Radio direction finders must be calibrated, and the operator should become experienced in the use of the equipment. Radar, radio direction finder, and loran equipment are subject to malfunctions which may not be immediately apparent to the operator, and there are conditions when loran or radio signals may be subject to error when the shipboard receiver is operating properly. Soundings should always be taken in critical places, and the position should be checked by visual bearings when possible.

(14) Except for the Arctic Coast of Alaska, where radar beacons (Racons) are seasonally maintained, navigation by **radar** is facilitated along the remainder of the coast of Alaska and in the various passages by the generally high relief of the coastline. The rugged coast provides many points, headland, large offshore rocks and islands which give accurate radar ranges and bearings. Radar ranges are more accurate than radar bearings. When two or more suitable targets can be positively identified, a better fix is obtained by radar ranges alone than by radar ranges and bearings. When visibility permits, visual bearings should always be taken. When positioning by a bearing and a radar range of a single object, the identification of the target must be positive. Floating aids to navigation should not be used as targets for fixing position.

(15) Radiobeacons are limited in the area of this Coast Pilot. Radio direction finder equipment is subject to several kinds of errors. Bearings obtained at twilight or at night or bearings which are almost parallel to the coast should be accepted with reservations, due to "night effect" and to the distortion of the radio waves if traveling overland. Other sources of error in the system may be avoided by the proper calibration of the shipboard receiver.

(16) **Loran** provides good coverage from several stations along the North Pacific Ocean. These stations provide vessels generally good fixes when sailing along the coast or approaching the coast from seaward.

(17) The frequent occurrence of fog along this coast makes radar an invaluable aid in detecting other traffic and obtaining a line of position and/or fix. Bridge-to-bridge radio communication (VHF-FM) is another useful aid, regardless of weather, in waters where maneuvering room is limited or restricted. The use of VHF-FM equipment for short-range communication is increasing, and so are the number of vessels equipped with this equipment. The primary advantages of this radio system are its line-of-sight characteristic and relative freedom from static interference.

(18) **Radar beacons (Racons)** have been established in the area of this Coast Pilot as additional aids to navigation. Most are along the U.S. Arctic Coast of Alaska from Point Lay (69°44.1'N., 163°00.6'W.) to Brownlow Point (70°09.6'N., 145°50.6'W.). **Racons** are generally seasonally maintained from July 1 to September 15. (See Racons, chapter 1, for additional information.)

(19) **COLREGS Demarcation Lines.**–The International Regulations for Preventing Collisions at Sea, 1972 (72 COLREGS) apply on all the sounds, bays, harbors, and inlets of Alaska. (See **Part 80,** chapter 2.)

(20) **Shipping Safety Fairways.**-A system of shipping safety fairways has been established in the approaches to Prince William Sound and through Unimak Pass. The Prince William Sound Safety Fairway, extending SE from Hinchinbrook Entrance, has separate inbound and outbound traffic lanes that merge in the NW part. The Unimak Pass Safety Fairway is comprised of an E-W fairway with a connecting N-S fairway in the W section. (See **166.100 through 166.110 and 166.400,** chapter 2, for limits and regulations.)

(21) **Ports and Waterways Safety.**–(See **Part 160,** chapter 2, for regulations governing vessel operations and requirements for notification of arrivals, departures, hazardous conditions, and certain dangerous cargoes to the Captain of the Port.)

(22) A **Traffic Separation Scheme (Traffic Lanes)** has been established in Prince William Sound. (See chapter 4, for details.)

(23) A **Vessel Traffic Service (VTS)** has been established in the Prince William Sound area. The Service has been established to prevent collisions and groundings, and to protect the navigable waters from environmental harm.

(24) The Vessel Traffic Service provides for a **Vessel Traffic Center (VTC)** that regulates the routing and movement of vessels by radar surveillance, movement reports of vessels, VHF-FM radio communications, and specific reporting points. The system consists of traffic lanes, a separation zone, and reporting points.

(25) The Service is mandatory. (See **161.301** through **161.387,** chapter 2, for rules and regulations, and chapter 4 for details.)

(26) **Anchorages.**–Many of the harbors in the mountainous areas are subject to violent williwaws. These severe gusts may come from any direction and should be considered when selecting an anchorage.

(27) **Dangers.**–Offshore drilling and exploration operations are increasing in the waters of Alaska, especially in Cook Inlet.

(28) Obstructions in these waters consist of submerged wells and oil well structures (platforms), including appurtenances thereto, such as mooring piles, anchor and mooring buoys, pipes, and stakes.

(29) In general, the oil well structures (platforms), depending on their size, depth of water in which located, proximity of vessel routes, nature and amount of vessel traffic, and the effect of background lighting, may be marked in one of the following ways:

(30) Quick flashing white light(s) visible at least 5 miles: fog signal sounded when visibility is less than 5 miles.

(31) Quick flashing white light(s) visible at least 3 miles: fog signal sounded when visibility is less than 3 miles.

(32) Quick flashing white or red lights visible at least 1 mile: may or may not be equipped with fog signal.

(33) Structures on or adjacent to the edges of navigable channels and fairways, regardless of location, may be required to display lights and fog signals for the safety of navigation.

(34) Associated structures within 100 yards of the main structure, regardless of location, are not normally lighted but are marked with red or white retro-reflective material. Mariners are cautioned that uncharted submerged pipelines and cables may exist in the vicinity of these structures, or between such structures and the shore.

(35) During construction of a well or during drilling operations, and until such time as the platform is capable of supporting the required aids, fixed white lights on the attending vessel or drilling rig may be shown in lieu of the required quick flashing lights on the structure. The attending vessel's foghorn may also be used as a substitute.

(36) Submerged wells may or may not be marked depending on their location and depth of water over them.

(37) All obstruction lights and fog signals, used to mark the various structures, are operated as privately maintained aids to navigation. (See **33 CFR 67,** for detailed regulations for the marking of offshore structures.)

(38) Information concerning the establishment, change, or discontinuance of offshore oil-well structures and their appurtenances is published in the Local Notice to Mariners or by Broadcast Notice. Additional information may also be obtained from the Coast Guard Commander. Mariners are advised to navigate with caution in the vicinity of these structures and in those waters where oil exploration is in progress, and to use the latest and largest scale chart of the area.

(39) During the continuing program of establishing, changing, and discontinuing oil-well structures, special caution should be exercised when navigating the inshore and offshore waters of the affected areas in order to avoid collision with any of the structures.

(40) Information concerning seismographic operations is not published in Notice to Mariners unless such operations create a menace to navigation in waters used by general navigation. Where seismographic operations are being conducted, casings (pipes), buoys, stakes, and detectors are installed. Casings are marked with flags by day and fixed red lights by night; buoys are colored international orange and white horizontal bands; and stakes are marked with flags.

(41) **Pipelaying barges.**–With the increased number of pipeline laying operations, operators of all types of vessels should be aware of the dangers of passing close aboard, close ahead, or close astern of a jetbarge or pipelaying barge. Pipelaying barges and jetbarges usually move at 0.5 knot or less and have anchors which extend out about 3,500 to 5,000 feet in all directions and which may be marked by lighted anchor buoys. The exposed pipeline behind the pipelaying barge and the area in the vicinity of anchors are hazardous to navigation and should be avoided. The pipeline and anchor cables also represent a submerged hazard to navigation. It is suggested, if safe navigation permits, for all types of vessels to pass well ahead of the pipelaying barge or well astern of the jetbarge. The pipelaying barge, jetbarge, and attending vessels may be contacted on VHF-FM channel 16 for passage instructions.

(42) **Kelp** grows on nearly every danger with a rocky bottom and is particularly heavy in many places in the Aleutian Islands. It will be seen on the surface of the water during the summer and autumn; during the winter and spring it is not always to be seen, especially where it is exposed to a heavy sea. Many rocks are not marked by kelp, because a heavy sea will occasionally tear it away and a moderate current will draw it under water so that it will not be seen. When passing on the side of a kelp patch from which the stems stream away with the current, care should be taken to give it a good berth. Dead, detached kelp, floats on the water swirled in masses, while live kelp, attached to rocks, streams

away level with the surface. Live kelp is usually an indication of depths less than 10 fathoms.

(43) **Logs and deadheads.**–Mariners are cautioned that a large number of logs and deadheads are adrift in the navigable waters of Alaska at all times particularly after storms and unusually high tides. Mariners are urged to be alert for the presences of such logs and deadheads, as they constitute a serious menace to craft of small and moderate size.

(44) **Danger zones** and **Restricted areas** are along the Alaskan coast. (See **Part 334**, chapter 2, for limits and regulations.)

(45) **Tides.**–The greatest diurnal range of tide in the United States is the 33.3 feet in Turnagain Arm, Cook Inlet. In contrast, Point Barrow has a diurnal range of only 0.4 foot. (See the Tide Tables for more detailed information.)

(46) **Caution.**–In using the Tide Tables, high or low water should not be confused with slack 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 water may differ by several hours from the time of high or low water stand. The relation of the times of high and low water to the turning of the current depends upon a number of factors, hence no simple rule can be given. (See the Tidal Current Tables for predicted times of slack water or strength of current.)

(47) **Currents.**–The nontidal current that sets N and W along the coasts of British Columbia and Alaska is greatly affected by strong winds and may reach velocities of 1.5 knots; the offshore extent of this current is not known but it is believed to be strongest between the 100-fathom curve and the coast. (See the Tidal Current Tables for more detailed information on currents.)

(48) **Tide rips** and **Swirls** in regions of strong currents usually are encountered in the vicinities of shoals, islands, or points and are, therefore, generally positive indications of danger. The backwash from seas striking steep cliffs often is felt at a considerable distance. In thick weather, any change in the feel of a moving vessel should be considered a warning of possible danger.

(49) **Earthquakes.**–The March 27, 1964, earthquake had wide effect on Prince William Sound, Cook Inlet, and Kodiak Island. Post-earthquake tidal observations indicate bottom changes ranging from a sinkage of 6 feet to a rise of 32 feet. Caution is advised in the affected areas because many of the depths and rocks yet to be resurveyed may be considerably different than represented on the nautical charts or in this Coast Pilot.

(50) **Tsunamis (seismic sea waves).**–There is no record of any destructive seismic sea wave along the Bering Sea coast of the Alaska mainland. The rest of Alaska, especially the area from Attu Island to Cape Spencer, occasionally is subject to severe waves which cause widespread damage to waterfront areas and shipping. Loss of life and property can be reduced by correct response to warning that such waves are imminent. (See chapter 1 for details about these waves.)

(51) One of the world's most active seismic belts parallels the S sides of the Aleutian Islands and the Alaska Peninsula. Another active belt parallels southeast Alaska and Canada. Earthquakes are frequent in both these areas but only a very few generate seismic waves. The National Oceanic and Atmospheric Administration has the Alaska Tsunami Warning Center at Palmer, Alaska, which will issue warnings of tsunamis generated in the Gulf of Alaska and the Aleutian Islands. Because of extensive telemetry nets, it is anticipated that this center will be able to issue tsunami warnings, based on seismic evidence, within 15 minutes of the occurrence of the generating earthquake. Warnings will be disseminated by the National Weather Service on NOAA Weather Radio and through Civil Defense and military authorities.

(52) Because of the long length of Alaskan coastline and the vulnerability of communication facilities to major earthquakes, any unexplained withdrawal or advance of the sea within an hour or so after an earthquake is felt should be considered nature's warning of an approaching wave.

(53) When a warning is received, persons should vacate waterfront areas and seek high ground. The safest procedure for ships will depend on the amount of time available, and this may not always be known. A ship well out at sea would ride such waves safely, and hence if time is available to put to sea, that would be the safest action. On the other hand, the crew of a ship in harbor may have a difficult time averting serious damage. The ship may be washed ashore by incoming waves or grounded because of excessive withdrawal of water between crests. Much of the damage in the Los Angeles area during the 1960 Chilean tsunami was caused by rapid currents and the swift rise and fall of the water level that parted mooring lines and set floating docks and ships adrift.

(54) **Weather.**–Dates of ice breakup and freezeup, climatological tables for coastal locations and meteorological tables for the coastal ocean area covered in this volume follow the appendix. The tables for the ocean area were compiled from observations made by ships in passage. Listed in the appendix are National Weather Service offices and radio stations which transmit weather information.

(55) Marine Weather Services Charts published by the National Weather Service show radio stations that transmit marine weather broadcasts and additional information of interest to mariners. These charts are for sale by the National Ocean Service Distribution Branch (N/CG33). (See appendix for address.)

(56) This section presents an overall, seasonal picture of the weather that can be expected in the offshore waters along the entire coast of Alaska. Detailed information, particularly concerning navigational weather hazards, can be found in the appropriate coastal sections.

(57) **Winter (October–March).**–The Aleutian Low looms over the North Pacific as a climatic warning to mariners navigating the Alaskan waters. This semipermanent feature is made up of the day-to-day storms that traverse these seas in a seemingly endless procession. And with these storms come the rain, sleet, snow, the howling winds, and the mountainous seas that make the northern Gulf of Alaska and the southern Bering Sea among the most treacherous winter waters in the Northern Hemisphere.

(58) The broad expanse of the Aleutian Low covers the Pacific Basin from the Arctic Ocean to 30°N, and from the North American coast to Japan. The center migrates from the Bristol Bay-northwestern Aleutian Islands by midwinter. While this migration indicates a shift in storm activity, particularly intensity, three of four storms per month still move through the area each month, on the average. Winter or extratropical storms from the Asian mainland and the waters around Japan generally move NE toward the Aleutians and then into either the Bering Sea or the Gulf of Alaska. Once they reach the Alaskan coast, they have a tendency to stall and dissipate, particularly in the Gulf, where there are mountain barriers to the N and E. Early winter storms are often intense and are more likely to make it into the Bering Sea than mid- and late-season storms. This makes the early part of the winter the roughest part of a rough season in the Gulf and the southern Bering Sea. As winter progresses, more storms remain S of the Aleutians

which results in a noticeable difference in wind, wave, and weather conditions in the navigable Alaskan waters.

(59) Winter winds are variable. No one direction prevails. In the northern Gulf, easterlies, southeasterlies, and westerlies are common. In the southern Bering Sea, including the Aleutian waters, SW through NW winds common early in the season give way to N through E winds by January. This is a reflection of the more S route of storms. Gales, which blow 10 to 20 percent of the time, are most likely in November and December. Windspeeds average 16 to 20 knots; peak values occur in October, November, and December. Wave heights climb to 10 feet or more throughout the winter. In situations that occur on the average of once every five years, severe wind and wave conditions may be encountered. Along the Aleutians, sustained winds may reach 65 to 70 knots; significant wave heights can climb to 40 to 50 feet, with an extreme wave height reaching 80 to 90 feet. In the northern and western Gulf of Alaska and in Bristol Bay, sustained winds may reach 60 to 70 knots; significant wave heights can climb to 30 to 40 feet, with an extreme wave height of 60 to 75 feet. These extremes are most likely to occur during the winter season.

(60) In winter, precipitation occurs 20 to 35 percent of the time. It is most likely along the Aleutians, where it falls as snow more than one-half of the time in midwinter. In the Gulf, it snows about 5 to 10 percent of the time. Since snow is the primary restriction to visibility in the winter, restrictions are most likely to occur along the Aleutians. Visibilities less than 2 miles occur 5 to 15 percent of the time. Cold winter temperatures are a result of winds blowing off land or off the ice sheet. Temperatures drop to freezing or below about 20 to 30 percent of the time in January. Rare polar outbreaks from the Arctic can drop temperatures into the teens.

(61) Heavy swells out of the S through SW in Aleutian waters are often forerunners of intense storms from the waters around Japan. They can climb to 20 to 30 feet. As storms from the S or W approach the Aleutians, they bring clouds and either rain or snow. Winds blow out of the NE through SE. They can reach gale force and whip up 30-foot seas. Gales and high seas can occur before and after the storm passes.

(62) Lows running E with their centers S of the Aleutians, as is common in midwinter, usually bring E winds backing through N to W over the southern Bering Sea. These winds can reach 60 knots, with seas to 30 feet. As these storms and storms from the mid-Pacific approach the Gulf of Alaska, they are sometimes preceded by heavy swells from the SE through the SW. Then winds strengthen out of the NE through S as clouds and rain begin to move in. Gales and 30-foot seas are not unusual with intense storms. Sometimes they will stall in the Gulf and prolong these rough conditions for several days. When a low is centered in the eastern Gulf, winds are generally out of the E off Sitka, out of the N off Seward, and out of the NW off Kodiak.

(63) Storms that move E or NE, remaining N of the Aleutians, as is common early and late in the season, are followed by a SW through N flow that can reach gale force, raise high seas, and bring snow. If these storms move into Bristol Bay, they can create a strong SE to SW flow in the northern Gulf of Alaska which can raise 20-foot seas.

(64) In the Gulf of Alaska, conditions are often roughest in the waters S of Seward and E of Kodiak Island. The long fetch to the E and SE allows a buildup of sea and swell from that quarter. Wave heights reach 20 feet or more up to 8 percent of the time in November, the roughest month. This is as rough as it gets in the Aleutians. Gales are most frequent here, blowing 15 to 17 percent of the time early in the season. While they blow most often out of the E, they are also common from the W and NW.

(65) **Summer (April–September).**–The changeover from winter to summer is subtle. The Aleutian Low slowly weakens and retreats, while the North Pacific High gradually strengthens and advances. The storms still come, but they are less intense. Winds get strong, but become gales less often. Rough seas are encountered, but less frequently. Clouds and rain remain a persistent weather feature, but snow and cold retreat N. Winds blow more often from a S quarter, bringing warmth and the most dangerous and frequent summer-weather navigational hazard, fog.

(66) Fog hampers navigation most often during June, July, and August. It is an advection or sea fog that forms when warm moist air blows across cooler water. The southwesterlies and westerlies that blow across the cold Oyashio Current, which runs S along Kamchatka and the Kurils, often bring a dense, widespread fog to the Aleutians and the southern Bering Sea. This fog can engulf a ship traversing these waters, for several days. Sea fog is also common, but a little less frequent, in the northern Gulf of Alaska and along the northwest and north coasts of Alaska. Off the west coast of Alaska and along the Aleutians, visibilities drop below 2 miles about 20 to 40 percent of the time, and 0.5 mile or below up to 20 percent of the time. Elsewhere, fog is about one-half as frequent.

(67) During May and June, summer weather features become more apparent. While the lows that move through the area cause variable winds, S through W winds are the most common. Gales occur less than 10 percent of the time everywhere; they are least likely in June, July, and August. Seas of 20 feet or more are unlikely from May through August, when seas of 10 to 20 feet occur 5 to 15 percent of the time; they are most likely in the northwestern Gulf and the Aleutians. Off the north coast, they have been observed less than 5 percent of the time. Freezing temperatures are rare from June through September except off the north coast.

(68) The weather-producing storm systems are gradually forced N by the North Pacific High. Some still move over the old winter routes, but they are usually weak. By midsummer, numerous weak lows find their way through the Bering Sea and Strait. This results in a maximum of cloudiness and precipitation off the northwest and north coasts of Alaska, and a minimum in the Gulf of Alaska and along the Aleutians. The more restricted movements of these storms and the clockwise flow around the North Pacific High to the S help make S through W winds the most common in the Alaskan coastal waters, except off the north coast where northeasterlies and easterlies prevail.

(69) September weather is often a harbinger of winter. This transition is usually more abrupt than the change from winter to summer. More storms begin moving into Bristol Bay and the Gulf of Alaska; some are intense. Gales blow up to 5 percent of the time, and 20- to 30-foot seas are occasionally encountered in the northwestern Gulf and southern Bering Sea. Waves of 10 feet or more occur up to 20 percent of the time. Breezy, warm days alternate with cool, stormy ones. Winter is approaching.

(70) **Superstructure icing.**–Ice accretion on ships can occur in coldwater seas. It is caused by freezing spray, freezing rain, or steam fog. On large merchant ships, it often results in only slippery decks, since they have a high freeboard and often pass quickly through icing conditions. Fishing trawlers, small merchant ships, and Coast Guard cutters have other problems. Their freeboards are relatively low. A trawler often has a large top hamper and is usually confined to one area for long periods. On a small ship, icing can greatly increase the weight. It elevates the center of gravity,

which decreases the metacentric height. It increases the sail area and heeling moment due to wind action. The trim is altered because of the nonuniform distribution of ice. Icing hampers steerability and lowers ship speed.

(71) Freezing sea spray is by far the most common and dangerous form of icing. It can occur when the air temperature falls below the freezing temperature of seawater (usually about 28° F) and sea-surface temperatures are below about 41° F. If air temperature falls below about 0° F, wind-induced spray may freeze before striking the ship and not adhere. In general, however, the lower the temperature and the stronger the wind, the more rapid the accumulation of ice.

(72) Tests by the Russians, Japanese, and British have shown that when air temperatures are just below the freezing point of the seawater, ice buildup is slow, and will not accumulate at more than 1 ton per hour on a 300- to 500-ton vessel, in any wind. On a vessel of this size, a moderate buildup of less than 4 tons per hour will generally occur with air temperatures between 27° F and 18° F, in winds of 16 to 30 knots. When winds exceed 30 knots and temperatures drop below 18° F, conditions are right for an accumulation rate of more than 4 tons per hour on a 300- to 500-ton vessel. These figures are somewhat subjective, and represent a compromise of opinions of the major maritime nations.

(73) Freezing rain can coat a ship with a freshwater glaze of ice the same way it covers trees and roads on land. The weight picked up is usually not enough to endanger a ship, but this ice can make topside conditions dangerous. Steam fog can occur when the air temperature is below freezing and is also considerably colder than the sea. It is usually confined to a layer a few feet thick. Trawlermen call it "white frost" when the top of the layer is below the observer's eye level, and "black frost" when it extends above the observer. The small water droplets in this fog are supercooled (exist as water even though the temperature is below freezing) and freeze on contact with the cold ship. Usually, ice accretion by this method is small. However, there are exceptions. The ERNEST HOLT, about 100 miles E of Bjornoya Island (an island N of Norway) and 20 miles from the ice edge, ran into a dense steam fog. She took 4 inches of rime ice on the deck, with up to 12 inches on the ship's side at the level of the rail, within a 12-hour period.

(74) The two categories of potential icing are somewhat subjective, but give a relative idea of which areas are dangerous. Moderate icing potential exists when temperatures fall to 28°F or below, and winds blow at 13 knots or more. This means a probable accumulation of up to about 2 inches per hour. The potential for severe icing (greater than 2 inches per hour) exists when temperatures are 16°F or lower, and winds are 30 knots or more.

(75) Superstructure icing is a threat in the northern Gulf of Alaska and along the Aleutians, from about November through April. In the Gulf, the waters around Kodiak Island are the worst. Here the potential for moderate icing exists 10 to 20 percent of the time from December through March, compared to a 3- to 10-percent potential in the other Gulf coastal waters. There is also a slight chance of severe icing in Kodiak waters during this period. The December-through-March period is also the roughest along the Aleutians, where the potential for moderate superstructure icing exists 10 to 25 percent of the time; severe icing is unlikely since temperatures rarely get down into the teens. In the ice-free waters of the southern Bering Sea and Bristol Bay, the potential for moderate superstructure icing exists 20 percent or more of the time from December through March, and up to 50 percent of the time in February. Severe icing is also a threat in February, when the conditions for it occur 5 to 10 percent of the time. Icing in the navigable northern Bering Sea waters can be a threat as early as September and as late as May.

(76) Icing rates can be cut by slowing down to reduce ship-generated spray. A course change to reduce spray, however, should be secondary to getting away from the icing, except in critical conditions. Another precaution is to remove the ice, if possible. When icing becomes a problem, it is important first to free the aerials, freeing ports, stays, shrouds, masts, rigging davits, running and navigational lights, windlass, and hawsepipes. If the ice is unevenly distributed, it should be removed from the listing side first.

(77) The Russians are well experienced with superstructure icing, as they do a lot of coldwater fishing. From a proposal they made to the International Maritime Organization (IMO), here are some excellent suggestions of what to do in an icing situation.

(78) **Tips to keep icing hazards to a minimum aboard fishing vessels:**

(79) 1. Head for warm water or protected coastal areas.

(80) 2. All fishing gear, barrels, and deck gear should be placed below deck or fastened to the deck as low as possible.

(81) 3. Cargo booms should be lowered and fastened.

(82) 4. Deck machinery and boats should be covered.

(83) 5. Storm rails should be fastened.

(84) 6. Gratings should be removed from scuppers, and all objects that might prevent water drainage from the deck should be moved.

(85) 7. Ship should be as watertight as possible.

(86) 8. If freeboard is high enough, all empty bottom tanks containing ballast piping can be filled with seawater.

(87) 9. Reliable two-way radio communication should be established either with a shore station or another ship.

(88) **Williwaws.**–These dangerous winds occur mainly along the Aleutian chain and Gulf of Alaska shores, and are influenced by local topography. They are most frequent in winter and are usually the result of air damming up on the windward slopes of mountains. This air spills over in strong gusts on the lee side; that lasts as long as the dammed-up cold air lasts, which frequently is only a matter of minutes. However, such winds are violent, often reaching hurricane force, and their onset is sudden, often interrupting periods of near-calm conditions. Some locations sheltered from the normal winds of the area may be extremely vulnerable to williwaws.

(89) **Ice.**–Ports in the Aleutian Islands and in the Gulf of Alaska, except at the upper end of Cook Inlet, are ice free and open to navigation the year around. Ports N of Unimak Pass are icebound in varying degrees. (See page T–21 for dates of ice breakup and freezeup.)

(90) **Routes.**–These are the usually traveled routes in W Alaska. In laying out courses to pass through the geographic positions of the turning points listed, allowance must be made for wind and current. Departure from these routes may become necessary because of weather conditions and ice in the more N latitudes. Special attention should be given to the continual current setting N and W along the coast of Alaska. Where necessary, directions for entering a port are given in the text for the place concerned, including information about dangers, prominent features, and other pertinent information.

(91) **Strait of Juan de Fuca to Prince William Sound ports (Cordova, Valdez, Whittier).**–Rhumb lines through:

(92) 48°31′N., 125°00′W.; Swiftsure Bank, Washington.

(93) 48°50′N., 125°39′W.; of Amphitrite Point, Canada.

(94) 50°01′N., 128°03′W.; off Solander Island, Canada.

(95) 51°49′N., 131°12′W.; off Cape St. James, Canada.

(96) 60°13′N., 146°41′W.; off Cape Hinchinbrook, Alaska.

(97) **Strait of Juan de Fuca to Seward.**–Same as to Prince William Sound ports to 51°49′N., 131°12′W., thence great circle to 59°51′N., 149°17′W., S of Barwell Island off Cape Resurrection.

(98) **Strait of Juan de Fuca to Cook Inlet ports (Seldovia, Homer, Nikishka, Drift River, Anchorage).**–Same as to Prince William Sound ports to 50°01′N., 128°03′W., thence great circle to 59°03′N., 151°26′W., off East Chugach Island.

(99) **Strait of Juan de Fuca to Kodiak.**–Same as to Prince William Sound ports to 50°01′N., 128°03′W., thence great circle to 57°42′N., 152°09′W., N of Cape Chiniak.

(100) **Strait of Juan de Fuca to Unimak Pass.**–Great circle from 48°31′N., 125°00′W., to 54°00′N., 163°00′W., thence rhumb line to 54°20′N., 164°45′W., off Scotch Cap.

(101) **Cape Spencer to Prince William Sound ports.**–Rhumb lines through:

(102) 58°10′N., 136°38′W.; off Cape Spencer.

(103) 59°43′N., 144°38′W.; S of buoy off Cape St. Elias.

(104) 60°13′N., 146°41′W.; off Cape Hinchinbrook.

(105) **Cape Spencer to Seward.**–Rhumb lines through:

(106) 58°10′N., 136°38′W.; off Cape Spencer.

(107) 59°21′N., 146°19′W.; S of Middleton Island.

(108) 59°51′N., 149°17′W.; S of Barwell Island off Cape Resurrection.

(109) **Cape Spencer to Cook Inlet ports.**–Rhumb line from 58°10′N., 136°38′W. to 59°03′N., 151°26′W.

(110) **Cape Spencer to Kodiak.**–Rhumb line from 58°10′N., 136°38′W. to 57°42′N., 152°09′W.

(111) **Prince William Sound ports to Seward.**–From Elrington Passage clear Cape Puget and Cape Junken by 1 mile, thence to 59°51′N., 149°17′W., S of Barwell Island off Cape Resurrection.

(112) **Prince William Sound ports to Cook Inlet.**–From Elrington Passage, rhumb lines through:

(113) 59°33′N., 149°38′W.; N of Seal Rocks.

(114) 59°21′N., 150°14′W.; off Outer Island.

(115) 59°09′N., 150°57′W.; off Gore Point.

(116) 59°03′N., 151°26′W.; off East Chugach Island.

(117) **Prince William Sound ports to Kodiak.**–From Elrington Passage, rhumb line to 57°50′N., 152°17′W.; off Spruce Cape.

(118) **Prince William Sound ports to Unimak Pass.**–Same as to Cook Inlet, thence Shelikof Strait route.

(119) **Seward to Cook Inlet.**–Rhumb lines through:

(120) 59°45′N., 149°26′W.; off Pilot Rock.

(121) 59°36′N., 149°32′W.; off Chiswell Island.

(122) 59°31′N., 149°40′W.; off Seal Rocks.

(123) 59°21′N., 150°14′W.; off Outer Island.

(124) 59°09′N., 150°57′W.; off Gore Point.

(125) 59°03′N., 151°26′W.; off East Chugach Island.

(126) **Seward to Kodiak.**–Same as to Cook Inlet to 59°31′N., 149°40′W., thence rhumb lines through:

(127) 58°21′N., 151°54′W.; off Tonki Cape.

(128) 58°13′N., 151°56′W.; Marmot Strait.

(129) 57°50′N., 152°17′W.; off Spruce Cape.

(130) **Seward to Unimak Pass.**–Same as to Cook Inlet, thence Shelikof Strait route.

(131) **Cook Inlet to Kodiak.**–Rhumb lines through:

(132) 59°03′N., 151°53′W.; S of Cape Elizabeth Island.

(133) 58°21′N., 151°54′W.; off Tonki Cape.

(134) 58°13′N., 151°56′W.; Marmot Strait.

(135) 57°50′N., 152°17′W.; off Spruce Cape.

(136) **Cook Inlet to Unimak Pass.**–Shelikof Strait route.

(137) **Shelikof Strait route—Cook Inlet to Unimak Pass.**–Rhumb lines through:

(138) 59°03′N., 151°26′W.; off East Chugach Island.

(139) 59°01.6′N., 152°19.0′W.; N of Ushagat Island.

(140) 57°38.5′N., 154°33.8′W.; off Cape Uyak.

(141) 56°27.0′N., 156°48.0′W.; off Foggy Cape.

(142) 55°46.0′N., 158°37.8′W.; SE of Mitrofania Island.

(143) 55°21.6′N., 160°03.6′W.; N of Andronica Island.

(144) 55°22.8′N., 160°21.7′W.; N of Popof Island.

(145) 55°26.0′N., 160°43.5′W.; off Unga Spit.

(146) 55°17.5′N., 161°15.2′W.; off Seal Cape Light.

(147) 55°17.2′N., 161°39.5′W.; N of Ukolnoi Island.

(148) 55°10.9′N., 161°54.2′W.; off Arch Point.

(149) 55°07.5′N., 161°55.6′W.; off Moss Cape.

(150) 55°06.7′N., 161°56.2′W.; NW of Goloi Island.

(151) 55°02.6′N., 161°54.5′W.; E of Iliasik Islands Light.

(152) 55°02.0′N., 161°55.5′W.; SE of Iliasik Islands Light.

(153) 55°00.5′N., 162°20.1′W.; N of Deer Island.

(154) 54°57.4′N., 162°27.6′W.; W of Fox Island.

(155) 54°48.1′N., 162°44.6′W.; W of Umga Island.

(156) 54°37.8′N., 163°03.6′W.; off Cape Pankof.

(157) 54°20′N., 164°45′W.; off Scotch Cap.

(158) **Kodiak to Unimak Pass.**–Proceed via Narrow Strait, Whale Passage, Kupreanof Strait, and Shelikof Strait route.

(159) **Unimak Pass to Aleutian Islands ports.**–Rhumb lines along the N coast of the Aleutian chain through:

(160) **To Dutch Harbor and Unalaska**

(161) 54°20′N., 164°45′W.; off Scotch Cap.

(162) 54°20′N., 165°38′W.; off Akun Head.

(163) 54°16′N., 166°00′W.; off North Head.

(164) 54°02′N., 166°24′W.; off Priest Rock Light.

(165) 53°55′N., 166°29′W.; off Ulakta Head.

(166) **To Kuluk Bay**

(167) 54°20′N., 164°45′W.; off Scotch Cap.

(168) 54°20′N., 165°38′W.; off Akun Head.

(169) 54°08′N., 166°40′W.; off Cape Cheerful.

(170) 53°36′N., 168°14′W.; N of Umnak Island.

(171) 52°28′N., 172°26′W.; N of Seguam Island.

(172) 52°28′N., 174°09′W.; off North Cape Light (Atka Island).

(173) 52°10′N., 176°09′W.; off Swallow Head Light (Great Sitkin Island).

(174) 51°54′N., 176°30′W.; E of Kuluk Shoal.

(175) **To Kiska**

(176) Same as to Kuluk Bay to 52°10′N., 176°09′W., thence rhumb lines through:

(177) 52°07′N., 179°46′E.; N of Semisopochnoi Island.

(178) 52°08′N., 178°05′E.; N of Segula Island.

(179) 52°05′N., 177°46′E.; E of Haycock Rock.

(180) 51°58′N., 177°35′E.; off North Head.

(181) **To Alcan Harbor**

(182) Same as to Kiska to 52°08′N., 178°05′E., thence rhumb lines through:

(183) 52°13′N., 177°38′E.; off Sirius Point (Kiska Island).

(184) 52°47′N., 174°05′E.; N of Shemya Island.

(185) **To Massacre Bay**

(186) Same as to Alcan Harbor, thence rhumb lines through:

(187) 52°49′N., 173°53′E.; N of Alaid Island.

(188) 52°47′N., 173°19′E.; off Alexai Point.

(189) Vessels may also proceed from Unimak Pass to Massacre Bay by great circle.

(190) **Unimak Pass to Bering Sea ports.**–Rhumb lines through:

(191) **To Port Moller**

(192) 54°20′N., 164°45′W.; S of Scotch Cap Light.

(193) 54°24′N., 164°59′W.; W of Scotch Cap Light.

(194) 54°36′N., 165°04′W.; off Cape Sarichef Light.

(195) 55°00′N., 164°36′W.; off Cape Mordvinof.

(196) 55°31′N., 163°18′W.; off Sea Lion Rock.

(197) 55°53′N., 162°15′W.; off Black Hill.

(198) 56°06′N., 160°50′W.; thence to entrance buoy.

(199) **To Kvichak Bay**

(200) Same as to Port Moller to 55°00'N., 164°36'W.; thence rhumb lines through:

(201) 57°44'N., 157°53'W.; off Cape Greig Light.

(202) 58°14'N., 157°53'W.; off Red Bluff Light.

(203) 58°27'N., 157°41'W.; off Middle Bluff Light; thence to the anchorage off the entrance to Naknek River.

(204) **To Nushagak Bay**

(205) Same as to Port Moller to 55°00'N., 164°36'W.; thence rhumb line to 57°44'N., 157°53'W. (off Cape Greig Light); thence to entrance buoy.

(206) **To St. Michael**

(207) 54°20'N., 164°45'W.; S of Scotch Cap Light.

(208) 54°24'N., 164°59'W.; W of Scotch Cap Light.

(209) 54°36'N., 165°04'W.; off Cape Sarichef Light.

(210) 60°14'N., 168°04'W.; off Cape Mohican Light (Nunivak Island).

(211) 63°00'N., 167°40'W.; 32 miles E of St. Lawrence Island.

(212) 63°41'N., 165°18'W.; Norton Sound.

(213) 63°41'N., 162°21'W.; N of Stuart Island.

(214) 63°32'N., 161°55'W.; off St. Michael.

(215) **To Golovnin Bay**

(216) Same as to St. Michael to 63°00'N., 167°40'W. thence rhumb line to 64°20'N., 163°00'W.

(217) **To Nome**

(218) Same as to St. Michael to 63°00'N., 167°40'W., thence rhumb line to 64°29'N., 165°26'W.

(219) **To Port Clarence**

(220) Same as to St. Michael to 63°00'N., 167°40'W., thence rhumb lines through:

(221) 64°58'N., 167°40'W.; E of King Island.

(222) 65°19'N., 167°40'W.; off Cape York.

(223) 65°19'N., 166°51'W.; off Point Spencer.

(224) 65°17'N., 166°25'W.

(225) **Unimak Pass to Arctic Ocean ports:**

(226) **To Point Hope**

(227) Same as to St. Michael to 63°00'N., 167°40'W., thence rhumb lines through:

(228) 64°58'N., 167°40'W.; E of King Island.

(229) 65°38'N., 168°31'W.; E of Fairway Rock.

(230) 68°21'N., 167°18'W.

(231) **To Point Barrow**

(232) Same as to Point Hope to 68°21'N., 167°18'W., thence rhumb lines through:

(233) 68°58'N., 166°40'W.; off Cape Lisburne.

(234) 70°34'N., 162°25'W.; off Icy Cape.

(235) 71°20'N., 156°55'W.

(236) **Principal ports.**–The principal deep-draft commercial ports within the area of this Coast Pilot are: Cordova, Valdez, Whittier, Seward, Kenai, Nikishka, Drift River, Anchorage, Kodiak, Sand Point, Unalaska, and Adak.

(237) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. Exempted from this requirement are (1) vessels under enrollment, (2) fishing vessels registered in the United States or in British Columbia, Canada, (3) motorboats as defined in Sec. 1 of the Federal Motor Boat Act of 1940 (54 Stat. 163; 46 U.S.C. sec. 526 et seq.), (4) vessels of United States registry of less than 300 gross tons and tow boats of United States registry and vessels owned by the State of Alaska, engaged exclusively on the rivers of Alaska, or in the coastwise trade on the west coast of the United States including Alaska, Hawaii, and British Columbia, Canada, (5) vessels of Canada, including cruise ships, engaged in frequent trade between British Columbia and Alaska, provided that reciprocal exemptions are granted by Canada to vessels owned by the State of Alaska and those of United States registry, and (6) pleasure craft.

(238) The State of Alaska has established the following boundaries of the inside waters of Southwest Alaska:

(239) (1) All waters of Prince William Sound inside a line drawn from Cape Puget to Point Elrington, thence to Cape Cleare, thence Zaikof Point to Cape Hinchinbrook Light, thence Point Bentinch to Point Whitshed; (2) the waters of Resurrection Bay N of latitude 59°59.0'N.; (3) all waters of Cook Inlet inside a line drawn from Cape Douglas (58°51.2'N., 153°14.9'W.) through Cape Elizabeth Light (59°08.8'N., 151°52.6'W.) to the Kenai Peninsula shoreline.

(240) At all buoyed entrances from seaward to bays, sounds, rivers, or other estuaries for which specified boundary lines are not described, the waters inshore of a line drawn 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 inside waters

(241) Vessels proceeding directly from points outside Alaska inside waters to an established pilot boarding station or pickup point are excluded from compulsory use of a pilot when traveling specified inside exclusion routes.

(242) The inside exclusion routes for Southwest Alaska are as follows:

(243) (1) travel via Prince William Sound to the Cordova Pilot Station about 2 miles S of Sheep Point (60°37.0'N., 146°00.0'W.);

(244) (2) travel via Prince William Sound to the Valdez and Whittier Pilot Station:

(245) (A) oil tanker traffic-about 3.6 miles SW of Bligh Reef Lighted Buoy 6 (60°50.5'N., 146°54.4'W.); or

(246) (B) nonoil-tank traffic-about 2.3 miles N of Busby Island Light (60°53.7'N., 146°49.0'W.);

(247) (3) travel via Cook Inlet to the Homer Pilot Station about 1 mile S of Homer Spit Light (59°36.ON., 151°24.6'W.);

(248) (4) travel to Kodiak or Women's Bay Pilot Station about 2 miles 100° from St. Paul Harbor Entrance Light (57°44.4'N., 152°25.7'W.).

(249) The Southwest Alaska Pilots Association's main office is P.O. Box 977, Homer, AK 99603, telephone 907-235-8783, FAX 907-235-6119, cable address SWAPILOT HOMER, radio call KCE-203. The Homer office monitors VHF-FM channels 16 and 10, 24 hours daily.

(250) The other office is P.O. Box 869, Valdez, AK 99686, telephone 907-835-2134, FAX 907-835-5372, radio call WAB-982. The Valdez office monitors channels 16 and 13, 24 hours daily.

(251) Southwest Alaska Pilots Association provides pilot service to all ports N and W of Cape Spencer. The major ports served include, but are not limited to, all Cook Inlet ports; all Kodiak Island ports; all Prince William Sound ports, including Valdez, Cordova, and Whittier; Resurrection Bay including Seward; all Aleutian Islands ports; and all Alaska Peninsula and Bristol Bay ports.

(252) The Homer pilot boat is the "MARY DELE"; a 42-foot trawler, green hull, white deckhouse, and the word Pilot forward. "MARY DELE" monitors channels 16 and 10, 24 hours daily. Contact her directly or through the Homer office.

(253) The Valdez pilot boat is the "EMERALD ISLAND"; 91-foot long with black hull, white house and the word Pilot on both sides. "EMERALD ISLAND" monitors channels 16 and 13, 24 hours daily. Contact her directly or through the Valdez office.

(254) The pilot boats for other Southwest Alaska ports can be contacted by calling "KODIAK KING" or "KODIAK PILOT BOAT," "SEWARD PILOT BOAT," "DUTCH

HARBOR PILOT BOAT," etc., on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel. When engaged in pilotage duties they display the appropriate day and night signals.

(255) Pilot services should be arranged in advance through ships' agents, or otherwise, in sufficient time to enable the pilot to travel to the area where the service is required.

(256) The established pilot boarding stations or pickup points for Southwest Alaska are as follows:

(257) (1) Cordova-about 2 miles S of Sheep Point (60°37.0'N., 146°00.0'W.).

(258) (2) Valdez-(A) oil tanker traffic-about 3.6 miles SW of Bligh Reef Lighted Buoy 6 (60°50.5'N., 146°54.4'W.); or

(259) (B) nonoil-tank traffic-about 2.3 miles N of Busby Island Light (60°53.7'N., 146°49.0'W.).

(260) (3) Whittier-pilot boarding station is the same as for Valdez.

(261) (4) Seward-about 1 mile SE of Caines Head Light (59°59.0'N., 149°23.1'W.).

(262) (5) Cook Inlet-about 1 mile S of Homer Spit Light (59°36.1'N., 151°24.5'W.).

(263) (6) Kodiak or Womens Bay-about 2 miles 100° from St. Paul Harbor Entrance Light (57°44.3'N., 152°25.8'W.).

(264) (7) Cold Bay-about 3 miles S of Cold Bay Channel Lighted Buoy 1 (55°05.5'N., 162°31.8'W.).

(265) (8) Dutch Harbor-about 1 mile E of Ulakta Head Light (53°55.5'N., 166°30.4'W.).

(266) (9) Adak-about 2 miles E of Gannet Rocks Light 4 (51°52.1'N., 176°36.4'W.).

(267) (10) Discoverer Bay-about 2 miles N of Posliedni Point (58°26.0'N., 152°20.0'W.).

(268) (11) Port Wakefield-about 1 mile NW of Kekur Point (57°51.5'N., 152°47.2'W.).

(269) (12) Port Bailey-about 1 mile N of Dry Spruce Bay Entrance Light (57°57.3'N., 153°06.2'W.).

(270) (13) Uganik Bay-about 1.5 miles W of East Point (57°50.5'N., 153°28.3'W.).

(271) (14) Larsen Bay-about 1 mile E of Harvester Island (57°38.8'N., 153°59.5'W.).

(272) (15) Alitak Bay-about 2 miles SE of Cape Alitak (56°50.7'N., 154°18.2'W.).

(273) (16) Old Harbor-about 1 mile E of Cape Liakik (57°06.9'N., 153°27.0'W.).

(274) (17) Chignik-about 1 mile N of Chignik Spit Light (56°18.6'N., 158°22.9'W.).

(275) (18) Sand Point-Squaw Harbor-about 2.5 miles S of Popof Head (55°14.7'N., 160°20.0'W.).

(276) (19) King Cove-about 1 mile SE of Morgan Point Light (55°02.4'N., 162°20.2'W.).

(277) (20) False Pass-Isanotski Strait-about 1.5 miles NW of Ikatan Point (54°46.5'N., 163°11.0'W.).

(278) (21) Akutan-about 1 mile E of Akutan Point (54°08.7'N., 165°43.6'W.).

(279) (22) Attu-Navy Cove-about 1.3 miles S of Murder Point (52°47.7'N., 173°11.7'E.).

(280) (23) St. Paul Island-about 4 miles W of Reef Point (57°06.5'N., 170°17.7'W.).

(281) (24) Port Moller-Herendeen Bay-about 7.5 miles NW of Entrance Point (55°59.5'N., 160°34.6'W.).

(282) (25) Port Heiden-about 7 miles WNW of Christiakof Island (56°55.8'N., 158°42.8'W.).

(283) (26) Ugashik Bay-about 0.5 mile W of Smoky Point (57°39.0'N., 157°42.0'W.).

(284) (27) Egegik-about 7 miles W of Red Bluff Daybeacon (58°14.1'N., 157°29.1'W.).

(285) (28) Naknek-about 9 miles WSW of Naknek Light (58°42.4'N., 157°04.8'W.).

(286) (29) Nushagak Bay-close aboard Nushagak Bay Entrance Buoy 2 (58°33.7'N., 158°24.3'W.).

(287) (30) Kulukak Bay-about 3 miles S of Kulukak Point (58°51.0'N., 159°36.0'W.).

(288) (31) Togiak-about 1 mile S of Summit Island (58°50.0'N., 160°12.0'W.).

(289) (32) Goodnews Bay-about 7.5 miles SW of Platinum (59°01.0'N., 161°49.4'W.).

(290) (33) Yakutat-about 1 mile NW of Yakutat Bay Lighted Whistle Buoy 4 (59°35.6'N., 139°51.2'W.).

(291) (34) Icy Bay-about 9 miles S of Claybuff Point (59°58.0'N., 141°35.0'W.).

(292) Alaska Marine Pilots, P.O Box 730, Dutch Harbor, AK 99692, telephone 907-581-1240, FAX 907-581-1372, radio call KBK-383, also provides pilotage in western Alaska. The pilot office, Dutch Harbor, monitors VHF-FM channel 16 and 4125.0 kHz, daily 24 hours.

(293) The Alaska Marine Pilots provide extensive pilot service to all ports from Kodiak Island W through the Alaska Peninsula and Aleutian Islands thence N to Bristol Bay and N regions through the Arctic Ocean to Demarcation Point.

(294) The major ports served include but are not limited to Chignik, Sand Point, King Cove, Akutan, Dutch Harbor, Captain's Bay, Atka, Adak, Port Moller, NakNek, Dillingham and Togiak.

(295) Pilot services should be arranged in advance through ships' agents or otherwise, in sufficient time to enable the pilot to travel.

(296) During times of frequent vessel movements, Alaska Marine Pilots station resident pilots in locations convenient to shipping activity to eliminate much of the detention which can occur due to inclement weather and limited transportation common to the area. These locations include but are not limited to Sand Point, King Cove, Port Moller, False Pass, Bristol Bay and Togiak. Contact Alaska Marine Pilots, Dutch Harbor, for current resident pilot locations.

(297) **Towage.**–Tugs are stationed at Anchorage, Valdez, and Kodiak. Navy tugs are stationed at Adak. At other places any towing that is required is done by cannery tenders and other local small craft. Much of the cargo traffic between Washington State and Alaska is by barges and tugs.

(298) **Vessel Arrival Inspections.**–Vessels subject to U.S. quarantine, customs, immigration, and agricultural quarantine inspections generally make arrangements in advance through ships' agents. Government officials conducting such inspections are stationed in most major ports. Mariners arriving at ports where officials are not stationed, should contact the nearest activity providing that service. (See appendix for addresses.) Unless otherwise directed, officials usually board vessels at their berths.

(299) **Harbormasters** are mentioned in the text when applicable. They generally have charge of the anchoring and berthing of vessels.

(300) **Supplies.**–Provisions and fuel are generally obtained by vessels prior to departure for western Alaska. Provisions and limited amounts of marine supplies are available at the principal towns in Alaska, and nearly all of the canneries can supply some provisions.

(301) Water is available at most of the ports and canneries, and gasoline, diesel fuel, and lubricating oils are available in all the larger towns and at many of the canneries in western Alaska.

(302) **Repairs.**–There are no repair facilities for large vessels in western Alaska. The nearest major facilities are in British Columbia and Washington. Most principal ports do, however, have facilities for minor emergency repairs to machinery, engines, and small boats.

(303) Some of the ports and canneries have small marine railways, slipways, or grids, but these are subject to frequent change due to destruction from ice, abandonment of canneries, or discontinuance of service.

(304) **Communications.**–There is scheduled steamer service from Seattle to ports in western Alaska, with limited service to nearby smaller ports. Air service is also available to most major ports in western Alaska, with connections to nearly every community in the State.

(305) Alaska State ferries maintain scheduled service between the cities of Anchorage, Whittier, Valdez, Cordova, Seward, Homer, Seldovia, and Kodiak.

(306) Telephone service is available from most communities in Prince William Sound, Cook Inlet, and Kodiak Island.

(307) Alascom, Inc., operates a radio network that includes coast stations with ship-to-shore service throughout most of Alaska. Complete information on this service can be obtained from Alascom, Inc., Office of Public Affairs, Pouch 6607, Anchorage, Alaska 99502.

(308) **Reporting Marine Emergencies and Oil Spills.**–Marine emergencies, oil spills, possible illegal entry, sightings of foreign naval or fishing vessels, icebergs, submarines, or any other unusual events should be reported to the nearest Coast Guard unit by radio or by calling, toll free, Zenith 5555 anywhere in Alaska except Juneau, Douglas, or Kodiak. Within these cities, call 586-2680 for Juneau/Douglas, and 487-5888 for Kodiak.

(309) **Small-craft facilities** are limited in Alaska. In general, only the larger communities have gasoline, diesel fuel, berths, marine supplies, and limited repair facilities. Services and supplies available at these facilities are described under the communities concerned.

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

(311) **Standard time.**–All of Alaska E of 169°30'W. uses Alaska standard time (Ak.s.t.), which is 9 hours slow of Greenwich mean time. Example: when it is 1200 at Greenwich, it is 0300 in Juneau and Anchorage. All the Aleutian Islands W of 169°30'W., including the communities of Adak, Atka, Attu, and Shemya, use **Hawaii-Aleutian Standard time (H.A.s.t.)**, which is 10 hours slow of Greenwich mean time. Example: when it is 1200 at Greenwich, it is 0200 at Adak.

(312) **Daylight saving time.**–In Alaska clocks are advanced 1 hour on the first Sunday in April and are set back to standard time on the last Sunday in October.

(313) **Legal public holidays.**–The following are legal holidays in the area covered by this Coast Pilot: New Year's Day, January 1; Martin Luther King, Jr.'s Birthday, third Monday in January; Washington's Birthday, third Monday in February; Memorial Day, last Monday in May; Independence Day, July 4; Labor Day, first Monday in September; Columbus Day, second Monday in October; Veterans Day, November 11; Thanksgiving Day, fourth Thursday in November; and Christmas Day, December 25. The national holidays are observed by employees of the Federal Government and the District of Columbia, and may not be observed by all the States in every case.

(314) In addition the following holidays are also observed in the area covered by this Coast Pilot: Seward's Day, last Monday in March; Alaska Day, October 18.

4. CAPE SPENCER TO COOK INLET

(1) This chapter describes the S coast of the Alaska mainland from Cape Spencer to Cook Inlet, and the many passages and tributary waters of Prince William Sound and Cook Inlet. Also described are the deepwater ports of Valdez, Whittier, Anchorage, and Seward, and the petroleum terminals and facilities on the Kenai Peninsula, as well as the numerous fishing and logging ports in this area.

(2) **Charts 16016, 16013.**–From Cape Spencer the coast extends NW for about 130 miles to Yakutat Bay. The Fairweather Range begins 20 miles from Cape Spencer and extends to Alsek River. The mountains are snowcapped and have elevations of 10,000 to more than 15,000 feet. From Alsek River to Yakutat Bay the mountains are 4,000 to nearly 6,000 feet high. Along the coast are numerous glaciers with terminal moraines. The most conspicuous are La Perouse Glacier, with a sea face 200 to 300 feet high and partly vertical; Yakutat Glacier, 25 miles E of Yakutat Bay; and the great Malaspina Glacier, W of Yakutat Bay.

(3) **Weather.**–Winds near the coast are only slightly less variable than over the open sea. As this coastline is irregular, with many islands, channels, and inlets, and is often steep, there are strong local effects to both wind speed and direction. In general, prevailing winds set parallel to the coastline, while speeds are increased by funneling effects or decreased by blocking.

(4) The gale frequencies of less than 1 percent at ports like Valdez, Anchorage, and Cordova can be misleading since they are usually much more sheltered than their approaches. This is reflected in the frequencies of calms, which range from 20 to 40 percent during the winter season. Storms and williwaws are responsible for the gales that are most likely in early winter. Williwaws, which blow down from the mountains in winter, occur along most of the coast; they are particularly severe at Seward. Extreme sustained winds at these ports have reached 74 knots at Cape Spencer, 66 knots at Anchorage, and 50 knots at Yakutat. Gusts of 60 knots or greater occur almost monthly during the winter season.

(5) In general from Cape Spencer to Yakutat, easterlies and southeasterlies are frequent; and from Yakutat to Cook Inlet, northeasterlies and easterlies prevail. At Yakutat, E winds blow 30 percent or more of the time from August through April. They also prevail at Cordova during this period. At Valdez, the sheltering effects of surrounding mountains funnel local winds into northeasterlies in winter and southwesterlies in summer. Over Controller Bay, summer winds range from the E through S and occasionally SW. Seward's prevailing winds are from the N in winter and S in summer. In Cook Inlet, winds are most frequent from the N, with topography causing deflections to the NW and NE in some sections. At Anchorage, winter northerlies give way to southeasterlies and southerlies from May through August. At Kenai, northerlies prevail in winter, although gales are often out of the E in early winter and SE later on; summer winds blow out of the S through SW. At Homer, winter northeasterlies give way to summer southwesterlies.

(6) Precipitation along this coast is also greatly influenced by topography. The annual ranges are from 15 inches at Anchorage to 132 inches at Yakutat; records from Latouche, which has since been abandoned, were 184 inches. Most of it falls during the winter season. September and October are often the rainiest months, when precipitation occurs on 15 to 20 days per month on the average, except at the well-sheltered ports. Snow is likely from October through April. At Valdez, an average of 61 inches falls in January compared to 7 inches at Kenai. April through June is often the driest period.

(7) Poor visibilities are mainly caused by advection or sea fog in the summer, and land fog or precipitation in winter. In general, sea fog affects exposed ports, while land fog is more of an influence at sheltered spots. However, visibilities are most likely to drop below 0.5 mile on winter mornings, even at exposed ports. Land fog can be very dense for short periods. At Cordova, for example, visibilities are most likely to be below 0.5 mile in January, but below 2 miles in August. Yakutat suffers from poor visibilities in both midwinter and midsummer, when they drop below 0.5 mile on up to 6 days per month. In Cook Inlet, January is usually the foggiest month. This land fog will set in during the night and persist until about noon. Fog banks frequently hang over open waters after the harbors have been cleared. Occasionally in winter, if extremely cold air moves over the water, a steam fog or frost smoke may be experienced as relatively warm water evaporates into much colder air.

(8) Air temperatures are mild for these latitudes and reflect the influence of the land and the sea. The more continental ports have a wide daily and annual temperature spread compared to those exposed to the sea. A noticeable cooling begins in September, when daytime highs average in the low to midfifties (°F), with nighttime lows in the upper thirties to low forties. January is usually the coldest month and is the time when the difference between exposed and sheltered locations is most noticeable. In the sheltered Cook Inlet, average maximums are in the low twenties, while minimums drop to about 5°F or less. At Seward daytime highs average 30°F, with nighttime lows of 18°F. At continental locations like Kenai, Anchorage, and Valdez, temperatures fall below 0°F on an average of 10 to 15 days in January, compared to 3 days at Seward. Freezing temperatures, also more frequent at sheltered locations, are common from October through April. Extreme low temperatures range from a –18°F at Homer to a –48°F at Kenai. A noticeable warming begins in April, and the difference between the two types of locations becomes less noticeable. Daytime highs in the low to midforties, and nighttime lows in the midtwenties to low thirties, are common. July and August are usually the warmest months. Maximums average in the low to midsixties, while minimums are frequently in the low to upper forties. It is often warmest at the more sheltered ports. Extreme highs reach the mid- to upper eighties.

(9) Ice is most often a problem along this coast in Cook Inlet. The upper end is usually closed by ice to all but heavily-built vessels, from December until late March. Elsewhere in the rivers and bays and in Prince William Sound, waters partially freeze after December 1, and some floating ice is seen through May. This ice usually does not interfere with navigation.

(10) **Chart 17301.–Cape Spencer** (58°12′45″N., 136°39′30″W.),873 miles from Seattle by the outside route and 976 miles by the inside passage, is a conspicuous headland on the NW side of the entrance to Cross Sound. The large shoal area that extends about 1.3 miles S from the cape has rocky islets, some of the inner ones wooded, and rocks,

the outermost of which break. The cape rises rapidly to ridges about 1,800 feet high which are heavily wooded up to 1,500 feet.

(11) **Cape Spencer Light** (58°11.9'N., 136°38.4'W.), 105 feet above the water, is shown from a white square tower on a rectangular concrete building on the outermost large rocky islet S of the cape; a fog signal and radiobeacon are at the light.

(12) **Cross Sound,** between Cape Spencer and Cape Bingham, 8 miles SE, is the northernmost passage to the inside waters of Southeast Alaska. The sound is described in U.S. Coast Pilot 8, Pacific Coast, Alaska-Dixon Entrance to Cape Spencer.

(13) **Dicks Arm,** a narrow inlet less than 200 yards wide in places, extends in a NNE direction for about 2 miles along the SE side of Cape Spencer. From the head of the arm, a gradually rising valley passes over a saddle to Taylor Bay. A narrow channel, with depths of 2½ to 12 fathoms leads E of **Zip Rock,** 20 feet high and bare, through the offlying rocks and islets to the inlet. Depths of ¾ to 8 fathoms are found in the inlet to within 0.5 mile of the head, where it is shoal.

(14) **Polka Rock,** 20 feet high, is 2 miles NW of Cape Spencer and at the outer edge of the foul ground, marked by kelp, which extends about 0.5 mile from shore in this general vicinity. Small craft approaching Graves Harbor from the SE usually pass between Polka Rock and Graves Rocks.

(15) **Graves Rocks** are a group of islets about 3.5 miles NW of Cape Spencer and about 1 mile from shore. Near the N end of the group is a wooded islet about 125 feet high. Rocks and kelp patches extend to the mainland and along the shore to Cape Spencer.

(16) **Libby Island,** 5.3 miles NW of Cape Spencer and 0.7 mile from the mainland, is high and wooded. Bare rocks and rocks awash extend about 0.3 mile S of the island. **Libby Island Light** (58°16.4'N., 136°46.4'W.), 53 feet above the water, is shown from a pole with a red and white diamond-shaped daymark on an islet SE of the island. **Horn Mountain** is a sharp, bare peak on the mainland N of Libby Island.

(17) **Graves Harbor** has an entrance about 1.2 miles wide between Graves Rocks and Libby Island Light and extends inland for about 3 miles. Depths in the harbor are 11 to 79 fathoms. The unnamed cove, which makes off to the S from the head of Graves Harbor, affords good landlocked anchorage in 7 to 15 fathoms and is easily entered. A daybeacon marks a shoal on the W side of the entrance to the cove.

(18) **Murphy Cove,** on the SE side of Graves Harbor 1.7 miles above Graves Rocks, has depths of 11 fathoms or more in its outer part and affords snug anchorage for small vessels. **Murk Bay,** opposite Murphy Cove, is clear but too deep and open for good anchorage.

(19) **Torch Bay,** 7 miles NW of Cape Spencer, extends inland more than 2 miles in a N direction and varies in width from 1 mile at the entrance to 0.3 mile at the head of the W arm. Rocks, which uncover 7 feet and always marked by breakers, are 1 mile S of **Venisa Point,** on the W side of the entrance; vessels can pass on either side of these rocks when entering the bay. The bay has depths of 13 to 56 fathoms and is not a good anchorage for large vessels; small vessels can find protected anchorage in the NE arm.

(20) **Sugarloaf Island,** 9 miles NW of Cape Spencer, was named from its shape as seen from S, from which direction it appears barely detached from the islet-like point projecting from Hankinson Peninsula. The island is high and wooded. From W, it has a uniform N slope; the S slope has a step and is separated from the narrow S extremity by a deep V-shaped ravine. Bare rocks and some that cover, fringe the shore from S around to W.

(21) **Sugarloaf Island Shoal,** about 0.5 mile long, is about 1 mile S of the southern end of Sugarloaf Island. A rock awash and submerged rocks on the shoal usually break. A lighted whistle buoy is off the W end of the shoal.

(22) During moderate E gales temporary anchorage is possible in 10 to 18 fathoms, rocky bottom, in the cove NE of Sugarloaf Island. The cove is 0.3 mile wide and open to the NW.

(23) **Local magnetic disturbance.**–Differences of as much as 3¼° from the normal variation, have been observed at the S end of Sugarloaf Island.

(24) **Astrolabe Point,** 11 miles SW of Cape Spencer, is rugged and has bare cliffs on its W side; the S face of the point is moderately wooded halfway up. **Astrolabe Rocks,** some bare, submerged, or awash, are 0.3 mile S of the point.

(25) **Dixon Harbor,** with its entrance between Sugarloaf Island and Astrolabe Point, has depths of 60 to 20 fathoms over an average width of 0.8 mile for 2 miles N to Thistle Cove, the NW arm. Depths of 13 to 18 feet are just W of the middle of the entrance. A glacier above the head of the harbor is visible from the entrance.

(26) **Thistle Cove** is 1 mile long in a N direction. At the point on the NE side of the entrance is a grass-covered rock, 20 feet high, from which a shoal extends SW across the entrance, leaving a channel 200 yards wide and about 2 fathoms deep close along the SW shore. The sea and swell from outside are well broken before reaching the cove and vessels have no difficulty in entering. The head of the cove is a secure anchorage with 7 fathoms, muddy bottom.

(27) **Palma Bay** is between Astrolabe Point and Icy Point, 6 miles to the NNW. This large body of water, sometimes called **Icy Bay,** has depths of 20 to 60 fathoms; large vessels have anchored close inshore in 15 to 20 fathoms.

(28) **Boussole Head,** in the E part of Palma Bay, is a prominent wooded 650-foot-high peninsula which extends about 1 mile into the bay. The outer end of the head is a natural arch which rises 60 feet above the water and is quite prominent from the S. **Alder Rock,** 0.3 mile S of Boussole Head, uncovers 4 feet.

(29) **Astrolabe Bay,** SE of Boussole Head, and **Boussole Bay,** on the NW side of the head, are open to the S but afford protection to small vessels in N or E weather. Anchorage is possible in 6 to 8 fathoms, sand bottom, near the head of each bay; the best is in Boussole Bay.

(30) Another anchorage, which affords some protection for small craft in W weather, is off the mouth of **Kaknau Creek,** a large stream which empties into Palma Bay on the NE side of Icy Point; recommended anchorage is close inshore in 6 to 10 fathoms, sand bottom.

(31) **Icy Point,** on the W side of Palma Bay and 17 miles NW of Cape Spencer, is low and wooded; from S La Perouse Glacier can be seen over the point. Many rocks fringe the point but deep water is only 0.3 mile offshore.

(32) **Chart 16760.**–From Icy Point to La Perouse Glacier, a distance of about 8 miles, the coast is low and wooded, with rolling hills that gradually increase in height to the bare mountain peaks. Rocks extend along the coast about halfway from the point to the glacier; the rest of the way is mostly smooth sand beach.

(33) **La Perouse Glacier,** about 24 miles N of Cape Spencer, is an outstanding landmark along this coast because the mountains are often covered by clouds. The face of the glacier is 200 to 300 feet high and is nearly perpendicular; at the foot of the glacier is a narrow strip of sand beach strewn with boulders.

(34) Between La Perouse Glacier and Lituya Bay, 15 miles NW, the coast is low and densely wooded. About 2 miles inland are hills that rise in a succession of terraces to the snowcapped peaks of the **Fairweather Range.** Most of the shore is sandy, with occasional boulders; huge boulders cover the last 1.5 miles to Lituya Bay.

(35) **Chart 16762.–Lituya Bay,** 39 miles NW of Cape Spencer, affords protected anchorage in all weather, but the entrance is dangerous and should never be attempted except at slack water because of the strong current. The bay extends about 6 miles in a NE direction and has widths of 1 to 2 miles. The shoaler area along the shore around the bay is obstructed by tree trunks. Anchorage for small boats close to the shore is not recommended because of the possibility of fouling anchors in the debris of trees and roots.

(36) In July 1958, a giant wave, caused by an earthquake-induced avalanche, denuded the shores of Lituya Bay of trees to a height of 1,720 feet. Giant waves are a recurring phenomenon in the bay, and other catastrophic waves were observed in 1853, 1874, and 1936. Steep shattered cliffs at the head of the bay present a continuing hazard of avalanches; destructive waves, caused by rock falls, can occur at any time.

(37) At the head of Lituya Bay are two arms, each leading to a glacier. **Gilbert Inlet,** on the NW, has **Lituya Glacier** at its head; **Crillon Inlet,** on the SE, has **North Crillon Glacier** at its head. Because of rapid shoaling, depths in these inlets may differ from the charted depths. **Cascade Glacier,** which discharges into the head of the bay between the two arms, can be seen far at sea. Depths in the bay are as much as 78 fathoms. Vessels can obtain water from streams near the head.

(38) **Harbor Point,** on the E side of the entrance to Lituya Bay, can easily be identified from offshore by **The Paps,** two conical, wooded hills about 1 mile to the NE; the NW hill is the higher and rises to 540 feet. Large boulders, 20 to 35 feet high, are strewn along the beach. **Cormorant Rock,** 16 feet high, is the largest of three bare rocks off the S side of Harbor Point.

(39) **La Chaussee Spit,** on the NW side of the entrance to Lituya Bay, is 100 to 225 yards wide and about 0.7 mile long. The spit, 2 to 12 feet high, is bare of trees, except for a lone tree near the base; the outer side of the spit is covered with large boulders.

(40) The entrance to Lituya Bay between Harbor Point and La Chaussee Spit is about 350 yards wide but is mostly foul. The channel has a controlling depth of about 5 fathoms but is only about 50 yards wide; the water shoals abruptly on either side and there are many rocks. The entrance is marked by a **007° 30′** lighted range.

(41) **Anchorage Cove** behind La Chaussee Spit, has depths of 3 to 5 fathoms, but is obstructed by numerous tree trunks and rocks awash and is not suitable for anchorage. On a flood tide with S weather, the cove has considerable swell.

(42) **Cenotaph Island,** in midbay and about 3 miles from the entrance, is densely wooded and has several hills, the highest rising about 320 feet. The N and W sides of the island slope gently, but the S side is an abrupt, high cliff with depths of 75 fathoms only 100 yards away. The island is named for a wooden monument, or cenotaph, which was erected by La Perouse in 1786 in memory of officers and men who were lost in the entrance to the bay. No trace of the monument or its site have been found in recent years.

(43) **Tides and currents.**–The diurnal range of tide is 9.7 feet 2 miles inside the entrance. The current velocity at the entrance is 5.1 knots on the flood and 4.1 knots on the ebb. Ebb currents, running against a SW swell, cause bad topping seas or combers which are dangerous to small craft. Small powered vessels in the bay should stay away from the entrance on the ebb to avoid being swept through. The ebb current follows a narrow path for several miles out to sea and can be seen for some distance. On the flood, the entrance is smooth and local fishing boats often negotiate it with a calm sea but are quickly swept through the channel by the powerful current. Strangers should not attempt to enter except at slack water. (See the Tidal Current Tables for daily predictions.)

(44) **Ice.**–The bay has never been known to freeze over but icebergs can always be found in the upper part. With NE breezes these icebergs often reach the entrance to the bay before melting. Ice is usually heaviest during October. The many streams flowing from the glaciers at the head of the bay give the water a murky discolored appearance.

(45) **Chart 16760.**–From Lituya Bay NW to Yakutat Bay, the shore is mostly gently curving sand beaches but boulders are found in the vicinity of Cape Fairweather and at other places. Prevailing currents set NW about parallel to the shore, but it has been observed that winds have a great influence on directions and strengths.

(46) **Cape Fairweather,** 54 miles NW of Cape Spencer, is an evenly rounded point sloping gently to the sea and abruptly back to the mountains. The summit of the cape is bare of vegetation but is covered with large piles of glacier drift, some of a bright iron-rust color. **Mount Fairweather,** 15,320 feet high, is 15 miles inland from the cape and is on the Alaska-Canada boundary.

(47) Protection from SE weather can be had N of Cape Fairweather, which appreciably breaks both wind and swell. Just N is a high rocky slide, with a cataract several hundred feet high, which is prominent from offshore.

(48) **Alsek River,** about 82 miles NW of Cape Spencer, empties into the NE part of **Dry Bay.** About 8 miles back of the coast is **Alsek Glacier.** Dry Bay is filled with bars and small islands between which are constantly changing channels. The entrance to the bay, about 400 yards wide with depths of about 6 feet, has been used to some extent by small craft. The tidal current has a velocity of about 2.5 knots on the ebb; during heavy weather the sea breaks fully 2 miles offshore.

(49) From Dry Bay to Yakutat Bay, the mountains are 5 to 15 miles from the coast, and between is a low wooded plain cut by numerous streams. The principal rivers between Dry Bay and Yakutat Bay have shifting bars at their entrances and lagoons or tidal basins inside; they can be used only by small boats or launches at high water and with a smooth sea. The mountains back of the coastal plain carry numerous glaciers; **Yakutat Glacier,** about 100 miles NW of Cape Spencer and 30 miles E of Yakutat Bay, is 3 miles wide and very prominent.

(50) Mariners are advised that in glacially fed areas such as Yakutat Bay, a layer boundary with a steep thermal/salinity gradient and/or suspended sediments in the water column can produce erroneous bottom traces on echo sounders. If this anomaly is suspected, a handheld lead line should be used to penetrate the layer for an accurate reading.

(51) **Chart 16761.–Yakutat Bay,** 130 miles NW of Cape Spencer, has a 16.5-mile-wide entrance between Ocean Cape on the SE and Point Manby on the NW; the bay is 7 miles wide at **Blizhni Point,** 15 miles above the entrance, and 2 miles wide a few miles farther up in Disenchantment Bay, the N extension of the bay. Yakutat Bay, the best anchorage between Cape Spencer and Prince William Sound for light

and medium-draft vessels, is mostly clear of islands and dangerous shoals. Depths in the bay range from 2 fathoms, marked by heavy growths of kelp W of Otmeloi and Krutoi Islands, to 141 fathoms off **Point Latouche,** 23 miles above the entrance. Two to 3 miles outside the line between Ocean Cape and Point Manby is a submarine ridge, very narrow on top, with depths of 3½ to 17 fathoms; the water deepens rapidly to more than 30 fathoms on either side except near Point Manby, and the ridge curves NE near Ocean Cape to join shallower water. During very heavy weather, it has been observed that breakers or pronounced increased height of swell occur across the entire entrance to Yakutat Bay; at such times entrance is dangerous.

(52) Current predictions are unavailable for Yakutat Bay, but complex currents are known to exist. The current to the E of **Knight Island** flows S on a flood tide and N on an ebb tide.

(53) **Ocean Cape,** on the SE side of the entrance to Yakutat Bay, is low and well wooded. Three bare light-colored bluffs 50 to 70 feet high, the westernmost point of the cape, are unmistakable landmarks. **Ocean Cape Light** (59°32.1'N., 139°51.3'W.), 130 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on one of the bluffs. A lighted whistle buoy, 3 miles W of Ocean Cape Light, marks the entrance to Yakutat Bay. Heavy breakers have been observed up to 0.5 mile offshore from the cape; vessels unfamiliar with the area should not attempt to pass between the lighted whistle buoy and Ocean Cape.

(54) **Point Manby,** on the NW side of the entrance to Yakutat Bay, is low and wooded. There is usually heavy surf and strong currents along the shore from this point NE to Blizhni Point, making it dangerous for boats to land, and causing migration of the shoreline and sandbars close to shore. Landings at stream entrances should only be made at high water and with local knowledge.

(55) **Point Carrew** is on the E side of Yakutat Bay 1.5 miles NE of Ocean Cape. A lighted whistle buoy, about 2 miles N of Point Carrew, marks the N end of a bank of shoaler water extending from the point, and the turn into Monti Bay. A rocky point, over which heavy surf breaks, extends N from Point Carrew. The W shore of Phipps Peninsula is foul with large boulders. The N and NE shore of Phipps Peninsula is subject to a periodic buildup of sand often producing sandbars offshore.

(56) **Point Munoz,** the westernmost extremity of Khantaak Island, is 3.5 miles above Ocean Cape. Dangerous rocks and heavy kelp growth, over which heavy surf breaks, extend SW to S from Point Munoz making the area foul for vessels. The island is about 5 miles long in a NE-SW direction and the greatest width is between Point Munoz and **Point Turner,** 2 miles to the SE. Khantaak Island is low and wooded except at Point Turner, which is a tongue of sand covered with grass and bushes. **Khantaak Island Light** (59°33.6'N., 139°47.1'W.), 28 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the S end of the island near Point Turner.

(57) **Monti Bay,** entered between Point Carrew and Point Munoz, extends about 3 miles SE to Yakutat, then turns N to Yakutat Roads anchorage. Depths in Monti Bay are 12 to 40 fathoms, except for a 10-fathom wreck 0.4 mile S of Point Turner. The S side of the bay is clear, but the N side in the vicinity of Khantaak Island is foul. Heavy breakers are reported to exist at the entrance to Monti Bay.

(58) **The Ankau,** on the S side of Monti Bay 1 mile SE of Point Carrew, is the outlet of an intricate system of shallow lagoons within the peninsula between the bay and the ocean. In 1979, a depth of 5 feet could be carried through the entrance to The Ankau; currents are strong and entry should not be attempted except at or near slack water and as close to Ankau Head as possible. A sandbar extending N across the channel from Ankau Head is building to the E making entry into The Ankau very difficult. Several large boulders on the S side nearly block the entrance. Inside The Ankau, tides lag those predicted for Yakutat by as much as 2 hours.

(59) **Tzuse Shoal,** about midway between Point Turner and the Yakutat mainland, has on its N side a rock 5 feet high; the bare shoal is about 300 yards in diameter at low water. A rock, 4 feet high, is near the S side of the shoal. Two rocks, awash at lowest tide, are about 0.2 mile N of the shoal. A buoy marks the SE side of the shoal.

(60) **Yakutat,** a town at the E end of Monti Bay, has a small hospital, school, and two general stores. Lodging is available at the airport S of the town.

(61) Vessels with drafts greater than 8 feet should anchor on the E side of the harbor.

(62) **Tide.**–The diurnal range of tide at Yakutat is 10.1 feet.

(63) **Weather.**–The Yakutat area is surrounded on three sides by the waters of the Gulf of Alaska and Yakutat Bay; consequently, the climate is maritime in character. Both daily and seasonal average temperatures are held within fairly well-confined limits. Differences between average maximum and minimum readings range from a little over 12°F in October to around 16°F in April and May. Normal monthly temperatures range from slightly above 26°F in January to around 53°F in July and August. Although Yakutat has experienced a record low of –24°F, readings approaching this figure are extremely rare. Yakutat averages about 20 days each year with temperatures below zero. The higher mountain areas to the N and NE of Yakutat, with extensive glaciation, provide downslope cold air drainage which results in wide variations of temperature within short distances. Maximum temperatures above the 80°F mark have occurred in June, July, and August.

(64) Although the area in the immediate vicinity of the station is relatively flat, rather rough, hilly terrain exists within short distances. At distances of 40 to 75 miles to the N and NE, peaks of the St. Elias Range rise to heights of from 14,000 to almost 20,000 feet. The upslope terrain, combined with the exposure of the station to moisture-laden air from the Gulf, tends to provide Yakutat with abundant rainfall. The annual precipitation of around 130 inches is one of the greatest in the State, and annual amounts have always been in excess of 85 inches. Thunderstorms seldom occur, averaging only about one per year. June has the lowest average precipitation of any month with around 5 inches. October, with an average of almost 20 inches, has the heaviest monthly rainfall. In spite of abundant rainfall, runoff from heavy rain seldom creates a problem of any consequence. This is particularly true in the vicinity of the station where runoff not easily reaching drainage ditches is quite readily absorbed by the porous gravel which is exposed as a surface layer over much of the area. The heavy precipitation produces copious growth of various types of vegetation in the surrounding woods, including several types of edible berries. Heavy stands of timber in the area are harvested for lumber and pulp. Salmon fishing is a main source of income for natives in the area.

(65) Snowfall has occurred in all months of the year except June, July, and August. The heaviest fall in any 24-hour period was experienced in March of 1960 when 32 inches fell.

(66) Cloudiness is abundant with the annual average sunrise to sunset exceeding eight-tenths sky cover. During the

spring, fall, and winter months, the Yakutat area is subjected to numerous storms, usually accompanied by high winds. During these seasons, the low pressure systems that develop in the Aleutians seem to follow a path lying just S of this area, resulting in persistent cloudy weather and extensive precipitation in the vicinity. During the summer, however, the weather occasionally remains cloudless and delightful for days at a time. The St. Elias Mountain Range, which borders the area on the NE and contains numerous glaciers, exerts a pronounced effect upon the local weather, particularly when a steep pressure gradient develops with low pressure in the Gulf to the SW of Yakutat. Under these conditions cold winds move down from the glacier slopes and skies are generally cloudless.

(67) **Ice.**–The ice in Yakutat Bay comes from the glaciers at the head of Disenchantment Bay and Russell Fiords. It is usually quite thick in Disenchantment Bay, but at times is scarce. Ordinarily, the ice banks on the W side of Yakutat Bay as far S as Blizhni Point. Scattered bergs usually are found in the bay proper, and occasional drifts find their way as far S as Ocean Cape and Point Manby.

(68) (See page T-1 for **Yakutat climatological table.**)

(69) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(70) Vessels en route Yakutat meet the pilot boat about 1 mile NW of Yakutat Bay Lighted Whistle Buoy 4 (59°35.6′N., 139°51.2′W.).

(71) The pilot boat can be contacted by calling "YAKUTAT PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(72) **Wharves.**–The Chevron U.S.A., Inc. wharf, formerly the government wharf, is on the S side near the head of Monti Bay, and has a 55-foot face with 25 feet alongside. Gasoline, diesel fuel, and water are available. Other petroleum products can be delivered by truck from the airport.

(73) The Yakutat Cannery Pier, 300 yards across the head of Monti Bay from the Chevron wharf, has a 110-foot face with about 18 feet alongside and 25 feet about 20 feet out from the face. The pier is exposed to SE swells.

(74) Yakutat Fishermen's Co-op Pier is about 500 yards WNW of the cannery pier.

(75) A small-craft and seaplane float owned by the State and operated by the City of Yakutat is off Yakutat Roads in **Shipyard Cove,** (59°33′50″N., 139°44′20″W.). No services or supplies are available at the float. Limited repairs to small-craft are available at the cannery, when in operation, and at a garage in town.

(76) The **harbormaster** assigns berths; he can be contacted on VHF-FM channel 16 and by telephone (907-784-3323 or 907-784-3270).

(77) **Communications.**–Barge service is available, stops being made only as freight traffic demands. Daily scheduled air service to Anchorage, Cordova, and Juneau is available from the Yakutat airfield, about 3 miles SE of the town; charter air service is also available.

(78) **Yakutat Roads,** extending NNE from Monti Bay, has a clear width of 0.3 mile E of Tzuse Shoal, a length of about 2 miles, and depths of 4 to 23 fathoms, mud bottom, except for an extensive foul area at its NE end. A light marks the N limit of shoals on the E side of the roads. The best anchorage for large vessels is in the middle of Yakutat Roads in 15 to 23 fathoms.

(79) **Port Mulgrave,** on the W side of Yakutat Roads behind Point Turner, Khantaak Island, is 1 mile long and about 200 yards wide; on the side opposite Point Turner is **Village Shoal,** parts of which show at high water. The entrance to Port Mulgrave has a depth of 1½ feet; the arm is usuable only by small boats.

(80) **Rurik Harbor,** the next arm indenting the inner side of Khantaak Island NE of Port Mulgrave, has depths of 5 to 14 fathoms in its entrance. Small vessels can anchor in the entrance.

(81) **Sea Otter Bay,** NE of Rurik Harbor, is 1.2 miles long and has depths of 10 to 36 fathoms. **Prince Shoal,** between Rurik Harbor and Sea Otter Bay, extends about 0.5 mile SE from the Khantaak Island shore. The shoal is foul with rocks and has an extensive area that bares. **Prince Shoal,** partly bare at low water, extends out 0.4 mile from the point on the NE side of the entrance. Small vessels can anchor in the entrance to Rurik Harbor.

(82) **Johnstone Passage,** at the NE end of Yakutat Roads, connects with several bays and arms between the numerous islands and rocks behind Khantaak Island. The connecting channels are navigable only for small craft at low water. Extensive shoaling and rocks exist throughout the area; local knowledge is advised.

(83) **Broken Oar Cove,** 2.5 miles NE of Yakutat, is the site of a logging operation. **Sawmill Cove,** on the S side of Broken Oar Cove, is used as a log dump and has a log boom with a submerged cable extending across the entrance.

(84) **Redfield Cove,** 3 miles NE of Broken Oar Cove, affords excellent protected anchorage for light and medium draft vessels in 5 to 22 fathoms. The S side is clear of obstructions or shoals. A shoal extends about 0.3 mile SSW from the N entrance point. The safest passage to the bay is from N between Knight Island and **Krutoi Island.** Unlighted buoys mark the passage.

(85) From the SE side of **Knight Island,** 6.5 miles N of Redfield Cove, a 500-yard-wide ridge extends SE to Tlaxagh Island. The ridge provides a good anchorage in 14 fathoms for moderate-draft vessels. About 0.5 mile E of Tlaxagh Island is the entrance to **Eleanor Cove. Chicago Harbor,** just NE of Eleanor Cove, is a well-protected steep-sided cove for small craft.

(86) N of Point Latouche, the bay bends to the NE and joins **Disenchantment Bay.** Depths of 120 to 136 fathoms are found throughout Disenchantment Bay, except in the vicinity of Haenke Island, about 4.5 miles NE of Point Latouche, Osier Island, about 2.5 miles NE of Haenke Island in the entrance to Russell Fiord, and a small islet about 1.3 miles NE of Haenke Island. A partially protected anchorage in 40 fathoms can be found behind **Haenke Island.**

(87) **Turner Glacier** and **Hubbard Glacier** actively discharge icebergs into the bay. The flow favors the W shore but at times heavy ice concentrations can be troublesome throughout the area. Turner Glacier flows into the W side of the bay. The position of the glacier's terminus varies and, at times, a moraine bar is exposed at low tide some distance off the ice cliffs. Hubbard Glacier, the largest tidal glacier in Alaska, discharges innumerable icebergs into the head of the bay along a 6-mile-long ice cliff. Large waves caused by calving ice from the glacier makes landing on the shores of the N part of the bay hazardous. **Osier Island** is 2.5 miles NE of Haenke Island and 95 feet high; the passage between the island and the mainland S is shallow. Hubbard Glacier has advanced in recent years, at times closing the entrance to Russell Fiord. Uncharted reefs, tidal currents, icebergs, and ice calving from the glacier and resulting waves make navigation between Disenchantment Bay and Russell Fiord extremely hazardous at all times.

(88) Mariners should contact the U.S. Forest Service Public Affairs Office, Chatham Area, Region 10, 204 Siginaka

Way, Sitka, Alaska 99835, for the latest conditions concerning Disenchantment Bay, Hubbard Glacier, and Russell Fiord; telephone, (907) 747-6671.

(89) **Russell Fiord** (see chart 16760) extends 27 miles SE of Osier Island and has depths well over 100 fathoms except in the vicinity of Hubbard Glacier. A branch, **Nunatak Fiord,** extends E for 12 miles from Russell Fiord to **East Nunatak Glacier** which terminates on shoals that bare at low water.

(90) Tide rips and strong currents have been observed at the entrance to Russell Fiord on both sides of Osier Island. Errors in charted depth of 1 to 5 feet may exist in the area E of longitude 139°30′ because of tidal differences between Yakutat Bay and Russell Fiord.

(91) **Ice.**–The ice in Yakutat Bay comes from glacier ice. Floating glacier ice and icebergs from Hubbard and Turner Glaciers is usually quite thick in Disenchantment Bay to as far S as Point Latouche.

(92) **Chart 16016.**–Between Yakutat Bay and Cape Suckling, the coast is formed by river and glacier deposit and is relatively regular. Coastal currents are discussed in chapter 3.

(93) A short way inland, the St. Elias Range rises to 18,008 feet at **Mount St. Elias,** on the Alaska-Canada boundary, and culminates in the 19,850-foot **Mount Logan** in Canada. These towering snow-clad peaks, only 25 miles apart, are surpassed in all Canada and the United States only by central Alaska's 20,320-foot Mount McKinley.

(94) Stretching from Yakutat Bay to the Bering River in one continuous icefield are the tremendous **Malaspina Glacier** and **Bering Glacier.** Malaspina Glacier, which covers most of the coastal plain between Yakutat Bay and Icy Bay, reaches the sea at **Sitkagi Bluffs** which are formed of forest and debris covered ice. From the sea the glacier appears as a vast, almost featureless white plain, gently sloping toward the coast from the base of the towering peaks of the St. Elias Mountains.

(95) **Chart 16741.–Icy Bay** is a glacially carved fiord that is 5 miles wide at the mouth and extends inland more than 22 miles. Actively calving Guyot, Yahtse, and Tyndall Glaciers are at the N end of the bay.

(96) **Caution.**–Mariners should use extreme caution when navigating Icy Bay. Icebergs and floe ice are hazards and their movement can cause changes to both shoreline and water depths.

(97) The bay is entered between **Point Riou Spit,** on the SE, and **Claybluff Point,** on the NW. Claybluff Point is composed of soft shale and sand.

(98) A bar extends across the entrance of Icy Bay, roughly in the shape of a crescent, with depths in midchannel of 5½ to 9 fathoms. Breakers extend out from each entrance point along the crest of the bar, varying from the size of the seas, but have never been observed to encroach on the channel.

(99) It is reported that most points on the E side of the bay give excellent radar returns from all positions in the bay.

(100) **Riou Bay** is behind Point Riou Spit. **Moraine Reef** lies in the entrance to Riou Bay. Numerous rocks awash and deadheads are in the entrance and throughout the bay.

(101) A dangerous shoal extends about 0.5 mile N from the E sandspit to a 2-fathom spot in 59°55′45″N., 141°25′47″W. Depths to the N of the shoal are greater than 5 fathoms.

(102) **Moraine Island,** actually a peninsula, is on the E side of Riou Bay. A bar, with a least depth of 1 fathom, N of Moraine Island, extends from 59°56′00″N., 141°23′35″W. to 59°56′00″N., 141°23′50″W.

(103) **Gull Island,** a natural bird sanctuary, is 2.5 miles NE of Moraine Island. A 40-foot-high conical hill on the NE end of the island is conspicuous. A shoal extends 0.6 mile W from the SW tip of the island. Between the island and the SE shore of Icy Bay, the water is foul with rocks and a moraine reef.

(104) The Icy Bay Lumber Company logging camp, on the NW side of the bay about 2 miles W of Claybluff Point, is the only settlement in Icy Bay. Two caretakers are in attendance at the camp during the nonoperational winter months. An airstrip is at the camp.

(105) The Icy Bay Lumber Company also operates a log dump and pier on the NW side of the bay at **Carson Creek,** about 2.5 miles NE of Claybluff Point. The pier, a 230-foot beached barge, has depths of 15 feet at its outer face and is subject to heavy surge action. Heavy swells, which frequently break along this coast, can make landings difficult. A road terminates at Carson Creek.

(106) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(107) Vessels en route Icy Bay meet the pilot boat about 9 miles S of Claybluff Point (59°58.0′N., 141°35.0′W.).

(108) The pilot boat can be contacted by calling "ICY BAY PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(109) **Anchorage.**–Possibly the best anchorage in Icy Bay is E of Moraine Island. This harbor makes an excellent anchorage in most weather, well protected from the wind. The bottom is soft clay which may yield in very high winds. In 1976, the controlling depth in the NW part of the harbor was 5 fathoms with a 1½-fathom spot at the entrance in 59°56′00″N., 141°22′40″W. Do not anchor between Moraine Island and Gull Island to the NE, as bergs drift through this area, sometimes with considerable velocity. Off the entrance to Riou Bay, NE of Moraine Reef, is an area that offers good protection from swells coming from the Gulf of Alaska and has a good holding bottom. Riou Bay has many foul areas along the E shore which, combined with the presence of Moraine Reef, makes the bay an undesirable anchorage.

(110) In 1972, the USCG Cutter CLOVER reported a good anchorage in about 20 fathoms, untroubled by ice in all except E winds of 20 knots or more in 60°00.8′N., 141°23.1′W., just SW of **Kichyatt Point.**

(111) A 5½-fathom spot is 3.5 miles SW of Kichyatt Point, 0.9 mile offshore.

(112) **Tides and currents.**–The diurnal range of tide at Icy Bay is 9.9 feet. Currents in the bay are weak. The combined effect of the ebb current and the discharge from the glacial streams is most pronounced in the NW part of the bay. In the entrance to Guyot Bay, the ebb current attains a velocity of 2 knots or more. The tidal current at the entrance to Icy Bay floods NE and ebbs SW, with a velocity of about 0.5 knot.

(113) **Weather.**–The prevailing winds are E and NE. A breeze off the glacier usually brings rain. Winds from other quarters are seldom observed, although offshore winds are known to blow at times. Breakers on the outside coast are generally heavy and plainly audible on either side in entering. Within the bay, W of **Claybluff Point,** breakers are frequently heavy enough to make landing difficult in small boats. There is no surf along the E shore of the bay.

(114) The bay trends generally NE for 10 miles with depths of generally less than 50 fathoms below Kichyatt Point; uncharted shoals and rocks may be present. N of prominent

Kichyatt Point, on the W side of the bay, the shores are barren having been recently exposed by glacier retreat; the bay trends NW for 15 miles to **Guyot Glacier** and **Yahtse Glacier** which discharge icebergs. The W shore is high; 7 miles NW of Kichyatt Point, **Tsaa Fiord** extends W 3 miles heading in three calving glaciers. The E shore of the bay is low and composed of glacial moraine and outwash from Malaspina Glacier. Two miles NNE of Kichyatt Point is low **Kageet Point;** N of the point **Taan Fiord** extends 5 miles NE to **Tyndall Glacier.**

(115) **Ice.**–Ice in the bay originates from the actively calving glaciers at the head of the bay. The part of the bay N of 60°00'N. is usually filled with ice. In the S part of the bay, the ice usually forms long tongues of loosely packed ice. Icy Bay is usually ice-free from the E shore, W to the centerline of the bay. The size of the ice ranges from a few widely spaced bergs of over 200 feet in length and 50 feet in height to many small bits 2 feet and smaller. Riou Bay remains relatively free of ice during the summer. During and shortly after periods of strong winds, the upper end of the bay is clear of ice sometimes to the face of the glaciers.

(116) Caution should be exercised when approaching or beaching a boat near the face of the glaciers. Boats may be swamped by the large waves generated by the falling of large chunks of ice into the water. Caution should also be exercised in the vicinity of the larger bergs which may roll over or break apart without warning.

(117) Freshwater may be obtained from streams along the W side of the bay in the vicinity of Kichyatt Point. Also, small icebergs can be taken aboard for potable water.

(118) **Chart 16016.**–From Icy Bay to Cape Yakataga, the coast is backed by a continuous ridge of stratified mountains 3,000 to 6,000 feet high. Numerous streams cut the foothills, and a dense growth of alders and bushes line the shore.

(119) **Yakataga Reef** extends about 0.5 mile from shore at **Cape Yakataga** (60°03'40"N., 142°26'00"W.) and parts of it show above high water. This is the best landing place between Icy Bay and Controller Bay about 57 miles to the W, but landing is possible only with occasionally smooth seas. In 1968, a depth of 9 fathoms was reported about 15 miles S of Cape Yakataga in 59°50.0'N., 142°31.0'W. An aero radiobeacon is at Cape Yakataga.

(120) **Chart 16723.–Caution:** Mariners are urged to use caution when navigating in the area of this chart due to possible changes in depths and shoreline as a result of the earthquake of March 27, 1964.

(121) **Cape Suckling** (59°59'24"N., 143°53'36"W.), 25 miles NE of Cape St. Elias, is low and wooded. Two miles N of the cape a prominent mountain ridge 1,500 to 2,500 feet high extends about 8 miles NE. Three bluffs about 100 feet high are 1.5 to 2.9 miles W of Cape Suckling. From the E bluff a sunken reef extends 0.6 mile SW to three rocks awash that are close together.

(122) **Southwest Breaker** is a rock bare at low water, 3.8 miles 260° from Cape Suckling.

(123) **Okalee Spit,** forming the S side of Controller Bay, is low with bare sand dunes, and is 7 miles long in an E-W direction. The SE entrance to Controller Bay between the N end of Kayak Island and Okalee Spit is of little use except for very small vessels that can cross the flats E of Wingham Island.

(124) Two prominent rocks about 75 feet high are in the approach, 1.5 miles E of **Lemesurier Point** at the NE end of Kayak Island, and 1.2 miles S of Okalee Spit. Ledges which uncover are between the two rocks, and extend about 300 yards E and W from them. Foul ground with 13 feet over its outer half extends from Lemesurier Point almost to the shoal surrounding the rocks.

(125) The channel is over a bar with least depths of 17 to 19 feet, thence between Okalee Spit and the two prominent rocks. N from the rocks, the channel has depths of 5 to 6 fathoms until about 1 mile inside the N end of Kayak Island; thence, through the flats, about 12 feet can be carried to Kayak Entrance, and 6 feet to Okalee Channel. Keep to the W of Southwest Breaker when using this channel.

(126) **Kayak Island** is 17.5 miles long, has peaks 1,110 to 1,390 feet high in the central portion, and slopes gradually to its N part, which is low and wooded.

(127) **Cape St. Elias,** the S end of Kayak Island, is an important and unmistakable landmark. It is a precipitous, sharp, rocky ridge, about 1 mile long and 1,665 feet high, with a low, wooded neck between it and the high parts of the island farther N. **Pinnacle Rock,** about 0.2 mile off Cape St. Elias, is 494 feet high and connected to the cape by a low, narrow strip of land.

(128) **Cape St. Elias Light** (59°47.9'N, 144°35.8'W.), 85 feet above the water, is shown from a white square tower at the corner of a rectangular building on the SW end of Kayak Island.

(129) A breaking reef extends 1 mile SW from Pinnacle Rock. Another breaking reef, about 1 mile E of Cape St. Elias, extends 2 miles SSE from Kayak Island and then continues as a submerged ridge of 4 to 8 fathoms to **Southeast Rock,** which uncovers 11 feet. Broken ground with 7 to 16 fathoms extends 2.5 miles SW from the rock. A bell buoy, 3.2 miles from Cape St. Elias Light, is on the broken ground. Tidal currents have considerable velocity across the reefs.

(130) The E coast of Kayak Island is strewn with boulders and landing is impracticable. Rocky shoals with 11 feet over them are 1.8 miles 172° from Lemesurier Point. Lying 3.2 miles SW of the point and 1 mile offshore is a reef 0.5 mile long. Its N end is a rock 10 feet high and its S end uncovers 5 feet. For 6 miles NE from Cape St. Elias, rocks awash and breakers extend 0.8 mile off the E coast of the island.

(131) **Sea Ranger Reef** is off the W coast of Kayak Island 3.3 miles N of Cape St. Elias. The inner shoal is 1 mile from shore, has 11 feet over it and often breaks. The outer shoal is 1.5 miles from shore, has a least known depth of 24 feet, and seldom breaks. Tide rips occur around it at times.

(132) The tidal currents on the W side of Kayak Island set N on the flood and S on the ebb, with an estimated velocity of 0.6 knot.

(133) **Anchorage.**–Good protection from all winds except from the W can be found on the W side of Kayak Island. This area is used by foreign fishing vessels, generally large stern trawlers, for the transfer of fish between vessels at anchor. The smoothest water usually will be found between Sea Ranger Reef and Kayak Entrance, an anchorage which is used by fishing vessels during the halibut season. Indifferent anchorage can be had on the E side of Kayak Island in 15 to 20 fathoms, about 1.5 miles offshore midway between Cape St. Elias and Lemesurier Point. The holding ground is poor and a vessel should be ready to move on short notice.

(134) **Controller Bay** is formed by Okalee Spit and Kayak Island on the S and Wingham and Kanak Islands on the W. For some distance back from the E shore the land is but slightly above high water, and is broken by many streams. Quicksand has been found in the channel at the mouth of Edwardes River. The bay is mostly flats. Entrance is through two principal channels; Kayak Entrance just S of Wingham Island; the other, Okalee Channel just N of Wingham Island.

(135) **Kayak Entrance,** between Kayak and Wingham Islands, is rocky and foul with shoals. The least depth of the shoals as far as abeam of the SE tip of Wingham Island is 1 fathom; above that and into the S portion of Controller Bay the depth is not more than 3 feet. Two rocks awash are about 0.3 mile N of the S entrance point. The channel is 0.5 mile wide between spits, which largely uncover, projecting out from Kayak and Wingham Islands. Kayak Entrance should be used with caution and only at high water.

(136) **Anchorage.**–Anchorage can be made in 2 to 3 fathoms, bottom soft in places, in Kayak Entrance as far N as abeam of the SE end of Wingham Island. There is some local chop with strong winds, but no outside swell enters the bay either through Kayak Entrance or around the N end of Kayak Island.

(137) Small vessels can anchor in the narrow channel close to the E side of Wingham Island. This channel is about 300 yards wide and has depths of 7 to 11 fathom for 1 mile, then shoals gradually S. The flats on the E edge of the channel have depths of 7 to 11 feet. At times the tidal currents in the channel have a velocity of 3 knots or more.

(138) With heavy E winds, anchorage and shelter can be found in 16 to 18 fathoms 0.5 mile off the W side of Wingham Island.

(139) **Wingham Island,** 4 miles long and wooded, has three hills, the highest, near its N end, rises to 833 feet. The W shore of the island is precipitous.

(140) **Okalee Channel,** between Wingham and Kanak Islands, is 0.6 mile wide at the entrance. A depth of 6 fathoms can be carried to abeam of the S tip of Kanak Island. Further NE, and into the bay depths are less. The channel is a secure anchorage, however, it changes annually and should be used only with local knowledge.

(141) The shoal on the S side of Okalee Channel, 1.5 miles NE from Wingham Island, uncovers shortly after high water, and this shoal and the one on the opposite side of the channel are usually indicated by breakers. The shoal extending S from Kanak Island is mostly uncovered at low water. Above these shoals the flats bordering Okalee Channel are partly uncovered at low water only, and there is nothing to indicate the channel when the flats are covered.

(142) Vessels sometimes anchor in Okalee Channel about 2 miles above the N end of Wingham Island. This part of the channel is generally easy of access in clear weather. Above this point Okalee Channel should be navigated at low water only, in the absence of local knowledge.

(143) **Kanak Island** is about 4 miles long, very low and flat, and wooded in the middle. Breakers mark the extensive shoal which makes out from the W side of the island. The S edge of the shoal is within 1.2 miles of the N end of Wingham Island.

(144) The passage between Kanak Island and Strawberry Point is used only by small boats at high water with local knowledge.

(145) **Tides and currents.**–The diurnal range of tide is 10.1 feet at the N end of Wingham Island. The current velocity is 1.5 knots on the flood and 1.2 knots on the ebb off the N end of Wingham Island, and 1.7 knots on the flood and 2.0 knots on the ebb in the channel SE of Kanak Island. The currents set into Controller Bay through all the entrances on the flood and out on the ebb. In Kayak Entrance the ebb has greater velocity than the flood and the estimated velocity is not over 3 knots. Tide rips occur at times in the channels S of Wingham Island and SE of Kanak Island.

(146) **Weather.**–During the summer the prevailing winds are from the E around through S to SW. During the early spring and fall, NW winds blow with great force over the flats. There is a great deal of cloudy misty weather during the summer. Fog is infrequent and usually clears before noon.

(147) **Point Hey** is a projecting and prominent point, high and narrow, on the NW side of Controller Bay 1 mile N of Kanak Island. **Chilkat,** an abandoned village, is on the W side of the mouth of **Bering River,** which flows into the NE end of Controller Bay.

(148) **Katalla Bay,** 23 miles N from Cape St. Elias, is between Strawberry Point on the E and Martin Islands on the W, a distance of 5 miles, and indents the coast about 2 miles to the mouth of Katalla River. The bay is a roadstead sheltered from offshore winds, but exposed to winds from SE through SW.

(149) **Strawberry Point** is low and bare at the end and wooded toward the foot of a prominent hill on the point which has a low break between it and the higher land N. A shoal with little water over it, and on which the sea generally breaks at low water, extends nearly 1.2 miles S from the point.

(150) The NE shore of the bay from Strawberry Point to the mouth of Katalla River is a steep sand beach. The NW shore from Katalla to Martin Islands is foul and should be given a berth of about 0.8 mile.

(151) **Palm Point** is 1.5 miles SW of Katalla. A boulder reef, bare at low water, extends 0.4 mile S from it.

(152) **Martin Islands,** two in number and about 150 feet high, have steep rocky sides, and are 0.5 miles from shore. The N island is joined to the shore by a flat, bare at extreme low water.

(153) **Martin Islands Light** (60°09.9'N., 144°36.2'W.), 150 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the SW point of Fox Island, the outer island of the Martin group.

(154) **Katalla** is an abandoned village at the head of the bay, on the W side of **Katalla River.** The bar at the mouth of the river has a depth of about 3 feet, and the sea generally breaks on it. The entrance is narrow and rocky, and requires local knowledge. With a smooth sea, lighters formerly landed in the bight on the NE side of Palm Point. The beach always has some surf, and with SE or SW winds, landing is impracticable. Shoals make out on both sides of the river mouth.

(155) The anchorage in the bay is 1.5 to 2 miles S of Katalla, in 5¾ to 7 fathoms, hard sand bottom. The holding ground is generally good, but quicksand S of Palm Point has caused the loss of many anchors. There are no dangers if the shore is given a berth of over 0.8 mile, but the shoal extending 1.5 miles S from Strawberry Point should be kept in mind.

(156) **Chart 16013.–Copper River** (60°25.0'N., 145°00.0'W.) emerges from the mountains between **Miles Glacier** and **Childs Glacier,** above which are rapids. Below the rapids, the river flows through broad flats in many changeable channels which vary in depth from 5 to 20 feet at high stages. There are five navigable channels in the Copper River Delta. These channels require local knowledge due to changing bar and sea conditions and frequent dangerous breakers. The current is swift, and tidal effects are felt only near the mouth.

(157) The delta is low and marshy except for sand dunes, 50 to 150 feet high, on the islands and banks of the main channel. From seaward, the vicinity of Copper River shows as a vast, rugged range with numerous glaciers filling its gorges. From **Point Martin** to Hinchinbrook Island is a chain of low sand islets, 4 to 5 miles offshore. These islets are marked by four lights, shown 12 feet above the water from steel skeleton towers with red and white diamond-

shaped daymarks. The daymarks, moving E to W, are labelled "S", "K", "G", and "P" in black. These lights are frequently destroyed in severe weather conditions. Between 1-2 miles offshore of these lights are corresponding yellow spherical special purpose buoys with black letters "S", "K", "G" and "P". These buoys are difficult to see and detect on radar even in moderate weather and should only be used for position reference, as they do not mark the navigable channels between the islets. Back of the islets are tidal flats of mud and sand, intersected by sloughs which drain into the Copper River passes and into Glacier and Eyak Rivers.

(158) The shoals extending seaward from the islets off the Copper River Delta have not been surveyed, however, danger can be avoided by giving the islets a berth of more than 3 miles and by avoiding depths less than 10 fathoms.

(159) **Alaganik Slough,** the westernmost and main outlet of Copper River, is 0.5 to 1 mile wide, with depths from 5 to 15 feet depending upon the stages of tide and river. The mean range of tide is about 9 feet at the mouth, and is reported to be 2 to 3 feet at **Alaganik** about 10 miles up the slough.

(160) **Chart 16709.–Eyak River,** 6 miles ENE of Point Whitshed (60°26′45″N., 145°52′42″W.), flows from Eyak Lake and has a swift current. At favorable stages of the tide it is navigable for small, light-draft craft to the lake. A highway bridge with a 43-foot fixed span and a clearance of 8 feet crosses the river about 3.5 miles above the mouth. **Mountain Slough** is 1.5 miles W from the mouth of Eyak River.

(161) **Egg Islands,** about 5 miles SE of mainland Point Whitshed and 10 miles E of Hinchinbrook Island, are low and partly grass covered. **Egg Island Channel,** just E of the islands, leads NE between sand and mudflats to Alaganik Slough. The seaward approach to the channel is marked by a lighted whistle buoy.

(162) **Egg Island Light E** (60°22.2′N., 145°45.0′W.), 33 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark, on the SE island of the group.

(163) The current in the channel is strong. E of Egg Islands, flood and ebb velocities of 3 to 3.5 knots, respectively, setting in the direction of the channel, have been observed. N of the islands a current of 1.5 knots, flooding NW and ebbing SE, was found. SE of Point Whitshed a W flood of 1.5 knots was observed.

(164) Navigation in this area is limited to small craft with local knowledge. Anchorage can be found in the wider parts of the sloughs N of the Egg Islands. There is no protection from prevailing winds but seas are broken up by the surrounding flats.

(165) **Point Whitshed** is at the S extremity of the **Heney Range,** the steep E side of which flanks the alluvial coastal region of the Cooper River. The waterfall, 1 mile from the point on the coastal side of the ridge, is a prominent landmark, seen for several miles over the mudflats, and shows well when the peaks and higher land are cloud covered. The higher peaks on Heney Range, as well as those on Hinchinbrook Island, are generally sharp and bare topped. The end of the peninsula W from Heney Range is rolling hills. **Government Rock,** at Point Whitshed, is 30 feet high and rounded in outline.

(166) The irregular slough, marked by stakes and black oil drum buoys and trending E and W near Point Whitshed and **Twin Rocks,** has a controlling depth of about 1 foot. When the Twin Rocks are just covered, the depth in the slough is increased to about 6 feet. Twin Rocks can be avoided by bringing the summit of Mummy Island, a rounded wooded knoll, in range with the 1,845-foot mountain peak on Hawkins Island.

(167) An abandoned radio tower is near **Gravel Point** on the mainland about 1 mile E from Mummy Island.

(168) **Mummy Island** is about 425 feet high and wooded. **Mummy Island Light 5** (60°27.7′N., 145°59.4′W.), 21 feet above the water, is shown from a skeleton tower with a square green daymark on the islets E of Mummy Island, where there is an approach through a slough. The islet 0.2 mile SW of Mummy Island has two steep ends, 75 feet high, with a low, flat strip between.

(169) **Little Mummy Island** is rounded in outline and profile.

(170) About 1 mile S of Mummy Island is **Pinnacle Rock,** on the edge of a slough extending from Point Bentinck to Mummy Island.

(171) Orca Inlet N to Cordova from Mummy Island is filled largely with flats. The channel from Mummy Island to Cordova is marked by seasonal buoys from May to November. In June 1983, 1¼ fathoms could be carried in the channel from Mummy Island to Cordova. Shoals throughout the area are constantly shifting; numerous other dangers exist in the area. Local knowledge is necessary. The inlet is described later in the chapter.

(172) **Point Bentinck** (60°23.5′N., 146°05.0′W.), at the E end of Hinchinbrook Island, is low, sandy, and grass covered, with sand dunes and brush 0.5 mile back. The brush covers a ridge extending SW from **Strawberry Hill** at the S shore of Boswell Bay. The 798-foot knoll with a parabolic antenna N of Boswell Bay is prominent.

(173) At low water, sandflats bare for 2 miles off Point Bentinck. Part of this area is above ordinary high water offering a footing for sparse grass and a lodging place for driftwood. Shoal water continues off the point in a SE direction, and about 4 miles from the point the shoal drops off into deeper water.

(174) A lighted bell buoy SSE of Point Bentinck marks the seaward approach to a channel that leads between the flats 1 mile E of the point to Orca Inlet. After crossing the bar the channel becomes deep and narrow abreast of Point Bentinck. Low water is the best time to negotiate the entrance as the flats are bare and of some aid. A stranger should not attempt this entrance.

(175) Current velocities up to 3 knots on the flood and 2 knots on the ebb were observed in this channel. On the bar, flood and ebb velocities of about 1 knot were found setting NE and S, respectively. S of the flats which extend W from Egg Islands, a NW flood of 0.5 knot and a SE ebb of 1 knot were observed.

(176) A ½-fathom spot is about 1.2 miles NNE of Point Bentinck in about 60°24.8′N., 146°03.7′W. A group of rocks that bare is in the middle of the entrance to Boswell Bay in about 60°24.9′N., 146°05.7′W.

(177) **Boswell Bay,** indenting the E end of Hinchinbrook Island, affords anchorage for small craft just inside the entrance. Massive **Boswell Rock** is 100 yards off the N point. Immediately adjacent to the point itself is an undercut rock. A very small rock is 100 yards outside of Boswell Rock.

(178) To enter bring the 65-foot rock, brown in color and near the S shore of the bay, just clear of the southernmost pinnacle inside the entrance, and steer on this range until abreast of Boswell Rock. Then haul S a little and anchor when the NE point of Hinchinbrook Island is just shut in on the undercut rock. Flood and ebb velocities of 1.5 and 2 knots, respectively, have been observed in the narrow entrance.

(179) **Hinchinbrook Island, SE coast.**–A mountain ridge parallels the SE coast of Hinchinbrook Island. The tree line

is about 1,000 feet high and the summits of the island are bare. The peaks are not prominent and from offshore they are difficult to identify.

(180) The promotory between **Point Steele** and **Hook Point** is 2 miles broad and is faced with 200-foot bluffs; back of the bluffs is swampland. Lowland and sand beaches are adjacent to the promontory on either side. A boat can land in good weather on the NW side of Hook Point and 0.5 mile N of Point Steele. Reefs make out 0.4 mile from the promontory.

(181) NE of Cape Hinchinbrook, the seaward face of Hinchinbrook Island is steep, with rocky bluffs at the water, for 12 miles to an open bight with a broad sand beach on the W side of Hook Point.

(182) Hinchinbrook Entrance is described later.

(183) **Chart 16700.–Prince William Sound** is an extensive body of water with an area of about 2,500 square miles. It is very irregular in outline, with great arms spreading in all directions. The entrance, from Cape Hinchinbrook to Cape Puget, is 58 miles across, but is almost closed off by islands. The largest is Montague Island which extends well out into the ocean.

(184) Many of the islands and peninsulas in the sound are low and tree covered but behind these rise eternal barriers of ice and snow. The **Chugach Mountains** stretch NW from the St. Elias Range and enclose the sound round through N and W. On the N shore glaciers come down to the heads of the bays.

(185) **Prince William Sound Shipping Safety Fairway**, extending SE from Hinchinbrook Entrance at the approaches to Prince William Sound, has separate inbound and outbound traffic lanes that merge in the NW part. (See **166.100 through 166.110 and 166.400**, chapter 2, for limits and regulations.)

(186) **Traffic Separation Scheme (Prince William Sound)**, wholly within U.S. Territorial waters, has inbound and outbound traffic lanes and separation zones, and leads from the vicinity of Cape Hinchinbrook through Prince William Sound and into Valdez Arm (the entrance to Port Valdez). (See charts 531, 16013, 16700, 16709, and 16708.) (See also, Traffic Separation Schemes, chapter 1, for additional information.)

(187) Mariners approaching or departing Hinchinbrook Entrance are advised to use caution, because of strong currents, occasional severe weather, and fishing activity in the area. Hinchinbrook Entrance may be transited E or W of Seal Rocks, at the vessel master's discretion.

(188) **Dangers.**–The off-lying dangers in the approaches to Prince William Sound are Middleton Island, Fountain Rock, Wessels Reef, and Seal Rocks.

(189) It has been found convenient to approach Hinchinbrook Entrance on a radio bearing using the radiobeacon station at Cape Hinchinbrook, and taking cross bearings on the radiobeacon at Cape St. Elias as an aid in clearing Wessels Reef and Seal Rocks.

(190) **The March 1964 earthquake caused a bottom uplift of from 4 to 32 feet in Prince William Sound. Some parts of the sound outside of the traffic separation scheme have not been surveyed since the earthquake. Until a complete survey is made of the area, extreme caution is necessary because depths may be considerably less than charted and mentioned in the Coast Pilot.**

(191) **A Vessel Traffic Service (Prince William Sound Vessel Traffic Service)**, operated by the U.S. Coast Guard, has been established in Prince William Sound, Valdez Arm, Valdez Narrows, and Port Valdez. The Service is designed to prevent collisions and groundings, and to protect the navigable waters of the Vessel Traffic Service area from environmental harm resulting from such collisions and groundings.

(192) The **Prince William Sound Vessel Traffic Service** comprises three major components: a **Traffic Separation Scheme, a Vessel Movement Reporting System, and radar surveillance.** The Traffic Separation Scheme comprises a network of one-way traffic lanes with a separation zone in between. The traffic lanes are each 1,500 yards wide from Hinchinbrook Entrance to the vicinity of Bligh Reef at the SE end of Valdez Arm, then gradually decrease in width to 1,000 yards and terminate at Rocky Point. The separation zone is 2,000 yards wide between Hinchinbrook Entrance and the vicinity of Bligh Reef, then gradually decreases in width to 1,000 yards and terminates at Rocky Point.

(193) The Vessel Movement Reporting System is controlled by the **Vessel Traffic Center,** call "Valdez Traffic," which is operated continuously by the U.S. Coast Guard. The center maintains radiotelephone communications with vessels in the Vessel Traffic Service Area on VHF-FM channel 13. The center receives, assembles, and processes information from vessels through mandatory and voluntary reports, and in turn disseminates marine safety information to vessels participating in the Service.

(194) The radar surveillance system covers Valdez Arm, Valdez Narrows, and Port Valdez from Coast Guard operated radar sites. One site is at **Potato Point,** on the W side of Valdez Narrows, and the other is on Valdez Spit, which borders the S and E sides of the small-boat basin at Valdez. A continuous radar watch of these areas is maintained by the Vessel Traffic Center.

(195) The mariner is cautioned that the reliability of information received by the Vessel Traffic Center may vary depending on the method of receipt and source. Additionally, the Coast Guard may not always have first-hand knowledge of hazardous circumstances existing in the Vessel Traffic Service area, and unreported hazards may confront the mariner at any time.

(196) The Vessel Traffic Service is shown on the appropriate nautical charts of the area.

(197) The rules governing vessels operating in the Vessel Traffic Service area are given in **161.301** through **161.387,** chapter 2. In addition, detailed operating procedures are contained in the Prince William Sound Vessel Traffic Service Operating Manual, available from the Commanding Officer, Coast Guard Vessel Traffic Service, Valdez, Alaska 99686.

(198) **Middleton Island,** about 50 miles off the entrance to Prince William Sound, is comparatively low and grass covered and difficult to pick up when making a landfall. An aerolight is on the W side about 1.3 miles from the S end of the island.

(199) From a few miles offshore the island appears flat. The highest ground, on the S, has an elevation of 126 feet. A pinnacle rock at the extreme S end is conspicuous from E and W. The N end slopes to a sandspit.

(200) The E and S sides of the island are bold hard-clay cliffs upon which great numbers of seafowl nest. The steepest and highest section of the cliff, on the W side, extends for 1 mile from the S end. There is also a short section of cliff midway along the W shore.

(201) A sandbar, awash at low water, extends 1.3 miles NW from the N tip of the island. The channel between the extreme end of the bar and the main island, 0.5 mile NW of the tip of the island, carries a depth of 3 fathoms, but strong rips occur and it is dangerous to use.

(202) Middleton Island is inhabited by a few families that operate the Federal Aviation Administration station. The island is fringed by vast areas of reefs, rocks, and kelp. Breakers occur at greater distances. Foul ground extends 2 miles S of the island, terminating in breakers except in very smooth weather. Seaward of these breakers, the bottom falls off rapidly into deepwater, except that in 1967, a depth of 5¼ fathoms was found to exist about 0.3 mile S of the foul ground in 59°22.3'N., 146°23.1'W. Broken ground extends 3 miles to the E, terminating in breakers which first begin to appear when a moderate swell is running. This side of the island should be given a wide berth.

(203) The waters W of Middleton Island are clear of off-lying dangers, giving an easy approach to an anchorage from this direction. The best anchorage is 1 mile S of the N tip and 2 miles W of the island in about 12 fathoms. Small vessels can anchor further E, 1 mile W of the island, in about 7 to 8 fathoms. This area gives protection from the NE and SE. Tidal currents, of about 2 knots, run approximately parallel to the island.

(204) There are two good landing places, depending on the prevailing seas; one is on the NE side of the island 0.3 mile from the N tip, and the other is on the W side of the island, directly W of a quonset hut, 0.7 mile S of the N tip of the island. These areas have steep beaches, and landings can be made in moderate swells. The remains of the S.S. COLDBROOK, which was wrecked in this vicinity in 1942, are above the high waterline.

(205) At the N and S ends of the island the current is irregular and sets in a NE-SW direction. Tide rips are visible several miles to the S of the island, and to the N in the vicinity of Fountain Rock. Mariners are advised to use extreme caution when navigating in shoal waters in the vicinity of Middleton Island because of possible additional shoaling as a result of the bottom uplift caused by the earthquake of March 1964.

(206) **Fountain Rock,** 4 miles N of Middleton Island, breaks in light seas. The rock, which uncovers 2 feet, and the danger area, centered around the rock is about 0.5 mile square. Safe passage can be made midway between Fountain Rock and the N tip of Middleton Island in 14 fathoms, but should be done so with caution.

(207) **Wessels Reef,** bare at low water and 2 miles long, NNE-SSW, is about 19 miles N of Middleton Island. Depths of 30 fathoms or more are close to the reef, and with smooth seas it can hardly be detected. A lighted whistle buoy is on the E side of the reef.

(208) **Seal Rocks** are discussed later with Hinchinbrook Entrance.

(209) **Routes.**–Vessels bound for ports on Prince William Sound from E use Hinchinbrook Entrance, between Montague and Hinchinbrook Islands. Vessels approaching from SW use Elrington Passage, it being the best marked. Montague Strait, the widest and deepest of the W entrances to Prince William Sound, Latouche Passage, Prince of Wales Passage, and Bainbridge Passage are also available to vessels approaching from the SW.

(210) **Tides and currents.**–In Prince William Sound high and low water occur about the same time as at Cordova. The diurnal range of tide is 12.4 feet at Cordova and 11.2 feet at Port Etches at the entrance to the sound. (See the Tide Tables for daily predictions for Cordova.) It is reported that the currents along the approach to Prince William Sound set SW invariably, and occasionally with a velocity of 2.5 knots; accordingly, extreme caution is required in approaching Hinchinbrook Entrance in thick weather.

(211) **Weather.**–The waters of the sound are very deep and are chilled by large amounts of ice from the surrounding glaciers. The meeting of cold water and the colder air from the mountains with the warmer waters and vapor-laden airs of the Gulf of Alaska causes changeable weather; sudden wind squalls and thick fogs are common.

(212) **Ice.**–Glacial ice is rarely found in the open waters of Prince William Sound. Ice is discharged by the Columbia Glacier, N of Glacier Island, and is driven into the sound by N winds; it may be expected, depending on the winds, from Bligh Island to Bald Head Chris Island and as far S as Storey Island. Large bergs may be found at anytime along the N shore from Point Freemantle to Fairmount Island.

(213) There are numerous discharging glaciers in Port Wells, the NW arm of the sound, but ice rarely reaches the entrance of the arm. There is a discharging glacier at the head of Blackstone Bay, but the ice is confined to the bay. Ice is discharged by Chenega Glacier on the SW side of the sound, and occasionally drifts E as far as Point Helen and the N entrance to Latouche Passage.

(214) During very cold weather ice sometimes forms in the arms of the sound which reach well into the mountains, and is at times heavy enough to impede navigation.

(215) **Montague Island,** on the W side of Hinchinbrook Entrance approach to Prince William Sound, is high, mountainous, and wooded to about 1,000 feet. There are no distinctive peaks, although Montague Peak, the most N one of the range, can be distinguished from the S. A striking characteristic of the E part of the N half of the island is the regularity of the succession of spurs reaching from the mountain range to the coast, where the spurs terminate in dirt bluffs with comparatively steep slopes.

(216) A constant SW current is reported along the E coast of Montague Island. (See remarks on currents in chapter 3.)

(217) Two logging camps are on the N side of Montague Island. Brown bears are numerous on the island, and they are said to be ferocious.

(218) **Montague Island was subjected to extensive upheaval during the March 1964 earthquake. Thirty-one feet was measured at Macleod Harbor, 11 feet at Port Chalmers, and 15 feet at Patton Bay. Mariners should exercise extreme caution when navigating in depths under 10 fathoms or areas of uneven bottom.**

(219) **Chart 16701.–S and E coast of Montague Island.**

(220) **Cape Cleare,** the SW extremity of Montague Island, is gently rounding and consists of eroded bluffs with rocky beaches. Back of the cliffs the cape is timbered and undulating with the ground gradually rising to the mountain masses nearby. A detached rock with a double head 25 feet high is about 75 yards off the SW extremity of the cape. A pinnacle rock (59°44.2'N., 147°51.2'W.) with a depth of less than 3 fathoms is S of the cape. The cape should be given a berth of at least 2.5 miles. Strong tidal currents sweep around the cape and tide rips are frequently encountered.

(221) Exposed anchorage can be had in the bight about 5 miles NE from Cape Cleare in 10 to 20 fathoms, sand and gravel bottom.

(222) **Neck Point,** the first prominent point NE from Cape Cleare, is a bold headland with eroded bluffs. A prominent pinnacle rock is about 100 yards off the point and deep water extends close to shore. The point is separated from the higher peaks back of it by a neck of land somewhat lower than the outside point. The headland and the 1,900-foot peak are separated from the main ridge by a deep valley. When viewed from a position SW of Cape Cleare the peak has the appearance of a detached conical island.

(223) **Jeanie Cove,** a bight 10 miles NE from Cape Cleare, is exposed to the S and affords no protected anchorage.

There are numerous reefs and rocky patches in this vicinity that should be avoided.

(224) A rock awash is 0.8 mile off the W entrance point, and a reef, which uncovers, is 0.8 mile off Jeanie Point, the E entrance point. A depth of 7 fathoms is about 1.4 miles 212° from Jeanie Point.

(225) **Jeanie Point** is bold with rock cliffs. Back of the cliffs the land is timbered and rolling. A prominent detached rock is a short distance off the point.

(226) **Wooded Islands,** on the SE side of Patton Bay, are 16 miles NE from Cape Cleare. The largest of the three is wooded and flat topped, with a prominent square-topped pinnacle rock about 175 yards off its W end. **Tanker Island,** the middle islet about 0.4 mile E of the largest island, has a small clump of trees near one end that appear similar to the stack and wheelhouse of a tanker. **Fish Island,** the easternmost island, is small with a few trees on the W summit. The area between the islands is foul, and the small passage SW of the largest island is shoal and foul. These islands should be given a berth of at least 2 miles, and without local knowledge, the shoal rocky passage SW of the islands should not be used by small boats.

(227) A survey of the coast from Wooded Islands to Cape Cleare disclosed no outlying dangers, but there are areas of broken bottom near the shore and vessels are advised to give the coast a berth of 3 miles.

(228) **Patton Bay,** 17 miles NE of Cape Cleare, is about 4.5 miles square with Box Point on the NE side and Wooded Islands on the SE side. The deepwater entrance, about 3.5 miles wide, is between the rocky foul ground extending E from Box Point and the irregular rocky ground extending ENE from the Wooded Islands.

(229) Inside the bay, foul areas make 0.3 mile S and 1.1 miles W of the S tip of Box Point; 1 mile offshore from the head of the bay due W of the bay entrance; and 0.7 mile N and 0.3 mile E from the prominent pinnacle rock on the rocky point 2 miles NW of the largest of the Wooded Islands. **Nellie Martin River,** on the S side of the bay, is blocked by a bar across its mouth.

(230) There is good anchorage, except during NE to S weather, for small boats in the bights at the NE, W, and SW parts of the bay in 3 to 10 fathoms, sand bottom, and for larger vessels in 15 fathoms or more, sand and mud bottom.

(231) **In July 1983, a reconnaissance survey of Patton Bay by the NOAA Ship DAVIDSON confirmed that the March 1964 earthquake caused a bottom uplift of at least 2 fathoms throughout the bay. Shoaling and new dangers may exist requiring extreme caution until a complete survey is made of the area.**

(232) **Box Point,** 20 miles NE of Cape Cleare, is about 130 feet high and comparatively level, with steep bluffs, giving a rectangular appearance. Two box-shaped islets are on foul ground extending 1.7 miles E to 6-fathom depths.

(233) **Purple Bluff,** 5 miles N of Box Point, has a purple hue especially in the afternoon. S of Purple Bluff, a conspicuous valley, drained by a river, trends far inshore.

(234) From Purple Bluff to Zaikof Point, the outer coast of Montague Island is unbroken and free from outlying dangers except for Seal Rocks. About 3.5 miles S of Purple Bluff, a spit extends 0.5 mile offshore, terminating in a group of rocks awash.

(235) The W and N coasts of Montague Island are described later.

(236) **Chart 16709.–Hinchinbrook Entrance,** the main entrance to Prince William Sound, is about 6 miles wide, and clear with the exception of Seal Rocks. The entrance (1.5 miles SW of Cape Hinchinbrook Light) is 1,168 miles from Seattle via Strait of Juan de Fuca and the outside route, and 1,306 miles via the inside passages, Cross Sound, and Cape Spencer.

(237) The S extremity of the **Prince William Sound Traffic Separation Scheme** leads through the middle of Hinchinbrook Entrance. Additional information on this scheme is given earlier in this chapter under Prince William Sound.

(238) **Seal Rocks,** off the entrance, are 6 to 7 miles SW from Cape Hinchinbrook and over 6 miles from Montague Island. They are two bare rocks, 30 and 37 feet high, surrounded by low rocks. The westernmost bare rock is marked by **Seal Rocks Light** (60°09.8'N., 146°50.3'W.), 48 feet above the water and shown from a skeleton tower with a red and white diamond-shaped daymark. A radar beacon (Racon) is at the light. Rocks, submerged and awash, extend 1 mile NE and 0.4 mile SW from them. The entire reef within the 10-fathom curve forms an obstruction nearly 2.9 miles long. A lighted whistle buoy marks the E end of this obstruction.

(239) **Currents.**–The tidal currents in the entrance set directly in or out of the sound, except E of Seal Rocks where the currents usually run E to W regardless of the tide. There is a strong set in the direction of Seal Rocks when the wind is blowing from the E and the tide is ebbing. In Hinchinbrook Entrance, Montague Strait, and Latouche Passage, the velocity of the current is about 1 knot. The ebb current running out against a large swell causes overfalls, especially in the deep water 2 or 3 miles E of Zaikof Point, which have been mistaken for breakers. There are also tide rips on the broken ground around Cape Hinchinbrook. The flood entering W of Montague Island sets NE past Montague Point and causes rips between it and Johnstone Point.

(240) Outside the entrance along the SE coast of Hinchinbrook Island the current sets SW almost constantly. (See remarks on current in chapter 3.) Current observations in Elrington Passage indicate a velocity of 1.5 knots.

(241) With a strong S gale and ebb tide, very heavy overfalls and tide rips occur in Hinchinbrook Entrance, and are dangerous to small craft. Tremendous seas, steep and breaking, are sometimes encountered just outside the entrance. During heavy weather, tide rips and confused seas are in the vicinity of Wessels Reef. Many halibut schooners have foundered between Cape St. Elias and Montague Island.

(242) **Cape Hinchinbrook** is on the E side of Hinchinbrook Entrance, the principal entrance to Prince William Sound from the E.

(243) A few rocky islets are close to the SE and SW sides of the cape, and submerged reefs on which the sea breaks in a moderate swell, are 0.4 mile SE and S from the cape. The cape should be given a berth of at least 1 mile.

(244) **Cape Hinchinbrook Light** (60°14.3'N., 146°38.8'W.), 235 feet above the water, is shown from a white square tower on the corner of a building on the SW point of the cape; a fog signal and radiobeacon are at the light.

(245) **Zaikof Point,** on the W side of Hinchinbrook Entrance, is one of three prominent points on the NE end of Montague Island. **Schooner Rock,** marked by a light, is a pinnacle 75 feet high about 0.3 mile off Zaikof Point.

(246) Between the three prominent points are Zaikof and Rocky Bays. Low depressions run through from the heads of these bays to the W side of Montague Island.

(247) **Zaikof Bay** is clear, but exposed to NE winds. In 1973, a 47-foot spot was reported in the entrance in 60°19.4'N., 146°56.8'W., 1.3 miles NW of Zaikof Point. Dangerous rocks awash are 2.6 miles WNW of Zaikof Point in about 60°19'02"N., 147°00'42"W. and 60°19'18"N., 147°00'39"W. Anchorage can be selected with the aid of the chart along the SE shore, from 2 miles inside Schooner

Rock to the head, also on a bar with 6 to 9 fathoms that extends across the bay 2.5 miles from the head. A swell makes in during SE gales.

(248) A small vessel can anchor in the cove on the SE side 1.6 miles from the head, with shelter from NE winds. Anchor close to the S side of the point, about 0.1 miles from the short spit making out from it, in 8 to 10 fathoms. There is no swell, but the williwaws blow with great force over the lower land inside the point. When the wind hauls SE or S the williwaws come from all directions, and it is well to shift anchorage farther from the spit. A small shallow lagoon is at the head of the cove, and the bank is steep-to.

(249) Foul ground marked by kelp extends 0.6 mile off **Middle Point,** which separates Zaikof and Rocky Bays.

(250) **Rocky Bay** is deep, and exposed to N and E winds. A small vessel can anchor in good weather about 0.6 mile from the head and 0.2 mile from the NW side, in 5 to 6½ fathoms. Small craft can anchor in the lagoon, on the S side 1 mile from the head, where a small area has a depth of 10 feet. When entering the lagoon care should be taken to avoid a reef, partly bare at low water, extending W and NW from the N point. A dangerous sunken wreck is in the entrance to the lagoon in about 60°20'30"N., 147°06'15"W.

(251) A reef that uncovers extends about 0.8 mile E from Montague Point which forms the W side of Rocky Bay. The S side of the bay has many dangerous off-lying rocks and reefs that extend up to 0.6 mile offshore. Mariners are advised to exercise extreme caution when navigating on this side of the bay.

(252) **Port Etches,** an inlet in the SW end of Hinchinbrook Island, has secure anchorage, the best in Hinchinbrook Entrance, and is easy of access. The strongest gales are NE and are not steady, but descend from the surrounding mountains in heavy williwaws of varied direction, and at times blow hard in Port Etches when comparatively light winds prevail outside. Water can be obtained from streams in Garden Cove and on the NW side of Constantine Harbor.

(253) The best anchorage for large vessels is abreast Garden Cove, in 11 to 14 fathoms, muddy bottom. A flat extends 1.5 miles from the head, but can easily be avoided. The swell is quite perceptible in heavy S weather.

(254) **Garden Cove,** on the SE side 2 to 2.5 miles from the head of Port Etches, is the best anchorage for small vessels. **Garden Island,** wooded and with a break through it, is in the middle of the entrance; there is no safe passage NE of it. **Point Horn,** the SW point of the cove, is the most prominent of the projecting points on the SE shore of Port Etches.

(255) Anchor with Point Horn in line with the southernmost of the Porpoise Rocks, and about 250 yards SE of Garden Island in 4 to 5 fathoms, sticky bottom. No ocean swell reaches the anchorage, but, as elsewhere in Port Etches, the williwaws are bad in E gales.

(256) **English Bay,** on the S side of the entrance to Port Etches, is a bight about 0.4 mile wide. It can be used as a temporary anchorage by small vessels, but is exposed to the ocean swell in heavy weather and open to N and W winds. E gales blow in williwaws from all directions but do not raise much sea in the inner cove. The holding ground is good. A submerged rock is about 0.2 mile N of the SW entrance point, in about 60°17'30"N., 146°40'47"W.

(257) The two bights on the SE shore of Port Etches, 1.2 and 3.5 miles NE of English Bay, are rocky and should be avoided.

(258) **Porpoise Rocks,** on the NW side of the entrance to Port Etches, are three principal rocks about 48 feet high, with numerous small rocks among and E of them. The westernmost and largest is flat on top and grass covered, and has a rock covered at high water 200 yards W from it. Deep water is close to the rocks except on their NE side where foul ground extends to Point Barber at Nuchek, a distance of 1 mile, with no safe channel between. Kelp surrounds Porpoise Rocks and extends 0.4 mile SW of Point Barber.

(259) **Nuchek** is an abandoned Indian village on the SE end of the shingle spit at the SW end of Constantine Harbor. A hunting lodge is conspicuous.

(260) In good weather steamers have anchored off the shingle spit NW of Nuchek. It is an uncomfortable anchorage because of the swell. The best anchorage in about 10 fathoms, sandy bottom, is abreast the spit midway between the village and the rocky wooded knob in the middle of the spit, with the southeasternmost of the three largest Porpoise Rocks in line with the end of Hinchinbrook Island.

(261) **Constantine Harbor,** the lagoon on the NW side of Port Etches, has its entrance at **Phipps Point.** It is suitable only for small craft because of the very narrow entrance channel, that is 50 to 100 yards wide with depths of 3 to 15 feet. The tidal currents have considerable velocity in the entrance. The best time to enter is at high water, preferably near slack. The harbor is mostly shallow, but has an area 0.5 mile long and 0.4 mile wide with depths of 3 to 4¼ fathoms, sticky bottom, but exposed to williwaws. Numerous brown bears are reported to inhabit the area.

(262) On the NE side of the entrance are three small rocky wooded islets with overhanging sides. Among them are rocks awash, and 60 yards SSE from the W islet is a submerged rock, all marked by kelp at slack water. The channel is close to the W islet, between the foul ground at the islets and a shoal of 9 to 10 feet extending 0.3 mile E from Phipps Point.

(263) Temporary anchorage in 10 to 12 fathoms, sticky bottom, can be had about 0.5 mile SE of the rocky islets in the entrance of Constantine Harbor; there is considerable swell in heavy weather.

(264) The diurnal range of tide in Port Etches is 11.2 feet.

(265) **Bear Cape,** steep and high, is the SW end of the NW mountain ridge of Hinchinbrook Island. **Deer Cove,** 3 miles N of Bear Cape, has anchorage a little S of the middle of the entrance in 3 to 6 fathoms, with shelter from E and SE winds. A light is on the point at the S side of the entrance to the cove.

(266) **Shelter Bay,** 5.5 miles NNE of Bear Cape, has a shallow entrance with strong currents and is foul inside. It should not be used even by small craft. A shoal with a rock that uncovers 3 feet extends 0.3 mile from the shore of the bight at the entrance to Shelter Bay. This bight should not be used without local knowledge.

(267) A vessel has anchored in 10 fathoms, about 0.3 mile NW of **The Seven Sisters,** a group of rocks 2 miles N of Shelter Bay, and found the williwaws less strong with SE winds than at the anchorage in the cove 3 miles N of Bear Cape.

(268) Temporary anchorage, with shelter from offshore winds, can be had S of the sharp point, with two rocks about 30 feet high close-to, 0.4 mile S of Johnstone Point. The anchorage is about 0.5 mile off the sand beach, in 10 fathoms, sandy bottom.

(269) **Johnstone Point,** the NW end of Hinchinbrook Island, is low and wooded with a small bluff at the water's edge. **Johnstone Point Light** (60°29.0'N., 146°36.7'W.), 57 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on a pillar rock off the point.

(270) Twin 100-foot-high communication towers, about 12 feet apart, and several buildings are about 1 mile E of Johnstone Point.

(271) E of Johnstone Point the shore is low, and broken by two shallow bays or lagoons. The E bay has secure anchorage for small craft. The entrance, 4 miles E of Johnstone Point, is W of a large island, and leads between two rocks. The one on the W side is bare at half tide and is at the end of a sandspit making out from the shore; it should be given a berth of about 40 yards. The rock on the E side is bare at extreme low water. When inside the rocks, head for the cove in the SW side of the bay and anchor in about 3 fathoms, sticky bottom, about 250 to 300 yards from shore and about halfway between the sandspit mentioned above and the S shore of the bay.

(272) **Middle Ground Shoal,** between Hinchinbrook and Hawkins Islands, extends for 3 miles into Orca Bay. A lighted bell buoy marks the NW end. The shoal, which uncovers at low water, consists of sand and mud, and is subject to shifting. A narrow unmarked channel with depths of about 2 feet leads from the NW corner of the shoal SE into Hawkins Island Cutoff. Anchorage can be selected off the shore, SW of Middle Ground Shoal, in 12 to 20 fathoms, soft bottom, with shelter from S and E winds.

(273) **Hawkins Island Cutoff,** between Hinchinbrook and Hawkins Islands, leads from Prince William Sound into Orca Inlet and is navigable only for small craft with local knowledge. It is full of shoals, and in its E end are extensive flats which bare and are largely covered at high water. Strong tidal currents are in its narrower parts.

(274) **Orca Bay** is the E arm of Prince William Sound, N of Hinchinbrook and Hawkins Islands. From its entrance between Johnstone Point on the S and Knowles Head of the N, Orca Bay extends about 30 miles in a general E direction. The city of Cordova is on Orca Inlet at the head of the bay. The S side of the bay is clear with the exception of Middle Ground Shoal. The N side is indented by large bays of no commercial importance.

(275) **Anchorage.**–An anchorage with fair to good holding ground is on the N side of Orca Bay and extends about 2.2 miles S of Knowles Head. (See **110.1 and 110.233,** chapter 2, for limits and regulations.) Williwaws may cause vessels anchored in the E part of the anchorage to drag; caution is advised.

(276) **Knowles Head,** the SW end of the mountainous peninsula between Port Gravina and Fidalgo Bay, is a steep massive headland, with a prominent yellowish landslide down its S face. There are numerous rocks close to shore and, a rock, covered 3¼ fathoms and marked by a lighted bell buoy about 0.5 mile SW of it, is about 3 miles W of Knowles Head.

(277) **Red Head,** 4 miles ESE of Knowles Head, is a high hill with a long, low, wooded neck behind it. It is the W entrance point to Port Gravina and marked by a light.

(278) **Gravina Point,** on the N side of Orca Bay, is low and wooded, and at its S end is a bare spit with a large and a small clump of trees on it. **Gravina Point Light 3** (60°37.4'N., 146°15.1'W.), 27 feet above the water, is shown from a skeleton tower with a green square daymark on the point.

(279) **Gravina Island,** low and wooded, is 1.5 miles NW of the point and 0.6 mile offshore. Anchorage in about 10 fathoms, with shelter from NE winds, can be had about 0.5 mile offshore between the island and Gravina Point.

(280) **Sheep Bay** has its entrance between Gravina and Sheep Points, and extends N about 7 miles. The bay has not been closely surveyed, the bottom is exceedingly broken, and vessels should proceed with caution. Foul ground extends 0.2 to 0.4 mile from the E shore for 2 miles N of Sheep Point. Indifferent anchorage in 18 to 20 fathoms can be selected in the middle about 3 miles above Sheep Point and 0.4 mile below the point where the bay narrows. Proceeding with care and preferably at low water, small vessels can follow the deep channel among the islands in the upper part of the bay and select anchorage in 6 to 15 fathoms.

(281) **Sheep Point** is moderately low and wooded at the end and backed by high land. A wooded islet is 0.3 mile W of the point with bare rocks between; foul ground extends 0.3 mile S and W from the islet.

(282) **Hanks Island,** small and wooded, is 0.8 mile E of Sheep Point and 0.5 mile from shore. **Gatherer Rock,** 0.6 mile 124° from Hanks Island, is a pinnacle covered 13 feet with deep water close-to. Broken ground on which the least depth found was 8 feet, extends 0.8 mile S from Hanks Island, and is marked at its S end by a lighted bell buoy.

(283) **Simpson Bay** is just E of Sheep Bay. **Bomb Point** is the E entrance point to Simpson Bay. The shores of the bay are fringed with numerous rocks and islets. In navigating the N arm, avoid the rock awash at extreme low water 400 yards S of the E entrance point of the inner part of the bay. Anchorage can be had at the head of the arm in about 15 fathoms.

(284) The E arm of Simpson Bay is clear except near the shores. Good anchorage in 12 to 15 fathoms, can be had on either side of the twin islands in the upper part of the arm. The Coast Guard uses the E arm for wet-pool storage of buoys. Occasionally lanterns are attached to the buoys, but at no time are they lighted. Mariners should not confuse these buoys with navigational aids.

(285) **Hawkins Island,** about 20 miles long and mountainous, is divided by **Canoe Passage** about 8 miles from its SW end; the passage is no longer navigable. The NW shore W of Canoe Passage is low tundra with patches of trees. NE of Canoe Passage the high land is nearer the NW shore of the island; there are bluffs in places, and it is more densely wooded.

(286) With the aid of the chart, anchorage can be selected in places along the NW shore of Hawkins Island with shelter from E and S winds. The best anchorage in 9 to 12 fathoms, soft bottom, is 0.2 to 0.4 mile off the spit at the S end of Cedar Bay. A round, wooded islet is at the N end of this spit, and a larger wooded one is 0.5 mile N. Small craft, entering at high water and passing N of the awash and covered rocks inside, can anchor E of the spit, where there is a limited area with a depth of 7 feet.

(287) **Windy Bay** is a small inlet on the NW coast of Hawkins Island about 5 miles NE from Canoe Passage.

(288) **Chart 16710.–Channel Islands,** wooded and nearly 1 mile long, are on the NW side of Orca Bay 6 miles above Sheep Point. The channel at the islands, 0.5 mile wide, is called **The Narrows.** A rock with 3 feet over it, 0.4 mile SW of the SW end of Channel Islands, is marked by a lighted buoy. The lighted buoy and a light opposite it on Hawkins Island mark the SW entrance to The Narrows.

(289) **Orca Inlet** extends S from the head of Orca Bay to Mummy Island. From North Island to Spike Island, about 4.5 miles to the S, the W side of the inlet is shoal, and S of Spike Island the inlet is largely blocked by flats. N of North Island it has depths of 25 to 30 fathoms, and a flat extends 1 mile from the head at its N end.

(290) **Salmo Point,** marked by a light, the N extremity of Hawkins Island, is just E of Channel Islands. **Deep Bay,** 1.5 miles long and 0.5 mile wide, is between Salmo Point and **Knot Point,** the NE end of Hawkins Island. A large shoal covered 4 to 17 feet is across the entrance of the bay and extends 1 mile inside; however, there are depths of 19 to 33 feet farther inside. Anchorage is possible for vessels able to cross the shoal.

(291) **Observation Island,** 0.8 mile long, high and wooded, is 0.4 mile NE of Knot Point.

(292) **North Island,** 0.4 mile long, low and wooded, is 1 mile NE of Salmo Point.

(293) **Shepard Point** is a sandspit 1.5 miles ENE of North Island and 6 miles N of Cordova. Ruins of a cannery and wharf are on the point.

(294) The ruins of a cannery and wharf are on the SE shore of **Nelson Bay,** about 1.5 miles NE of Shepard Point.

(295) Chugach Alaska Fisheries has a cannery at Orca, 2.5 miles NE of Cordova. The 200-foot-long wharf has depths of 12 to 22 feet alongside its face, 11 feet off the NE end, and 5 to 8 feet off the SW end. A submerged obstruction covered about 10 feet is about 50 feet N of the SW corner of the face of the wharf. Large vessels make port landings; the dock heading is 224°. Docking on the flood is difficult as the current tends to set off the wharf.

(296) **Cordova** is on the E shore of Orca Inlet opposite **Spike Island,** which is wooded and marked by a light at its N end. Cordova is 1,221 miles from Seattle via the ocean route and 1,363 miles via inside passages through British Columbia and Southeast Alaska to Cape Spencer. It is one of the most important towns in southwestern Alaska and is the supply and distribution point for numerous outlying fishing localities.

(297) **Prominent features.–Mt. Eyak,** 2,498 feet, and **Mt. Eccles,** 2,680 feet, dominate the approach, the town nesting at the foot of Mt. Eyak.

(298) **Channels.**–The deepest channel, and the one used by larger vessels, leads N of North Island and then follows the E shore S to Orca and Cordova. The buoyed channel has a controlling depth of about 20 feet on the W side, but deeper water in midchannel can be carried to Orca and Cordova.

(299) **Anchorages.**–Good anchorage can be had in the channel NE of Spike Island in 45 to 55 feet, 0.1 mile NW of Spike Island in 40 feet, and 0.5 mile NW of Spike Island in 26 to 30 feet, sand bottom.

(300) **Dangers.–The March 1964 earthquake caused a bottom uplift of 6.3 feet at Cordova. Shoaling and new dangers may exist requiring extreme caution until a complete survey is made of the area.**

(301) Log booming areas are on the N side of Channel Islands and 1.3 miles N of Spike Island.

(302) The area extending from **North Island Rock,** marked by a light and 1.6 miles N of Observation Island, to over 2 miles S of the island has several visible rocks and shoals with little water over them. The E limit of the shoal area is buoyed.

(303) **Routes to Cordova** (see also chart 16709).–**From the S via the Prince William Sound Traffic Separation Scheme** (discussed earlier in this chapter under Prince William Sound). Depart the scheme about 14 miles N of its southern entrance, thence via the charted recommended track leading from about 60°28.0'N., 147°52.5'W., through Orca Bay, thence via the buoyed channel through the E part of Orca Bay, thence via marked Orca Inlet to Cordova.

(304) **From the W via Elrington Passage.** Pass 1 mile E of Point Helen Light, thence 1.5 miles W and 1.5 miles N of Seal Island, thence E across the Prince William Sound Traffic Separation Scheme to the charted recommended track in about 60°35'02"N., 146°42'10"W., through Orca Bay, thence the same as from the S to Cordova. **Caution:** Mariners are advised to adhere to the general principles for navigation when entering, departing, or crossing a traffic separation scheme. (See Traffic Separation Schemes, chapter 1.)

(305) Fishing vessels sometimes approach Cordova through **Western Channel** and **Odiak Channel,** on the W and S sides, respectively, of Observation Island. Both channels are buoyed, but local knowledge is helpful. Fishing boats also approach Cordova through Orca Inlet from the S. This route requires local knowledge and was discussed earlier in this chapter.

(306) **Tides and currents.**–The diurnal range of tide at Cordova and Orca is 12.4 feet. (See the Tide Tables for daily predictions.)

(307) The flood current enters the NE end of Orca Inlet and sets SW past Orca and Cordova. Off Orca the current velocity is about 1 knot, but a flood of nearly 2.5 knots has been observed. The current sets parallel with the face of Ocean Dock and Municipal Dock on the flood and ebb. In the channel between the Municipal Dock and Spike Island the swiftest water will be found along the E shore of Spike Island sometimes attaining 2 knots.

(308) Off Cordova the velocity is 1.8 knots on the flood and 1 knot on the ebb. (See the Tidal Current Tables for daily predictions.)

(309) In the channel W of Big and Gravel Points, 6 miles SW of Cordova (see chart 16709), velocities up to 2 knots have been observed setting along the channel. A NE current can be expected at low water and a SW current at high water.

(310) **Weather.**–(See page T-2 for Cordova climatological table.)

(311) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(312) Vessels en route Cordova meet the pilot boat about 2 miles S of Sheep Point (60°37.0'N., 146°00.0'W.).

(313) The pilot boat can be contacted by calling "CORDOVA PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between the pilot and agent/vessel.

(314) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(315) **Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(316) **Coast Guard.**–A U.S. Coast Guard vessel is stationed at Cordova.

(317) **Harbor Regulations.**–The **harbormaster** administers the municipal wharves and the small-boat harbor, and maintains an office at the N end of the small-boat basin.

(318) **Wharves.**–The waterfront facilities at Cordova consist of two piers for large vessels, a small-boat harbor, and a few piers for fishing boats.

(319) **Ocean Dock**: L-shaped pier 0.8 mile N of town; 408-foot outer face with about 25 feet alongside; inner face, 325 feet long, 16 feet alongside; deck height, 20½ feet; 140-ton mobile crane, water, gasoline, and diesel fuel are available on the pier; AlaskaState Ferry Terminal is at the SW end of the pier; receipt of petroleum products and general cargo; owned by the city of Cordova.

(320) **Morpac, Inc. Dock,** just S of Ocean Dock, is a cannery with docking facilities for unloading fishing vessels; N pier, 14 feet alongside; S pier, 8 feet alongside.

(321) **Municipal Dock**: T-shaped pier across from Spike Island; 280-foot outer face; 23 feet alongside; deck height, 20 feet; the outer face is used by a U.S. Coast Guard vessel stationed at Cordova; the inner face is privately rented moorage; water is available; owned by the city of Cordova.

(322) St. Elias Ocean Products, Inc., and North Pacific Processors are just N of Municipal Dock. Both have unloading facilities for fishing boats with depths of 12 to 13 feet alongside.

(323) **Cordova Small-Boat Harbor,** SE and inshore of Municipal Dock, is protected by two breakwaters, the S of which is lighted. It has about 852 berths, and transient moorage is available; the harbormaster assigns berths. The harbormaster's office monitors 2509 kHz, VHF-FM channels 16 and 19. In July 1983, the controlling depths were 16 feet in the entrance channel, thence in June 1988, reported depths of 16 feet were available in the basin, except for shoaling to 4 feet along the edges of the basin. In July 1985, a pinnacle rock, covered 6½ feet, was reported in about the middle of the entrance to the basin about 75 yards E of the breakwater light. Water, electricity, gasoline, and diesel fuel are available in the basin. The basin is owned by the State and operated by the city.

(324) **Supplies.**–Gasoline, diesel fuel, and water are available at Ocean Dock; gasoline, diesel fuel, and water are available at the small-boat harbor. Most provisions can be obtained in town.

(325) **Repairs.**–Several machine shops can handle minor engine repairs. A marine grid, in the small-boat harbor, can handle craft up to 70 feet; a small boatyard is S of town.

(326) **Communications.**–Regular freight van ship feeder/vessel and barge services to and from Seattle use the Municipal Dock. Telephone and telegraph service is available, and scheduled air service to Anchorage and Juneau is maintained. Ferry service to Valdez and Whittier is maintained by the Alaska State Ferry System.

(327) RCA Alascom maintains a public coastal radio station at Cordova and on nearby Hinchinbrook Island.

(328) **Charts 16708, 16707.–Port Gravina** has its entrance between Gravina Point and Red Head. A 3¼-fathom bank is near the middle of Port Gravina, between Gravina Rocks and St. Matthews Bay.

(329) **Gravina Rocks** are about 0.8 mile offshore near the SE entrance point.

(330) **Comfort Cove** is a small inlet on the SE shore about 6 miles from Gravina Rocks. The entrance is narrow and the cove is suitable for small craft only.

(331) **The March 1964 earthquake caused a bottom uplift of 4.6 feet in Comfort Cove. Shoaling and new dangers may exist requiring extreme caution until a complete survey is made of the area.**

(332) **Beartrap Bay** is a narrow inlet near the head of Port Gravina. There are rocks awash and areas of broken bottom in midchannel just within the entrance. About 1.2 miles from the entrance, an island nearly blocks the channel. The deep channel is on the N side of the island. Depths of 27 to 30 fathoms, mud bottom, will be found in the upper basin.

(333) The upper end of Port Gravina is deep, and terminates in mudflats which extend for 1.3 miles to the head of the bay.

(334) **Parshas Bay** is a small bay on the N side of Port Gravina. Depths of 40 to 30 fathoms extend nearly to the head of the bay, but there is no suitable anchorage. An extensive area of rocks, islets, and foul ground extends about 1 mile SW from Parshas Bay.

(335) **Olsen Bay,** 1.5 miles W from Parshas Bay, shoals gradually from 20 fathoms at the entrance to mudflats at the head. In entering, the W shore should be followed at a distance of 0.5 mile or less to avoid the foul ground extending SW from the W entrance point of Parshas Bay.

(336) **St. Matthews Bay** indents the N shore of Port Gravina 5.5 miles NE from Red Head. The only known dangers are a reef extending 0.4 mile off the E point and a rock awash 0.1 mile S of the prominent point on the W side of the bay, 1 mile within the entrance. Good anchorage can be had near the head of the bay in 14 fathoms, mud bottom.

(337) Between Red Head and St. Matthews Bay are a series of lagoons. **Hells Hole** is the northeasternmost one. This shore should be given a berth of 0.8 mile or more.

(338) **Port Fidalgo,** an E arm of Prince William Sound, has its entrance between Goose and Bligh Islands and extends E about 22 miles. There are abandoned mines on the shores of Boulder and Landlocked Bays and on the S shore of Port Fidalgo, between Irish Cove and Whalen Bay.

(339) The waters of the main arm of Port Fidalgo are deep and free from outlying dangers. Vessels can navigate with safety as far as the SE arm at the head of the bay by keeping over 0.3 mile offshore.

(340) **Goose Island,** on the S side of the entrance to Port Fidalgo, is wooded and has two prominent knolls. **Gull Island,** small and rocky, is midway between Goose Island and the shore. The passages between the islands and the shore should be avoided by strangers.

(341) **Goose Island Light** (60°42.8'N., 146°43.6'W.), 38 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the SW side of the island, and marks the entrance to Port Fidalgo.

(342) **Porcupine Point** is a round, high, wooded bluff, with a low depression between it and Knowles Head. A rock awash and marked by kelp, is 350 yards N of the point.

(343) **Snug Corner Cove,** on the NE side of Porcupine Point, has good anchorage except with NW winds, but the bottom is irregular and should be avoided by large vessels. A rocky patch with 4¼ fathoms, possibly less, is in the entrance 0.5 mile off the NE side of Porcupine Point. A low divide is at the head of the cove and another is across Porcupine Point.

(344) To enter Snug Corner Cove, avoid the rock off Porcupine Point and follow the SW shore at a distance of about 0.3 mile. Anchor about 0.3 mile off the bight in the SW shore in 10 to 11 fathoms, soft bottom. Small vessels can find better shelter from N winds in the basin at the head of the cove, in a depth of 5 fathoms. Favor the SW shore slightly when entering and anchoring. The shore of the basin should be given a berth of over 0.2 mile.

(345) **Two Moon Bay** indents the SE shore of Port Fidalgo. Low divides cut the peninsula from the heads of its two arms. Good anchorage can be had in the bay at the entrance to either arm, and vessels of moderate size can anchor in the arms in about 10 to 15 fathoms, bottom generally sticky. A midchannel course should be followed in the arms. At the head of the SE arm is a basin trending SW where small vessels can anchor in 4 to 7 fathoms. The channel is between the W point and a reef bare at low water near the middle of the entrance.

(346) **Irish Cove,** on the S shore of Port Fidalgo, is a narrow inlet about 1 mile long. Small craft can find secure anchorage in the widest part near its head in 5 fathoms. To enter, favor the E side of the narrows and then keep in midchannel.

(347) In **Whalen Bay,** mudflats, bare at low water, extend across the bay 0.5 mile from the head. Small vessels can enter the bay on a midchannel course, and find anchorage in 7 to 10 fathoms 1 mile inside the entrance to the bay.

(348) A group of islands is near the head of Port Fidalgo. A single islet is about 900 yards SW of this group, the passage to the bight to the N lying between the groups. This bight is not recommended as an anchorage. Its head is obstructed by mudflats, and it is reported that strong williwaws are encountered.

(349) The entrance to the E arm at the head of Port Fidalgo is 2 miles ESE of the group of islands. A dangerous rock awash is 460 yards off the NE entrance point. The head of the arm ends in a narrow passage that opens out into a

circular lagoon. It is reported that this passage is foul and should not be attempted.

(350) A well-sheltered anchorage is in midchannel 0.6 mile W from the above mentioned dangerous rock in 15 fathoms, mud bottom. Small vessels can find anchorage near the head of the SE arm in midchannel, 0.8 mile beyond the rock, in 7 fathoms.

(351) **Fish Bay,** on the N shore of Port Fidalgo 9 miles above Porcupine Point, is an indifferent anchorage and should be avoided by large vessels. The williwaws are very heavy with NE winds drawing through the bay from the high mountains above its head. A small wooded island is just inside the entrance and 0.2 mile from the W side. The channel is E of the island and is obstructed near the middle by a rock covered 3½ fathoms, possibly less. Rocks awash are 200 yards off the E point at the entrance. Anchorage can be had in the middle of the bay, 0.3 to 1 mile above the island, in 8 to 13 fathoms, with soft bottom in places.

(352) **Landlocked Bay** is on the N shore of Port Fidalgo between Bidarka Point and **Graveyard Point.** Secure anchorage is afforded in the widest part above the narrows, in 14 to 15 fathoms, sticky bottom. The bay is easily entered during daylight, but the shadows cast by the hills at night obscure the narrow entrance, rendering it difficult for vessels not equipped with searchlights.

(353) The islands on the E side below the narrows have covering rocks near them. Near the middle of the narrows is a rock with 12 feet or less over it. The channel is NW of the rock, but the NW shore abreast of it should be given a berth of about 100 yards. There is a flat at the head of the bay with an islet at its lower edge. Water can be obtained from a fall on the S side of the bay SE of an old mine.

(354) There are no commercial enterprises in this bay. The mines are abandoned and the wharves are in ruins.

(355) **Bidarka Point** is a high wooded hill with a lower strip at its S end. A shoal extends 0.3 mile SW from the point.

(356) **Boulder Bay,** between Bligh Island and Bidarka Point, has several dangers, the depths are very irregular, and the anchorage is not desirable.

(357) In the approach to Boulder Bay, a reef bare at lowest tide is 0.6 mile from Bligh Island. About 0.3 mile E of this reef is a 2½-fathom spot and a depth of 6½ fathoms about 0.7 mile to the S. A submerged rock, nearly awash at low water, and a rock awash close N, are 0.4 mile from a point on the E shore and 1.6 miles NW from Bidarka Point. A reef, partly bare at low water, is 0.2 to 0.4 mile SE from the small wooded island in the middle near the head of Boulder Bay.

(358) **Bligh Island,** on the E shore of Prince William Sound, is mountainous. The SW end of the island is a high, steep, wooded head, with yellow landslides near the water. On the NW side are islands with foul ground between.

(359) Good anchorage from N winds for large vessels can be found about 1 mile S of Bligh Island. Radio reception from Valdez is reported to be poor at this anchorage.

(360) **Reef Island,** off the W side of Bligh Island, is level and wooded, and has a single knoll in the middle. A rock awash is 0.3 mile 208° from the SW end of the island.

(361) **Bligh Reef,** about 2 miles long, has depths of ¼ fathom to 9 fathoms and shoals to bare near the center. The reef is marked by **Bligh Reef Light** (60°50.3′N., 146°53.1′W.), 59 feet above the water and shown from a pile structure with a red and white diamond-shaped daymark. A lighted bell buoy is about 0.7 mile W of the light. The steamship OLYMPIA was lost on Bligh Reef in 1910.

(362) **Busby Island,** off the NW end of Bligh Island, is high, and partly wooded. Its W point is long, level, and wooded, and is surrounded by a reef to a distance of nearly 0.5 mile. The point is marked by **Busby Island Light** (60°53.7′N., 146°49.0′W.), 48 feet above the water and shown from a skeleton tower with a red and white diamond-shaped daymark.

(363) **Tides and currents.**–The diurnal range of tide is 12 feet in Snug Corner Cove in Port Fidalgo. At the entrance to Port Fidalgo, N of Goose Island, the velocity of the current is about 0.5 knot.

(364) **Tatitlek Narrows** separates Busby and Bligh Islands from the main shore, and offers a more direct route for small craft between Port Valdez or Ellamar and points on Port Fidalgo. The channel, buoyed in the SE part, has depths of about 4 fathoms, except for a shoal with a least depth of 8 feet in midchannel in about 60°51′58″N., 146°42′13″W. The channel is narrow with foul ground on both sides; local knowledge is advisable.

(365) **Tatitlek,** an Indian village on the N shore at the SE end of the narrows, has a Bureau of Indian Affairs school and a small store. A State-maintained pier with a 64-foot face is here. The Alaska State Ferry will stop for passengers on request. Skiffs are used to embark and debark passengers in the vicinity of Tatitlek Narrows Buoy 8 (60°53.5′N., 146°43.4′W.).

(366) **Virgin Bay** is a shallow bight 0.5 to 0.8 mile long on the NE shore of Tatitlek Narrows. There is little water in the bay, and on the N side of the entrance is a long reef bare at low water.

(367) **Ellamar,** an abandoned village on the NE side of Virgin Bay, has a large wharf in ruins. Small craft find shelter S of the ruins; the approach is marked by a lighted buoy.

(368) Anchorage can be had 0.3 to 0.4 mile from the NE shore of Tatitlek Narrows, and 0.5 to 0.8 mile NW of Ellamar, in 12 to 16 fathoms, sticky bottom.

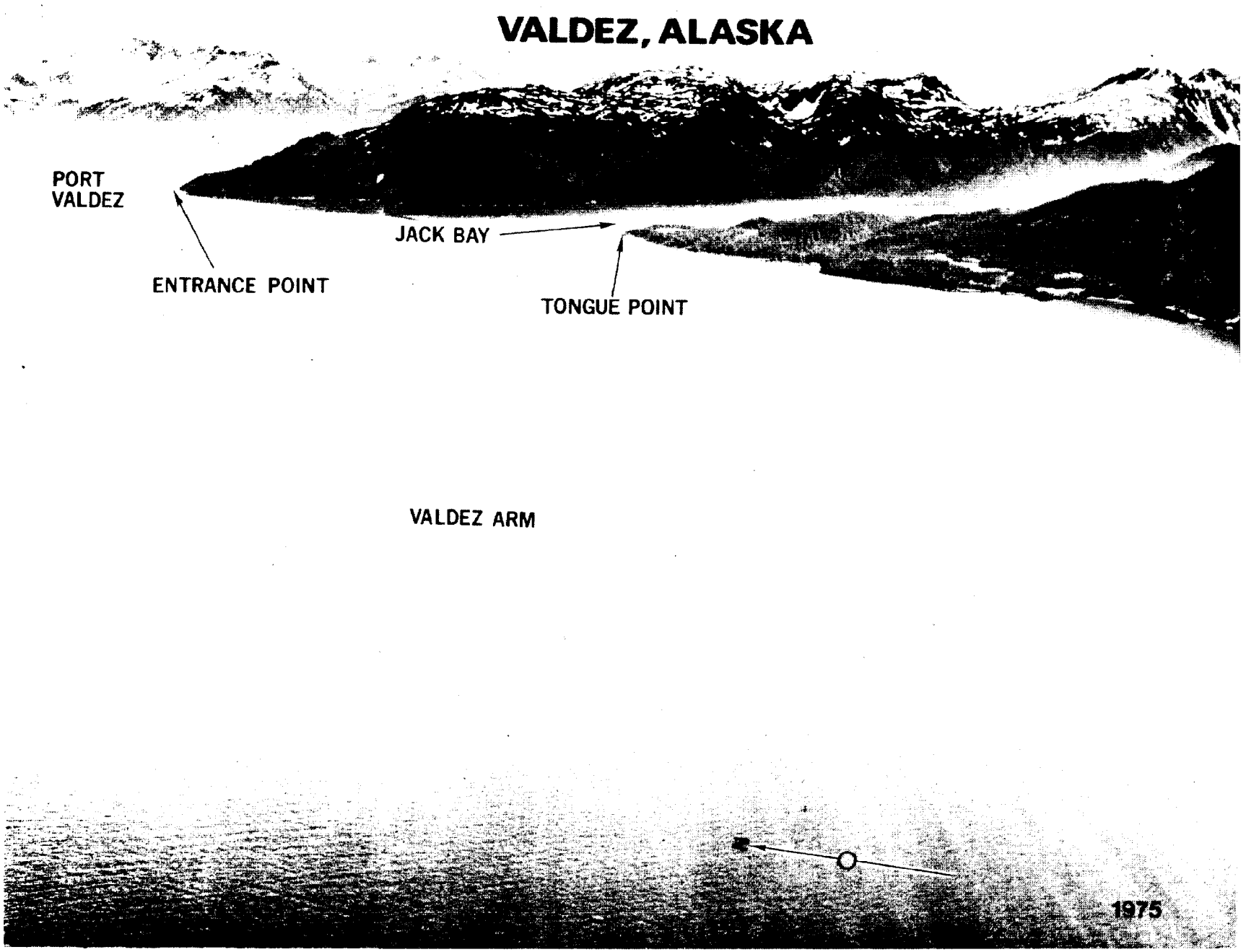
(369) Larger vessels can find anchorage between Busby Island and Black Point, 1.4 miles NW of Ellamar, in about 30 fathoms, fair holding ground.

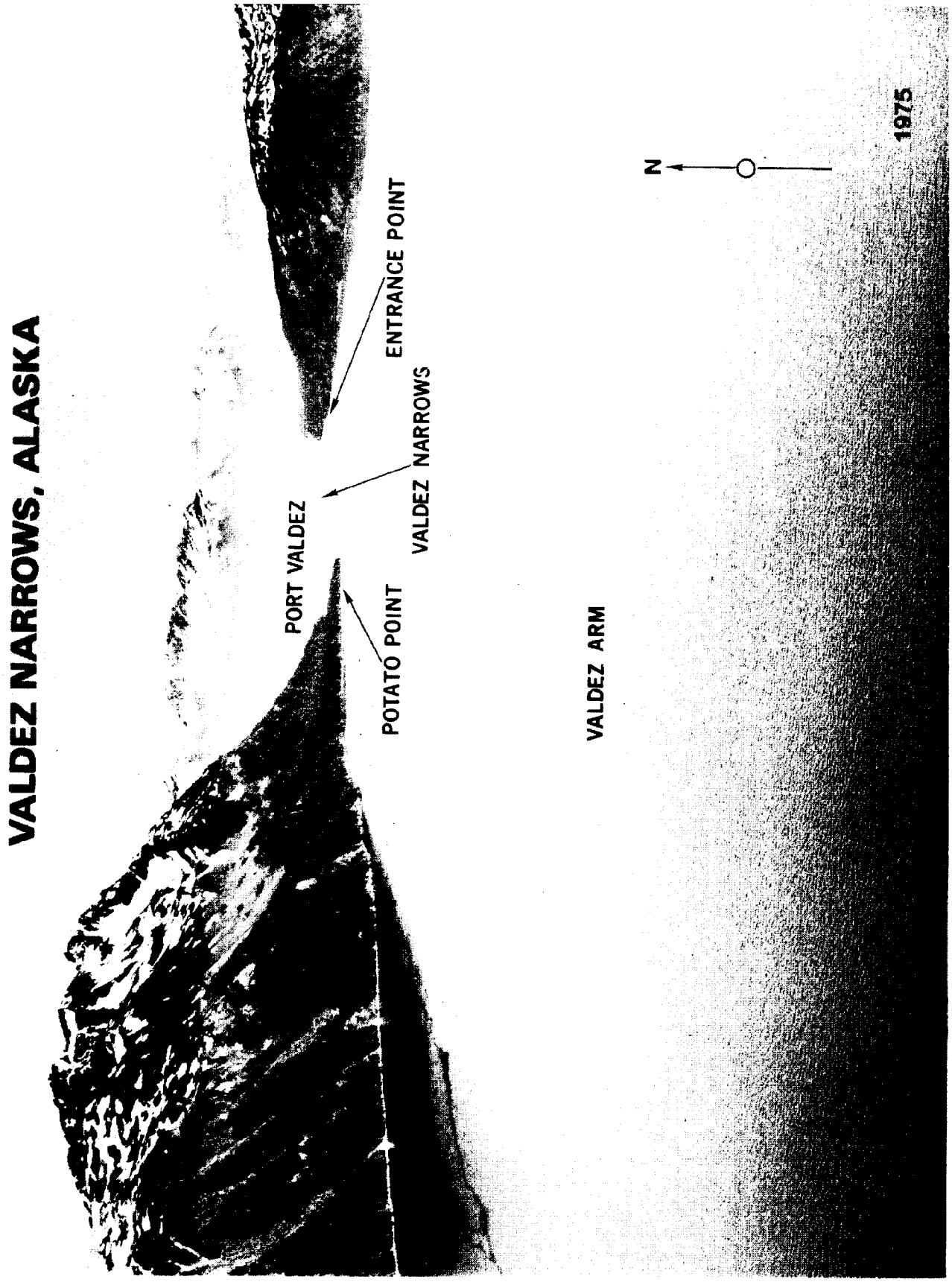
(370) **Valdez Arm,** the main N arm of Prince William Sound, extends about 13 miles NE from Busby Island and **Point Freemantle** to the N end of Valdez Narrows, then turns E for 11 miles to the head of Port Valdez. The water is very deep and there are no known outlying dangers except for Middle Rock near the N end of the narrows, which is described later in this chapter, and two shoals, 2¼ and 7 fathoms, about 0.2 mile apart, near the W edge of the arm about 3.5 miles NE of Point Freemantle. The S side of the 7-fathom shoal is marked by a lighted buoy. Anchorages are few because of the great depths.

(371) The **Prince William Sound Traffic Separation Scheme,** which is a component of the **Prince William Sound Vessel Traffic Service,** leads through the middle of Valdez Arm. Additional information on the traffic separation scheme and the vessel traffic service are given earlier in this chapter under Prince William Sound.

(372) **Sawmill Bay,** on the W shore of Valdez Arm 9 miles from Point Freemantle, has depths of about 6 fathoms in its 0.4-mile-wide entrance. Secure anchorage, with a clear width of over 0.2 mile, can be had behind the W entrance point, in 9 fathoms, sticky bottom. The S and W ends of the basin forming the anchorage are shoal, and a flat fills the head of the bay down to the narrows at the N end of the basin.

(373) **Rocky Point** is the W end of the peninsula between Tatitlek Narrows and Galena Bay. A rocky grass-covered islet is 0.2 mile N of the point. **Rocky Point Light 10** (60°57.0′N., 146°47.1′W.), 38 feet above the water, is shown from a skeleton tower with a red triangular daymark on the SW point of an island W of Rocky Point.


VALDEZ, ALASKA
PORT VALDEZ
ENTRANCE POINT
JACK BAY
TONGUE POINT
VALDEZ ARM
1975


VALDEZ NARROWS, ALASKA
ENTRANCE POINT
VALDEZ NARROWS
PORT VALDEZ
POTATO POINT
VALDEZ ARM
N
1975

(374) **Tides and currents.**–The diurnal range of tide at Rocky Point is 12.1 feet. The currents in Valdez Arm are too weak or variable to be predicted.

(375) **Galena Bay** is about 5 miles long in a general E direction. The depths are great throughout except for flats off the mouths of streams. Care should be observed in the vicinity of **The Narrows,** about 3 miles from the entrance, as that area has not been thoroughly surveyed. The only anchorage is about 0.2 mile S of the islets on the N side at the head of the bay, in about 15 fathoms, bottom soft in places.

(376) A group of rocky, grass-covered islets extends 0.5 mile off the N point at the entrance of Galena Bay. Anchorage can be had in the middle of the cove NE of the islets, in 10 to 12 fathoms, sticky bottom.

(377) **Jack Bay,** on the E shore S of Valdez Narrows, is 0.8 mile wide at the entrance and 0.2 to 0.4 mile wide in the upper 3 miles. An island with an islet off the NW end and several islets off the SE end are in the middle of the bay. Numerous rocks surround the island and the islets to the SE. Two coves indent the S shore, 0.7 mile and 1.8 miles inside the entrance. The entrance to the first cove is foul; the second cove has depths of 5¾ to 8 fathoms and is a suitable anchorage for small vessels. Jack Bay has mudflats at the head and numerous boulders along the shore. Anchorage for large vessels can be had 1.2 miles inside the entrance about 0.2 mile from the N shore, in 12 to 15 fathoms. Other anchorages are also available in the entrance to the cove about 1.5 miles ESE of **Tongue Point,** in 9 to 12 fathoms, and in the cove about 0.5 mile E of the island, in 9 to 14 fathoms. The diurnal range of tide is 12.1 feet in Jack Bay.

(378) **Valdez Narrows** is about 0.8 mile wide, with deep water and bold shores. **Middle Rock,** near the middle of the N end of the narrows and marked by a light, is a pinnacle barely covered at extreme high tides. A shoal, W of the light, extends E from the mainland about 0.4 mile. The shoal consists of a rock covered 2 feet at the inner end, a 3½-fathom depth at the outer end, and a wooded islet in between. The tidal currents in the narrows are too weak and variable to be predicted, however, it is reported that deep-draft tankers maneuvering at the regulated low speed of 6 knots will be affected appreciably by the currents. Speed adjustments may be necessary to lessen the effect of the currents on deep-draft vessels.

(379) **Entrance Point,** 1 mile N of Jack Bay on the E side of Valdez Narrows, and **Potato Point,** on the W side of the narrows, are marked by lights. **Entrance Island,** E of Middle Rock, is marked by a light.

(380) **Port Valdez** is the designation given the body of water extending from Valdez Narrows to the head of the bay.

(381) **Shoup Bay,** at the face of **Shoup Glacier,** is closed by a sandspit nearly dry at low water and over which the best depth is about 7 feet. The bay occasionally has floating ice, some of which escapes into Port Valdez when the wind and tide are favorable.

(382) **§166.103 Geographic Coordinates.**

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

(384) **Jackson Point** is a jutting point of land extending from the mainland on the S side of Port Valdez. This point of land was once an island.

(385) **Valdez Marine Terminal** is on the S side of Port Valdez between Jackson Point and **Saw Island,** 0.8 mile to the W. It is the terminus of the Trans-Alaska Pipeline which carries crude oil S from Prudhoe Bay on the Arctic Ocean. The terminal and adjacent waters are within a **Safety Zone.** (See **165.1 through 165.8, 165.20, 165.23, and 165.1701,** chapter 2, for limits and regulations.)

(386) **Towage.**–Three 5,750-hp tugs and two mooring launches are available for docking and undocking.

(387) **Wharves.**–The terminal, operated by Alyeska Pipeline Service Co., has four deepwater berths for the shipment of crude oil. Berth No. 1 is a floating pier with four 12-inch loading arms with a maximum loading rate of 20,000 barrels per hour each. Berth Nos. 3, 4, and 5 are T-head piers each having four 16-inch loading arms with a maximum loading rate of 27,500 barrels per hour each arm.

(388) No bunker fuel or freshwater are available at the terminal. The alongside depths for each facility are reported depths. For information on the latest depths contact the operator. For complete information on terminal facilities, services, and regulations refer to the Trans-Alaska Pipeline Port Information Manual, Valdez, Alaska, published by the operator. For a complete description of the port facilities for all of Port Valdez refer to Port Series No. 38, published and sold by the U.S. Army Corps of Engineers. (See appendix for address.)

(389) Berth No. 1: E end of Jackson Point; 1,200 feet with dolphins; 150 feet alongside; deck height, 32 feet.

(390) Berth No. 3: W side of Jackson Point; 1,050 feet with dolphins; 90 feet alongside; deck height, 38 feet.

(391) Berth No. 4: about 0.4 mile W of Jackson Point; 1,380 feet with dolphins; 90 feet alongside; deck height, 38 feet.

(392) Berth No. 5: about 0.7 mile W of Jackson Point; 1,385 feet with dolphins; 85 feet alongside; deck height, 38 feet.

(393) A rock that uncovers 10 feet is about 175 yards SW of Saw Island. A private buoy displaying the word "Rock" marks the E end of the rock SW of the island.

(394) About 0.5 mile E of Jackson Point, submerged piling of an abandoned cannery wharf may exist. Ruins of the inactive Midas mine wharf are 2.3 miles E of Jackson Point.

(395) **Valdez** is on the N shore of Port Valdez about 2 miles from its head. It is at the S end of **Richardson Highway,** which connects with Fairbanks 374 miles distant. Open all year, the highway also serves Anchorage and Seward and links with the **Alaska Highway.**

(396) The town of Valdez was formerly at the head of Port Valdez, but was relocated to its present site due to the extensive damage it suffered from the March 1964 earthquake.

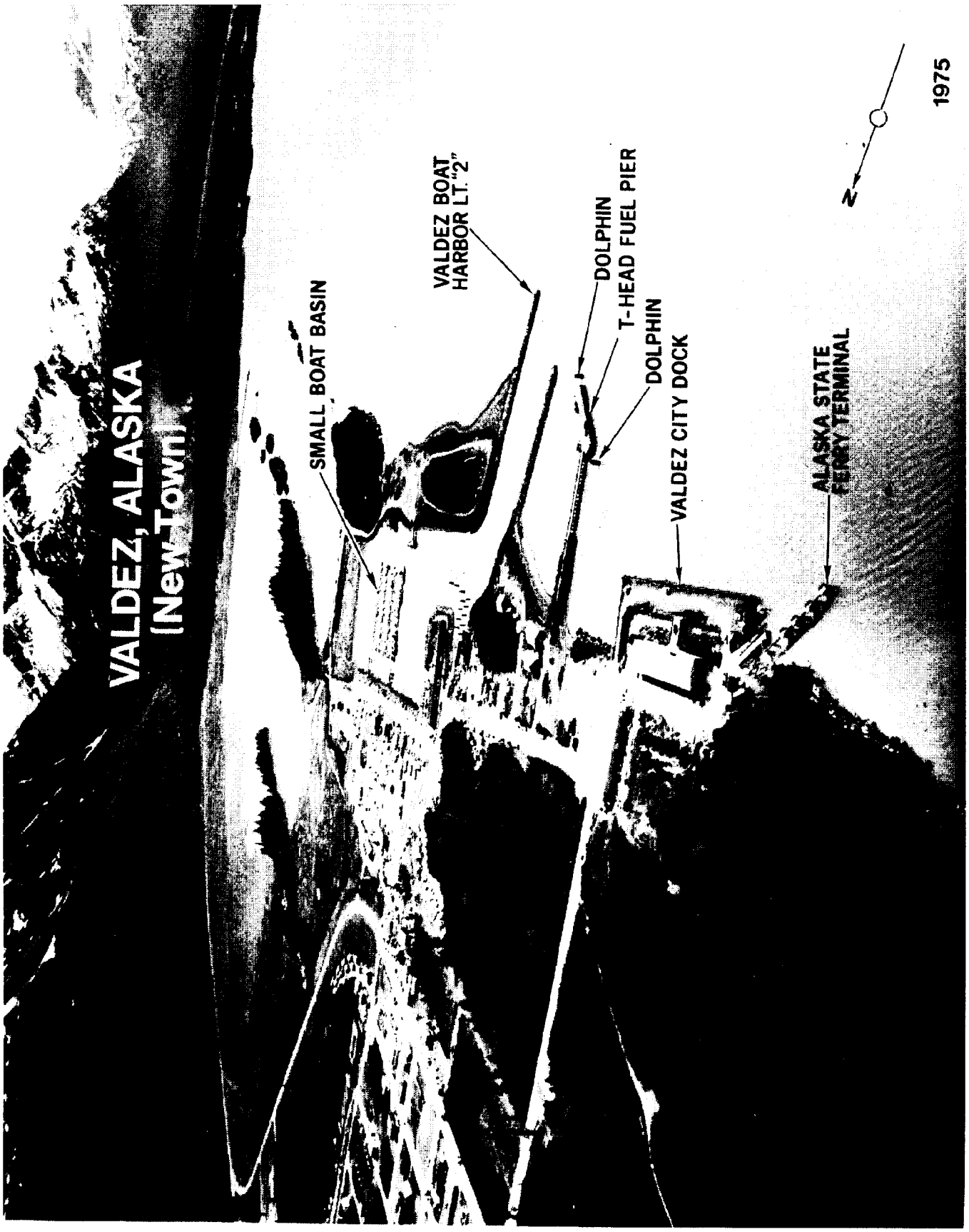
(397) Valdez is 1,232 miles from Seattle via the outside route through the Strait of Juan de Fuca and 1,374 miles via the inside route to Cape Spencer.

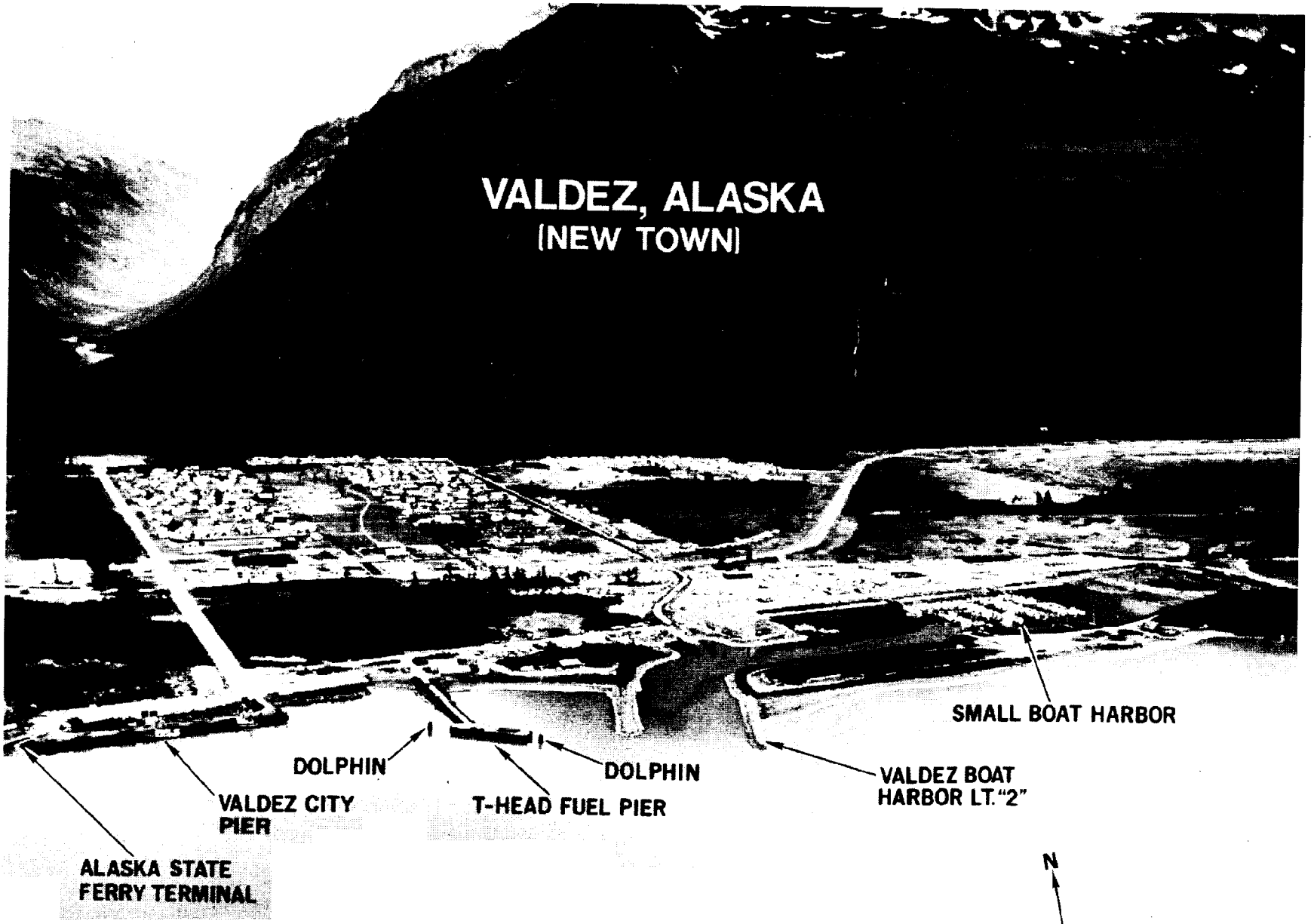
(398) **Prominent features.**–The white petroleum tanks at Old Valdez are most prominent, and the Coast Guard radar tower on the S side of Valdez is conspicuous.

(399) **Channels.**–The approach to Valdez is deep and clear of dangers once through Valdez Narrows.

(400) **Anchorage.**–There are no safe anchorages at Valdez due to the foul ground and high winds that prevail from the W during the afternoons of the summer season. Convenient anchorages in the approaches to Valdez Arm and Port Valdez have been described.

(401) **Routes to Valdez** (see also chart 16700).–**From the S via Prince William Sound Traffic Separation Scheme** (described earlier in this chapter under Prince William Sound). Depart the scheme at its N end in Valdez Arm, thence through Valdez Narrows and Port Valdez to Valdez.


VALDEZ, ALASKA
(New Town)
SMALL BOAT BASIN
VALDEZ BOAT HARBOR LT. "2"
DOLPHIN
T-HEAD FUEL PIER
DOLPHIN
VALDEZ CITY DOCK
ALASKA STATE FERRY TERMINAL
N
1975


VALDEZ, ALASKA
(NEW TOWN)
SMALL BOAT HARBOR
DOLPHIN
DOLPHIN
VALDEZ BOAT
HARBOR LT."2"
VALDEZ CITY
PIER
T-HEAD FUEL PIER
ALASKA STATE
FERRY TERMINAL
N
1975

(402) **From the W via Elrington Passage.** Pass 1 mile E of Point Helen Light, thence 1.5 miles W of Seal Island Light, thence 2 miles E of Smith Island, thence enter the Prince William Sound Traffic Separation Scheme and depart the scheme at its N end in Valdez Arm, thence through Valdez Narrows and Port Valdez to Valdez. **Caution:** Mariners are advised to adhere to the general principles for navigation when entering, departing, or crossing a traffic separation scheme. (See Traffic Separation Schemes, chapter 1.)

(403) **Tides and currents.**–The diurnal range of tide at Valdez is 12.0 feet. (See Tide Tables for daily predictions.) Additional information on the predicted hourly heights of the tide can be obtained from the publication "Supplemental Tidal Predictions - Anchorage, Nikishka, Seldovia, and Valdez, Alaska," published by the National Ocean Service. The tidal currents are too weak and variable to be predicted. In 1966, however, it was observed that noticeable currents from the Robe River discharging into the SE end of Port Valdez are created at times of low and high stand of the tide. This current affects the area of the Old Valdez waterfront. The current sets 000° with a maximum observed velocity of 2 to 3 knots flowing perpendicular to the ruins of the piers at Old Valdez.

(404) In 1979, it was reported that the surface currents in Port Valdez had a maximum velocity of 0.5 to 1.0 knot.

(405) **Pilotage.**–Pilotage, except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(406) Vessels en route Valdez or Whittier meet the pilot boat as follows:

(407) (A) oil tanker traffic-about 3.6 miles SW of Bligh Reef Lighted Buoy 6 (60°50.5'N., 146°54.4'W.); or

(408) (B) nonoil-tank traffic-about 2.3 miles N of Busby Island Light (60°53.7'N., 146°49.0'W.).

(409) The pilot boat can be contacted by calling "EMERALD ISLAND" on VHF-FM channels 10 and 16, or on 4125 kHz from 1300 to 1400 daily. The pilot boat is a 65-foot trawler with a dark blue hull, and a white deckhouse with the word "Pilot" shown on both sides of the house. Vessels picking up a pilot should maintain a speed of about 6 knots and have the pilot ladder 8 feet above the water. The pilot boat displays the appropriate day and night signals when on duty.

(410) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and Appendix for addresses.)

(411) **Customs.**-Valdez is a **customs port of entry.**

(412) **Quarantine.**-A U.S. Public Health Service Contract Physician is located at the hospital in Valdez. (See appendix for additional information.)

(413) Valdez is a **customs port of entry.**

(414) **Coast Guard.**–A Coast Guard Marine Safety Office is in Valdez. (See appendix for address.) A Coast Guard vessel is stationed in Valdez.

(415) **Wharves.**–There are four deep-draft waterfront facilities at the new town of Valdez. For a complete description of the port facilities refer to Port Series No. 38, published and sold by the U.S. Army Corps of Engineers. (See appendix for address.)

(416) **Valdez City Dock** (61°07'30"N., 146°22'30"W.): 600-foot face with 25 feet alongside; deck height, 22 feet; receipt and shipment of fish; cranes to 25 tons; owned by the city and operated by Nautilus, Inc.

(417) **State of Alaska, Valdez Ferry Terminal**: W side of City Dock; 200 feet of berthing space; 20 feet alongside; deck height, 22 feet; landing for passenger and vehicular ferry; owned by the city and operated by the State.

(418) **Valdez Dock Co., Petroleum Dock**: 133 yards E of City Dock; 200-foot face, 300 feet of berthing space with dolphins; 24 to 34 feet alongside; deck height, 22 feet; receipt and shipment of petroleum products; bunkering vessels; pipelines extend from wharf to storage tanks in rear, total capacity 180,500 barrels; owned and operated by Valdez Dock Co.

(419) When approaching this pier care must be taken to avoid a 3-fathom shoal extending about 100 yards out from the W breakwater of the small-boat harbor to E.

(420) **Valdez Small-Boat Harbor,** the small-boat harbor to the E of the fuel pier, is entered between two breakwaters. In April 1982, the controlling depth was 9 feet (12 feet at midchannel) in the entrance channel, thence 10 to 12 feet were available in the basin, except for lesser depths near the edges. A light is shown from the E and W breakwaters. The harbor can accommodate about 520 boats, and transient berths are also available. The **harbormaster** assigns berths, he can be contacted on VHF-FM channel 16. Water, electricity, fuel, boat-launching ramps, and a 60-ton mobile vertical boat lift are available in the harbor. A tide grid is available for underwater repairs.

(421) **Port of Valdez, General Cargo and Container Wharf**: 1.5 miles E of the small-boat harbor; 704-foot face, 1,200 feet total berthing space with dolphins; 50 feet alongside; deck height, 14 feet; 21 acres of open storage; nine 522,000-bushel capacity grain silos; two cranes are available; receipt and shipment of containerized and general cargo; shipment of grain; owned and operated by the city of Valdez.

(422) A mooring buoy is 0.5 mile W of the marginal wharf.

(423) **Supplies.**–Gasoline, diesel fuel, and water are available at the fuel pier and in the small-boat basin. Some marine supplies can be obtained in town.

(424) **Repairs.**–Minor repairs can be made to small craft.

(425) **Communications.**–Valdez is connected with the Alaska Highway system. Scheduled air service to Anchorage is maintained, and charter service is available. The Alaska State Ferry maintains service to Cordova year-round and to the Alaska Railroad at Whittier during the summer. Telephone and telegraph service are available.

(426) **Glacier Island** is on the N side of Prince William Sound, W of the entrance to Valdez Arm. It is mountainous and indented by a number of bays.

(427) **Glacier Island Light** (60°52.4'N., 147°05.4'W.), 38 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the E side of the island.

(428) **Chamberlain Bay,** on the S side of Glacier Island, is exposed to the S but affords anchorage for small vessels about 0.4 mile from the head in about 15 fathoms, muddy bottom. Rocks, which partly bare at low water, extend 0.2 mile from the W side of the bay about 0.6 mile from the head.

(429) **Jackson Cove,** on the W side of Chamberlain Bay, is a secure harbor for small craft. The entrance has a least width of about 50 yards and a depth of about 12 feet; at the narrowest part of the entrance, favor the N side. The upper half of the cove has rocks on both sides, and a careful midchannel course should be followed. Anchorage can be selected in the lower part of the cove in 10 to 15 fathoms, also about 350 yards from the head in about 5 fathoms. A divide about 75 feet high extends through to **Jackson Hole.** The diurnal range of tide is 11.9 feet in Jackson Cove.

(430) The passage N of Glacier Island in its E part is very deep except near the shore. The N side of Glacier Island is indented by Finski Bay, Growler Bay, Eagle Bay, and Jackson Hole. On the N side of the passage, Columbia Bay,

Long Bay, and several other smaller inlets form an irregular coast. None of the waters have been completely surveyed.

(431) **Finski Bay,** situated on the NE side of Glacier Island, has depths of 30 fathoms in the exposed N part. The inner cove is encumbered with rocks exposed at low tide and is unsuitable for anchorage.

(432) **Growler Bay** provides good anchorage near its head for small craft. Several rocks bare at low tide, situated along the S shore near the head of the bay, are the only known offshore dangers once well inside the entrance. The E side of the channel should be favored when approaching the bay with depths as little as 9 feet reported off the entrance in midchannel, and shoals extend all along the E side of the island between Growler Bay and Elder Point.

(433) The unnamed bay E of Elder Point provides two small-craft anchorages. As both entrance points are foul, a midchannel course should be maintained while entering and while passing on either side of a wooded island near the W shore. Anchorage can be had in about 50 feet SE of the island and in 40 feet S of the island. The narrow passage which connects with Growler Bay, with a least depth of about 3 feet, is suitable only for small boats.

(434) **Eagle Bay** provides secure anchorage at its head, but unsurveyed shoals are situated in midchannel on the W side of the bay SE of an unnamed island about 1 mile W of Elder Point. Rocks awash at low tide extend about 0.3 mile NE of the NE side of the unnamed island. Dangerous offshore rocks, nearly awash at low tide are situated about 0.5 mile W of this island and the passage on the S side has not been surveyed. Eagle Bay can be entered by maintaining a course about 200 yards off the W shore S from Elder Point until the lowland opens between Eagle Bay and the next bay E, then steering directly SW for the head of the bay, where anchorage in 4 to 6 fathoms is available. **Eagle Lagoon** connects with Eagle Bay by a very narrow passage which is encumbered on its S side by rocks exposed at low tide. Small craft entering at high water slack can find anchorage in depths up to 70 feet inside the lagoon.

(435) **Jackson Hole,** about 1 mile W of Eagle Bay, appears to be clear of offshore dangers and has depths ranging from 20 feet in its narrow entrance to 90 feet inside at midchannel.

(436) **Campbell Bay** and **Irish Cove,** on the NW side of Glacier Island, have not been surveyed. The bottom is irregular in the channel between them and the mainland with depths of 30 feet or less 0.3 mile off the W end of Campbell Bay. Dangerous uncharted rocks may also exist. A midchannel course is recommended for traversing the W part of the passage N of Glacier Island.

(437) **Iceberg Point** forms the W extremity of Glacier Island. A dangerous rock is reported about 0.5 to 1 mile SE of the point with its exact position unknown. Mariners are advised to use caution when navigating in the area.

(438) Between **Point Freemantle** and **Columbia Bay** the coast is encumbered by dangerous rocks extending at least 0.2 mile offshore. A shoal with a least known depth of 27 feet is reported 0.5 mile S of **Elf Point.**

(439) **Columbia Bay,** situated W of Heather Island, is deep except near the shores. Between **Heather Island** and a small island to its S is a narrow, rocky passage, called **Lutris Pass,** which has a maximum depth of 10 feet; due to numerous reefs S and W, this latter island should be given a berth of at least 0.5 mile. Rocks extend 0.2 mile offshore along the NW shore of Heather Island.

(440) **Columbia Glacier** closes the head of Columbia Bay with a magnificant ice cliff 2.5 miles long and as much as 300 feet high, from which icebergs are constantly being discharged. Mariners are warned to keep at least 0.5 mile away from the cliff, as blocks of ice may be thrown great distances when falling seracs strike the water. A moraine shoal completely crosses the bay in front of the glacier. Both E and W ends of this moraine dry at low water; elsewhere the depths vary from about 2 to 12 fathoms.

(441) **Glacier Ice:** At any time of the year, but especially in summer and fall months, icebergs and brash ice discharged from the Columbia Glacier may completely fill Columbia Bay and block the passage and coves north of Glacier Island. Particularly dangerous to vessels are low-lying icebergs (growlers) which scarcely show above the water surface. Ice conditions change rapidly and mariners are cautioned to be vigilant at all times. At night and under conditions of low visibility, navigation of these and adjacent waters should not be attempted. Glacier ice provides extremely pure water and small bergs taken aboard provide excellent drinking water.

(442) **Heather Bay,** situated E of Heather Island, shoals gradually NE from 50 fathoms to moraine reefs near its head and provides good protection from wind and heavy glacier ice for moderate-sized vessels. The best anchorage is situated in about 30 fathoms in midchannel, where the bay trends N. The E side of the bay is encumbered by dangerous rocks and shoals. A moraine reef, with a maximum depth of 5 fathoms about 0.3 mile off the NE point of Heather Island, and with rocks awash at low tide further NE, encloses the head of the bay. Although Columbia Glacier extends nearly a mile across the head of Heather Bay, due to shoal water, only small icebergs are discharged.

(443) **Emerald Cove,** situated on the SE side of Heather Bay 1 mile NE of Elf Point, provides the most secure small-craft anchorage in the area. Depths of 85 feet, muddy bottom, are found in midchannel, and a small bight on its N side has midchannel depths of 33 feet; sunken rocks are located on both the E and W entrance points to the bight. Fresh water can be obtained from a small cascade at the E side of the bay; a drying flat extends 0.1 mile off the stream mouth. Another anchorage for small craft called **Jade Harbor** is situated S of an island about 2 miles NE of Emerald Cove. A midchannel course should be followed when entering due to rocks along both shores; once inside, good anchorage is available in 4 to 5 fathoms. A shoal extends about 0.2 mile off a small river of good water which enters the head of the cove.

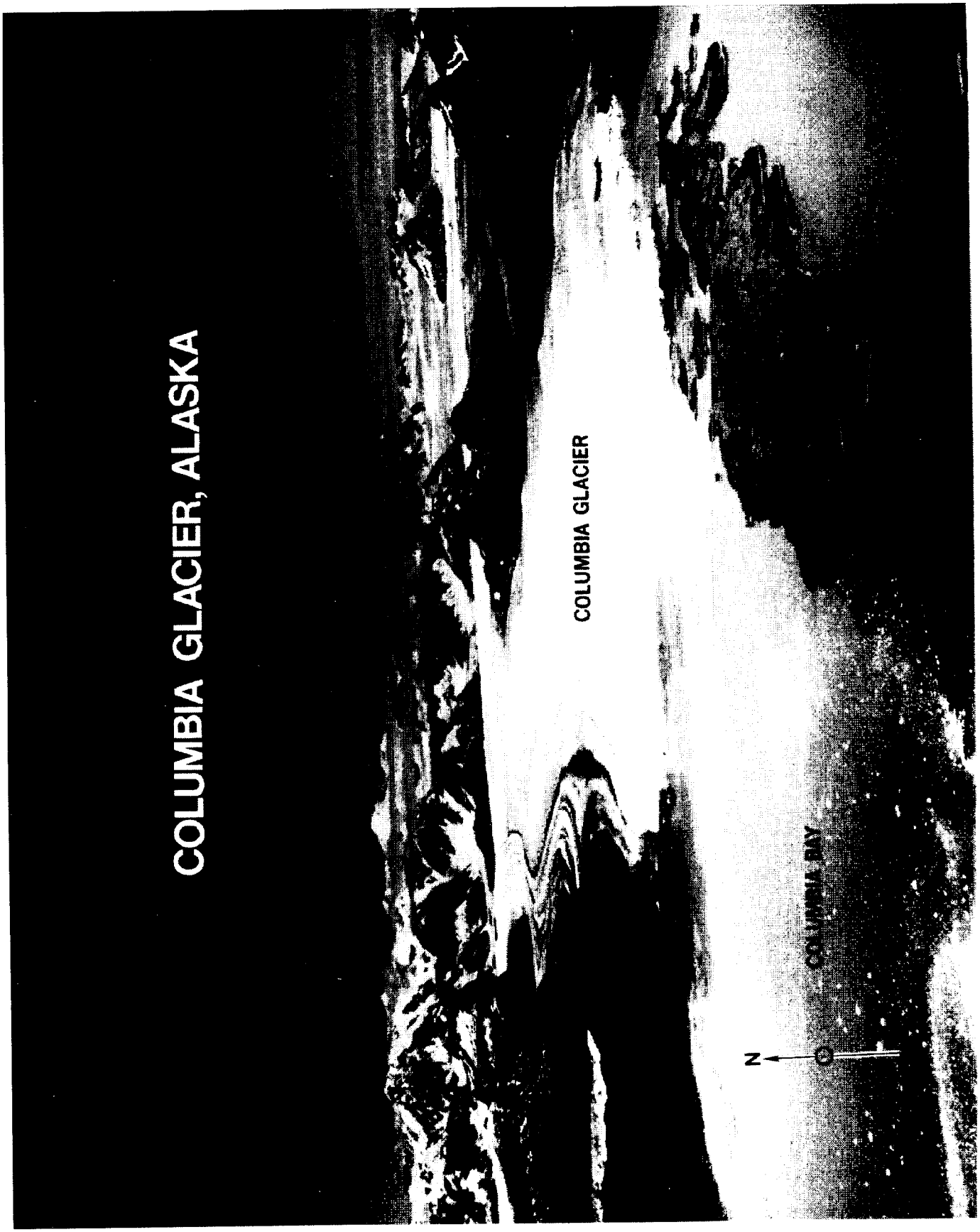
(444) The NE corner of Heather Bay is shoal, and even small launches should not proceed N of a group of small islands and rocks situated on the E shore. Fishermen occasionally anchor in good weather in the passages on either side of the largest of the islands while visiting nearby lakes.

(445) **Granite Cove,** situated on the W side of Columbia Bay, has maximum depths of about 1 fathom, rocky bottom, in midchannel in the passage N of the entrance island. Once inside, the cove has depths up to 5 fathoms. Due to the shallow entrance and frequency of glacier ice, this cove is little used as an anchorage.

(446) The coast between **Granite Cove** and **Flent Point** is shoal. A reef with a least depth of about 10 feet is located 0.2 mile E of Flent Point and the beach S of the point is also foul. Vessels are advised to maintain a distance of at least 0.3 mile off these shores.

(447) **Long Bay,** 3.5 miles W of Columbia Bay, extends in a N direction for about 6 miles and at its head divides into two arms, each about 2 miles long. There are numerous islands and rocks that bare at various stages of tide. The bay is unsurveyed, but the bottom is known to be very broken. There are no apparent secure anchorages.

(448) **Useless Cove,** which indents the E shore of Long Bay, is reported to be foul. One mile NW of Useless Cove


COLUMBIA GLACIER, ALASKA
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N

are numerous dangerous rocks which extend as much as 0.4 mile offshore. Other rocks encumber the E and W shores of Long Bay, and a midchannel course is recommended. S, W, and N of **Schrader Island,** situated near the center of Long Bay, foul ground is located between a small wooded island and the mainland. The NE extremity of Long Bay appears to be deep in midchannel until about 1 mile of the head, where the bottom rises abruptly to a shoal with depths of less than 3 feet.

(449) Moderate-sized vessels find good anchorage in 8 to 12 fathoms, mud bottom, in **Buyers Cove** just W of **Slipper Point,** situated off the W entrance point to Long Bay. Commercial fishermen use the cove as a transfer point. Just W of this cove is **Eickelberg Bay,** about 2 miles long, with depths of 10 feet, possibly less, near the middle of the entrance."

(450) **Charts 16705, 16700, 16709.**–The NW part of Prince William Sound has long inlets and fiords, most of which are very deep. The shores are generally bold, wooded, and rise abruptly to lofty peaks, especially near the heads of the fiords. Spectacular valley glaciers descend into the heads of the fiords and discharge large quantities of icebergs which may completely block the upper channels, especially in the spring months.

(451) The bottom of the entire area is a bluish-gray glacial silt of very fine texture, and often quite sticky even though the deposit is only a few inches thick over the rock. In selecting an anchorage, care should be exercised to determine the true character of the bottom, for it is often difficult to get an anchor to hold on the underlying rock, even though the sounding lead shows a sticky bottom.

(452) **Naked Island, Peak Island,** and **Storey Island,** near the center of Prince William Sound, form a group about 8 miles long, N-S, and about 6 miles wide. They are high and wooded to the summits.

(453) The bottom in the vicinity of the islands, including the passages among them, is rocky and very broken. As a measure of safety it is advisable for vessels, especially large ones, to avoid areas with depths less than about 20 fathoms in the vicinity of the islands and to avoid the passages between them.

(454) It is safer for vessels to keep in the deeper part of the passage between Naked Island and Smith Island, preferably between the 50-fathom curves.

(455) The best anchorages are in the S part of the large bay on the N side of Naked Island in 20 to 30 fathoms for large ships, and in the E bight of this bay in 10 to 20 fathoms for vessels up to 500 tons. The bottom is rock and mud.

(456) Small craft can anchor in the small bight on the N side of Naked Island and in the small bight on the SW side of Peak Island. They may also anchor in the bay on the N side of the E part of Storey Island with protection from all winds except N. Anchorage in 6 to 10 fathoms on the E side of Naked Island affords protection only from the N and W.

(457) **Bass Harbor,** on the S side of Naked Island, offers secure anchorage in 20 fathoms, mud bottom, about 0.4 mile W of the entrance to a small unnamed cove on its E side. The anchorage is open to S winds, and a slight swell makes in during heavy S weather.

(458) **Cabin Bay,** on the W side of Naked Island, offers some protection from E winds for vessels up to 500 tons, but the bottom is broken and not ideal holding ground.

(459) **Fairmount Island,** 7.5 miles N of Storey Island, is high. Buildings of a former fox farm are on the gravel beach on the SW side but they are not prominent. The channel between the island and the mainland is about 0.6 mile wide at its narrowest part, but has numerous rocks that bare at various stages of the tide; passage should not be attempted without local knowledge. Foul ground extends about 2 miles from SE through SSW of the S shore of the island.

(460) **Wells Bay** (60°53.5'N., 147°28.5'W.) is a large bay just E of Unakwik Inlet and separated from it by a narrow peninsula. The bay extends N about 8 miles to a forked head, and is about 2 miles wide at the mouth and narrows to 0.6 mile about 4 miles N of the entrance. The E side is indented by two bays. **Granite Bay,** 1.3 miles from the mouth, extends ENE about 2.3 miles and is about 0.3 mile wide at the entrance. A constricted passage about 100 yards wide is about 1 mile from its head. The sides are usually bold. **Cedar Bay,** 2.5 miles from the mouth of Wells Bay, extends NE about 3.5 miles and averages 0.5 mile in width; an island near its head almost closes the upper part of the bay.

(461) A group of islands and bare rocks between Granite and Cedar Bays extends W past the center of Wells Bay. A prominent point juts out about 0.5 mile on the E side of this bay 1.3 miles N of the entrance; an island is on the SE side of the point. Temporary anchorage for moderate-sized vessels may be had about 0.2 mile N of the point and 0.2 mile E of the W shore in 17 to 20 fathoms, mud bottom. The bay is unsurveyed, but it is known that the entrance is deep.

(462) **Unakwik Inlet,** unsurveyed, has its entrance 6 miles W of the W point of Glacier Island, 2 miles W of Wells Bay. The inlet extends N about 18 miles and averages 1.5 miles in width, narrowing to 0.5 mile at its N end at **Meares Glacier,** which discharges large quantities of small icebergs. Numerous rocks and islets are situated off the E and W shores; in midchannel, excepting the shoal off Jonah Point described below, the inlet's depth gradually diminishes from over 1,000 feet at its S end to 500 feet near the glacier.

(463) **Olsen Island** is situated on the W side of the entrance to Unakwik Inlet; a rock awash at low water is reported about 1,200 yards E of the island and a group of rocks are situated 0.4 mile off its NW side; the passage between the island and these rocks is foul. Many rocks encumber the passage between Olsen and a small island SW; rocks and shoals extend a mile or more S of this latter island. The passage between Olsen Island and the mainland is used by small vessels. A course slightly W of midchannel is recommended, due to numerous rocks on both sides.

(464) **Olsen Cove** provides anchorage for small craft in 40 to 60 feet of water near the center of the basin. Sunken rocks extend 300 feet from the N shore just outside of the entrance narrows, which has a least depth of 14 feet. Once inside the narrows, a course slightly S of midchannel should be maintained to avoid rocks situated about 400 feet offshore midway between the two N points. A sunken rock is also located about 300 feet W of the S entrance point. The main basin appears to be clear of danger with the exception of shoals and a drying rock which block the NW extremity of the cove.

(465) An unnamed cove, 1 mile N of Olsen Cove, affords good anchorage for small craft near its S shore just W of the two small wooded islets marking the S entrance point. Depths shoal gradually from 25 to 8 fathoms, sand and gravel bottom. This anchorage is exposed to the NE.

(466) **Siwash Bay,** on the W side of Unakwik Inlet 6 miles N of Olsen Island, affords excellent anchorage in 10 to 15 fathoms, mud bottom, about 0.2 mile W of the entrance island. This bay is about 2 miles long, 0.5 mile wide, and has a wooded island near the S shore at the entrance. The deep channel is to the N of the island. Entering on a midchannel course the depths shoal rapidly to 10 fathoms just N of the island, continuing at that depth until well inside. Sheltered

from all directions, the anchorage appears suitable for large vessels.

(467) **Jonah Bay,** on the W side 9 miles N of Olsen Island, is crescent shaped and about 2.5 miles long. A glacial stream discharges at its head. The entrance is narrow and nearly blocked by a small island. The best water appears to be S of the island, but the depths are unknown.

(468) A dangerous moraine bar completely crosses Unakwik Inlet just N of Jonah Bay. The shoal extends from **Jonah Point** to the E shore of the inlet. A low, grassy islet, difficult to observe in thick weather, is situated approximately one-third of the channel width from the E shore to which it is connected by drying rocks. Three crossings of the shoal in 1977 found a least depth of 22 feet about 0.4 mile W of the islet and depths of 11 and 10 feet approximately 0.1 mile E and W of this line. Shallow water extends about 0.2 mile E from Jonah Point and well offshore W to the mouth of Jonah Bay. The ruins of an abandoned cannery and wharf are on the E shore just S of the bar. A mooring buoy is near the ruins. A rock, depth unknown, lies at the entrance to the cove S of the cannery ruins.

(469) On the E side of the inlet, 11 miles N of Olsen Island is a series of small coves known collectively as **The Cow Pens.** A small ragged island lies about 0.5 mile offshore.

(470) **Eaglek Bay,** midway between Unakwik Inlet and Esther Passage, is a large irregularly shaped bay extending N about 7 miles. The S half is about 2.5 miles wide and the N half about 1 mile wide. Two coves are on the W side, each extends W for about 1.5 miles. One large and several small coves are on the E side. The shores are extremely ragged and there are many wooded islets, bare rocks, and rocks awash. The large cove on the E side has numerous good anchorages for small craft. The bay is unsurveyed, and caution should be used because of the irregularity of the bottom. In entering, the best water appears to be about 0.2 mile W of the small prominent wooded islet 0.5 mile SW of **Point Pellew.**

(471) **Axel Lind Island,** 2.5 miles SSW of the entrance to Eaglek Bay, is high. The buildings of a fox farm are prominent on a stretch of gravel beach on the N side. Passage to the N is deep, but there are several off-lying dangers. Fishing craft use this passage and the one N of Bald Head Chris Island when bound for Port Wells via Esther Passage.

(472) **Squaw Bay,** 1 mile E of Esther Passage and 1.5 miles N of Bald Head Chris Island, extends NNE 2 miles and averages 0.5 mile in width. Its E side is irregular, with numerous islands and rocks baring at various stages of the tide. The W side has no visible dangers and is unbroken except for a small cove about midway in. The cove affords excellent anchorage for small craft in 8 to 10 fathoms, sticky mud bottom. Water may be obtained from a waterfall at the head of the cove. The bay is unsurveyed, but the best water appears to be near the W shore.

(473) **Lone Island,** about 3 miles E of Perry Island and 5.5 miles S of Axel Lind Island is wooded, comparatively level, and high. Foul ground extends nearly 0.5 mile N. A 3½-fathom shoal 1.4 miles S of the island is marked by a lighted bell buoy. A bank with a least depth of 3½ fathoms is between the shoal and the island.

(474) **Dutch Group** consists of several wooded islands and bare rocks 4.3 miles NNW of Lone Island, the largest having elevations up to 150 feet. Foul ground extends 1.3 miles S of the group to two prominent rocks about 5 to 10 feet high. An abandoned white building with a yellow roof is on the large N island of the Dutch Group and is prominent from offshore.

(475) **Fool Island,** 3 miles W of the Dutch Group, is wooded and about 50 feet high. A rock that uncovers is 0.3 mile S of Fool Island.

(476) **Egg Rocks** are prominent bare rocks 1.5 miles WNW of Fool Island.

(477) **Perry Island,** in the NW corner of Prince William Sound, is wooded to a height of about 1,000 feet. It is prominently marked on its NE side by a round peak, the summit of which is small, bare, and dome shaped. The bays indenting the island are anchorages for small craft only, because of the foul, rocky, and broken bottom.

(478) **Perry Island Light** (60°39.3′N., 147°55.8′W.), 35 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the southernmost point of the island. A rock, 14 feet high, is about 150 yards S of the light. A rock awash is 0.4 mile NW of the light.

(479) Foul ground extends 0.5 mile E from the E end of Perry Island, and nearly 1 mile SE and S from the SE point of the island.

(480) On the E side of Perry Island Light is a bay that is known locally as **South Bay.** Good anchorage is available for moderate-size vessels in 10 to 24 fathoms, sand and mud bottom, in the cove at the head of the bay. The only known off-lying danger in the cove is a rock awash about 50 yards off the point on the E side of the entrance. The buildings at the head of the cove are prominent from the S; the cove is a port of call for the biweekly mail boat from Cordova. South Bay should be entered with caution because of the irregularity of the bottom in the outer part.

(481) **East Twin Bay,** indenting the N side of Perry Island, has anchorage for small craft on the SW side of the head in about 11 fathoms; small area of soft bottom. A midchannel course should be followed until up with a prominent rock about 20 feet high, that is near the middle 0.7 mile from the head. Pass NE of the rock and follow the NE shore at a distance of about 150 yards. A rock with 1 fathom over it is 450 yards 135° from the prominent rock and 275 yards from the NE shore.

(482) **West Twin Bay,** on the NW side of Perry Island, affords no anchorage because of the rocky, broken bottom. Small craft entering should favor the NE side to the narrow part 1.3 miles from the head, and then favor the SW side, passing W of a rock, about 25 feet high, near the middle of the bay 0.6 mile from the head.

(483) From the point on the W side of entrance to West Twin Bay, a chain of islets and foul ground extends N for over 1 mile.

(484) **Perry Passage** is between Perry Island and Culross Island, 2.5 miles to the W. **Wells Passage,** between Perry and Culross Islands on the S and Esther Island on the N, is over 2 miles wide. The two passages have depths of 100 to 250 fathoms.

(485) **Esther Island** is mountainous, wooded to a height of about 1,000 feet, and the summits are bare rocks. The peak on the SE point of Esther Island, and the sharp twin peaks on the SW point, are prominent. **Point Esther Light** (60°47.1′N., 148°06.0′W.), 31 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the SW side of the island. Three bays are between the light and Esther Passage. **Esther Bay,** the easternmost, is unsurveyed. It is 3.5 miles E of the light on Point Esther and extends N about 2 miles. The entrance, 0.7 mile wide, is partly blocked by several wooded islets, bare rocks, and rocks awash. The interior of the bay is dotted with islets and rocks.

(486) **Quillian Bay,** the middle bay, is unsurveyed. It is 1.3 miles E of the light, extends 1.7 miles NNE, and is about 0.2 mile wide. The entrance is constricted to a width of 0.1 mile.

An islet is 0.7 mile above the entrance and two rocks awash are toward the head of the bay. The shores are steep-to.

(487) **Lake Bay,** the westernmost bay, is 0.7 mile E of the light, extends 1.2 miles NW, and is about 0.1 mile wide. Fishing craft find indifferent anchorage near the E shore SE of the narrowest part where the bay widens to its maximum of 0.3 mile. Rocks awash extend about 100 yards SE of the point forming the NW extremity of this anchorage bight. A submerged rock is near the head of the bay. In general, the shores are steep-to and depths are too great for convenient anchorage. About 0.5 mile from the head on the E side is a freshwater stream that discharges from **Esther Lake.**

(488) **Esther Passage** separates Esther Island from the mainland. The S entrance, 7.5 miles E of Point Esther and 1.8 miles NW of **Bald Head Chris Island,** is about 1.5 miles wide. The entrance is flanked by two wood islets. A rock awash at about half tide is about 0.3 mile E of the W islet. The bottom of the entrance is extremely irregular, varying from 6¼ to 60 fathoms. Once inside, the water deepens rapidly to more than 100 fathoms for 2 miles or more. The passage trends NW for about 10 miles and connects with Port Wells about 8.5 miles N of Point Esther and 3.5 miles S of Golden; it is sharply constricted at its midpoint. The least depth in the constricted channel is reported to be about 5 fathoms. The S half is about 0.7 mile wide and the N half, 400 to 250 yards wide. The passage is unsurveyed but appears to be clear, except for a rock, that uncovers, on the S side of the W entrance, and another rock, reported to be submerged, near midchannel at the bend 1 mile E of the W entrance to Port Wells. It is reported that the best way to avoid the reported submerged rock is to hold well into the N half of the channel when swinging on the turn. Fishing craft use the passage regularly.

(489) **Esther Rock,** 1 mile W of **Point Esther,** is 22 feet high and sparsely covered with grass.

(490) A reef, bare at lowest tide, is reported to extend about 1 mile off the S point of **Granite Bay,** on the W side of Esther Island.

(491) **Culross Island** is mountainous and wooded to a height of about 1,000 feet. **Culross Island Light** (60°44.8'N., 148°06.8'W.), 40 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the NE point of the island.

(492) **Culross Bay,** on the N side of Culross Island, has good anchorage in 30 fathoms with limited swinging room about 0.9 mile inside the entrance just S of a prominent point on its NW side. The bay is open to NE winds, but no swell makes in, and it is not subject to williwaws.

(493) **Culross Passage,** between Culross Island and the mainland to the W, is used occasionally by fishing craft and cannery tenders. It is narrow and congested and should be used only with local knowledge. In May-June 1978, the NOAA Ship McARTHUR reported finding excellent anchorage in midchannel about 1 mile S of the N entrance in about 50 fathoms, mud bottom. No swell makes in, and the area offers protection from all but N weather. The small bay on the E side 1 mile from the N entrance affords good anchorage in 3 to 8 fathoms, mud bottom; water can be obtained from the streams at the head of the bay.

(494) **Goose Bay,** on the E side of Culross Passage 3.5 miles S of the N entrance, is narrow and extends NE about 1 mile. The entrance narrows to about 50 yards and has a reported depth of about 2 fathoms. The narrow entrance opens out into a bay with two arms; extensive flats and shoal water are reported in both arms.

(495) **Long Bay,** on the W side of Culross Passage across from Goose Bay, is narrow and extends SW about 2 miles. It is reported that the bay appears clear in midchannel with about 10 fathoms and shoals rapidly in the vicinity of the small islets at the SW end of the bay.

(496) It is further reported that anchorage for small vessels can be had in the vicinity of the small islets in 7 to 10 fathoms, fair holding ground. E winds funnel into Long Bay blowing from the NE with considerable force and gusts; vessels should guard against dragging onto the shoals at the head of the bay.

(497) **Routes,** Culross Passage, from the northward.–When entering the narrowest part of Culross Passage from the N, pass between the small islet, just off the W shore 2 miles inside the entrance, and a rock nearly awash, just E of the islet. Do not attempt to pass between the islet and the W shore as there is a rock, barely covered, making passage impossible. Continue S between the larger island in midchannel and the W shore, then shift to midchannel to avoid a shoal extending off the point on the W shore. One mile farther S and off Goose Bay, are numerous islands. The channel, with a least depth of 4¼ fathoms, passes to the E of the island. (This route from the N was reported to National Ocean Service in 1974.)

(498) In entering the passage from the **southward,** give a wide berth to the many dangerous rock ledges and rocks that extend off the S shore of Applegate Island on the E side of the entrance. Considerable current has been observed through this area.

(499) **Port Wells** extends N from Wells Passage along the W side of Esther Island for 13 miles to **Point Pakenham** where it divides into **Barry Arm** to the W and **College Fiord** to the E. A low spit extends well offshore from the W shore just S of the entrance to Barry Arm and 2.5 miles N of Hobo Bay. Depths of 2 fathoms have been reported 0.5 mile off the end of the spit. In May 1985, a reef was reported at the entrance to Barry Arm in about 60°59'N., 148°09'W. In September 1992, shoaling was reported in about 60°59'30"N., 148°08'25"W. Offshore depths in Port Wells are 100 to 200 fathoms. **Harriman Fiord,** about 5 miles above the entrance to Barry Arm, extends SW about 10 miles. Gravel bars, which uncover, extend across the entrance to Harriman Fiord from **Point Doran.**

(500) **Bettles Bay,** on the W side of Port Wells 7 miles above Wells Passage, is reported free from dangers in midchannel. Good anchorage is available in 25 fathoms, mud bottom, in midbay 1 mile above the entrance, and in 22 fathoms, mud bottom, in the NE corner of the bay. A stream and an extensive delta from a glacier are at the head of the bay. Vessels should approach with caution because depths are reported to rise abruptly from 20 fathoms to 1 fathom. An abandoned mine building is on the hillside NW of the stream.

(501) **Hobo Bay,** on the W side of Port Wells just N of Bettles Bay, is crossed at the entrance by a bar that is covered about 3½ fathoms. Vessels entering follow the N side of the bay at a reported distance of 100 yards. Several rocks, bare at low water, are along the S shore of the bay. A grassy rock is close offshore. A vessel entering this bay reported anchoring off the grassy rock in 5 fathoms.

(502) **Golden** is a mining camp on the E shore of Port Wells, about 3 miles NE of Esther Passage. Steamers anchor 200 to 300 yards S of the little island off Golden in about 20 fathoms, rocky bottom. It is regarded as a poor anchorage and it is probable that the anchor will not hold with strong winds drawing down Port Wells. The area between the island and the shore uncovers.

(503) **Pigot Bay,** on the W side of Port Wells just N of Passage Canal, has a rocky shore except at its head where sand and mudflats extend offshore about 0.2 mile and bare at low

water. The bottom in Pigot Bay is heavy blue clay with good holding qualities. Depths near the entrance to Pigot Bay are too great for anchoring, but good anchorage is available for vessels near the head of the bay in 30 fathoms. A small area 1 mile from the head of the bay affords good anchorage in 12 fathoms, but is difficult to find because of its limited extent. A similar area 0.2 mile from the head of the bay affords excellent anchorage for small vessels in 13 fathoms. Mooring buoys are near the head of the bay. Good anchorage is available for small boats in the NE corner of the bay and in **Ziegler Cove,** on the N side of the bay immediately inside the entrance.

(504) The ruins of an abandoned logging camp are at the head of Pigot Bay, and an abandoned mine is a short distance up the river which empties into the bay.

(505) **Point Pigot** is the SE end of the peninsula between Pigot Bay and Passage Canal. Low valleys extend across the peninsula from Entry Cove and **Logging Camp Bay.** The S end of Point Pigot is a wooded, rocky headland 220 feet high. This headland is joined to the mainland by a sandy neck 6 feet high. **Point Pigot Light** (60°48.1′N., 148°21.3′W.), 25 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the S tip of the point. A rock that bares at lowest tides is 0.8 mile E of the light. A similar rock is 200 yards WNW of the light.

(506) **Entry Cove,** immediately W of Point Pigot, affords good anchorage in 13 fathoms, soft bottom, with swinging room for one vessel up to 200 feet long.

(507) **Cochrane Bay** empties into the S end of Port Wells opposite Point Pigot. The middle of the bay has depths of 100 to 200 fathoms and the shores are steep-to.

(508) **Surprise Cove** is on the W side of Cochrane Bay just S of the entrance. The SW arm of the cove appears clear of dangers with 33 fathoms in the middle decreasing towards the head, near which indifferent anchorage is available in 12 to 15 fathoms. The thin layer of glacial silt over the rocky bottom is poor holding ground. The W arm of Surprise Cove has a restricted entrance and can be entered only by small craft.

(509) **Blackstone Bay** empties into the S side of Passage Canal SW of Point Pigot. The middle of the bay has depths of 100 to 200 fathoms to **Willard Island,** a large island about 489 feet high near the head of the bay. A rock, bare at low water, is 0.1 mile N of the island. An islet and nearby rocks awash are on the E side of the bay about 3.7 miles inside the entrance in about 60°45′48″N., 148°31′42″W. A 15-fathom spot is about 1.6 miles SW of the islet in about 60°44′41″N., 148°34′00″W. The area between Willard Island and the E side of the bay is constricted by shoals extending from both shores. A shoal with two rocks awash at the end extends from the E side of the bay to about 60°42′12″N., 148°36′30″W.; extreme caution is advised. There are no known anchorages in the bay.

(510) Depths along the W side of Willard Island range from 29 to 66 fathoms. Glacial moraines, with little water over them at low water, extend from both shores of Blackstone Bay to Willard Island midway of the island's length. **Blackstone Glacier** is active, and there are generally numerous small icebergs in the head of the bay.

(511) **Passage Canal** has its entrance at the SW end of Port Wells between Point Pigot and **Blackstone Point,** the N extremity of the peninsula separating Cochrane and Blackstone Bays. The canal trends NW for 4 miles, then W for 8 miles.

(512) The principal approaches to Passage Canal and the canal itself offer little difficulty for navigation with the aid of the chart. These waters, including the Knight Island group and both shores of Knight Island Passage, are characterized by rocky and exceedingly broken bottom. Differences of 50 fathoms between adjacent soundings are not uncommon, and it is possible that on the broken areas there may be less water and possibly dangers not disclosed by surveys. As a measure of safety, vessels should avoid areas where abrupt changes are indicated by the chart to depths less than 50 fathoms.

(513) Passage Canal is 1 to 1.5 miles wide, has great depth and is clear except in a very few places near the shores. The shores rise abruptly and are wooded to about 1,000 feet. The higher peaks are bare or snow-covered rock.

(514) **Chart 16706.–Decision Point,** on the S side of Passage Canal about 3 miles W of Point Pigot, is marked on the N end by **Decision Point Light** (60°48.4′N., 148°27.2′W.), 35 feet above the water and shown from a skeleton tower with a red and white diamond-shaped daymark.

(515) **Shotgun Cove,** on the S side of Passage Canal 2.5 miles W of Decision Point, has depths through the middle of 30 to 35 fathoms, muddy bottom. Foul ground fills the narrow parts of the head of the bay; approaching slowly, a small vessel can select anchorage just above this foul ground in 15 to 20 fathoms. Several mooring buoys are in the cove.

(516) The bight on the SE side of Shotgun Cove is obstructed near the middle by a rock covered ½ fathom. Anchorage with a clear width of 0.3 mile can be had in the NE part of this bight in 15 to 20 fathoms, mud bottom.

(517) **Trinity Point** is on the S side of Passage Canal 3 miles W of Decision Point. Tiny **Emerald Island** is 0.4 mile W of Trinity Point. A light, 39 feet above water, is shown from a skeleton tower with a red and white daymark on the outer end of the narrow point between Trinity Point and Emerald Island. Small **Emerald Bay** extends SW from the island and offers good shelter and anchorage for small craft in 3 to 5 fathoms, mud bottom; the entrance is narrow but clear of dangers.

(518) Anchorage in 12 to 18 fathoms, sticky bottom, can be had on **Bush Banks** which extend 0.3 mile from the S side of Passage Canal at a point 1 mile above Emerald Island and 3.5 miles from the head. The least depth is 4½ fathoms at the SW end of the banks.

(519) Small craft can anchor in the cove at the NW end of the head of the canal in 6 to 12 fathoms.

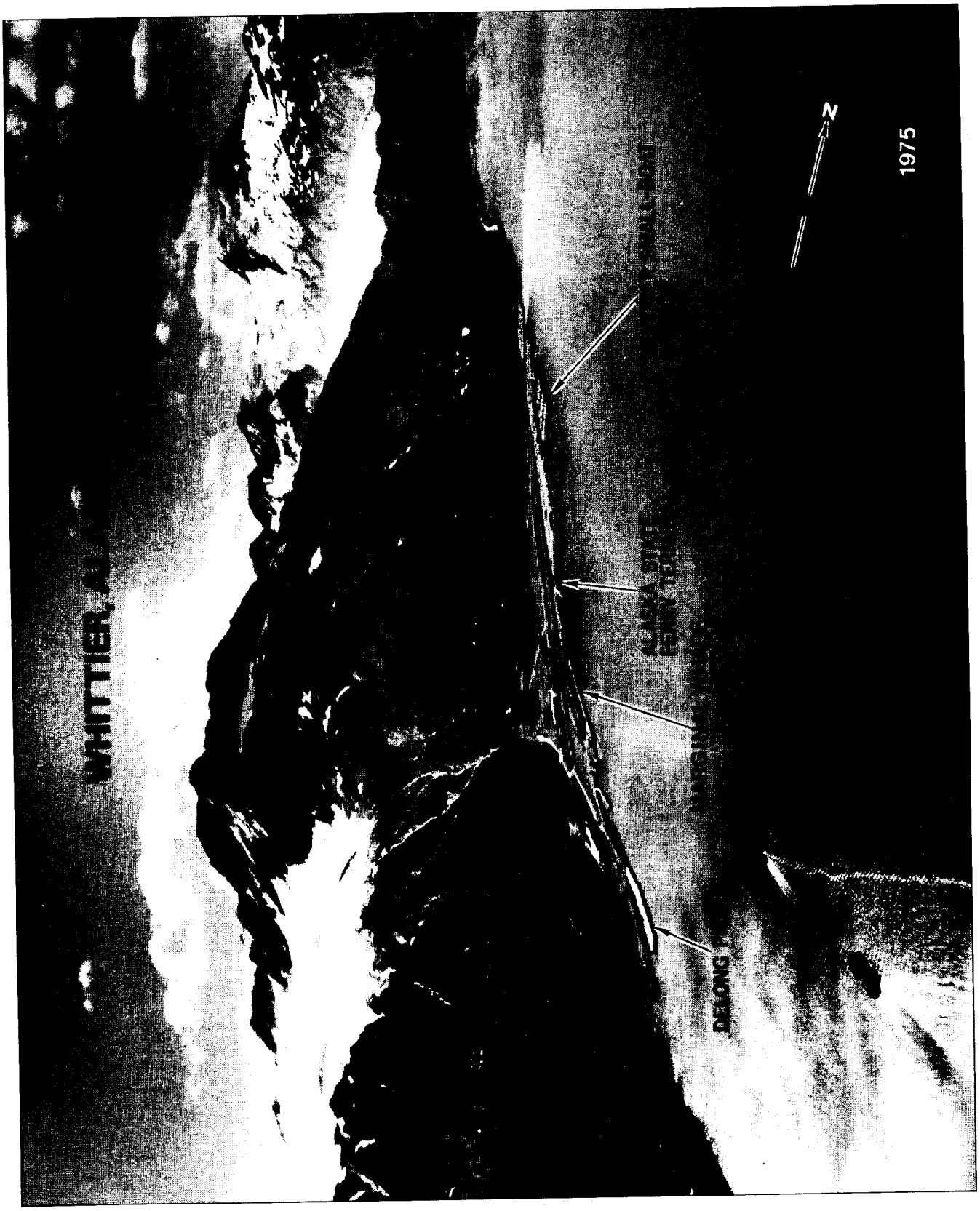
(520) **Whittier** is the Alaska Railroad terminus on the S side of Passage Canal, 1.5 miles from the head. The town has a sawmill and wood-treatment plant and a U.S. Army fuel depot.

(521) **Prominent features.**–In the approach to Whittier, the army tank farm at the head of Passage Canal and the buildings in town are prominent. The three large buildings in town were built by the army during World War II. The largest is 14 stories high and almost all of the living quarters and business activities in town are within this building.

(522) **Anchorages.**–Large vessels sometimes anchor clear of the 4½-fathom shoal on Bush Banks about 2 miles NE of Whittier or in Pigot Bay.

(523) **Routes to Whittier** (see also chart 16700).–**From the S via Prince William Sound Traffic Separation Scheme** (described earlier in this chapter under Prince William Sound). Depart the scheme N of Hinchinbrook Entrance and set courses to pass 1.5 miles NE of Smith Island, 1.5 miles N of Point Eleanor Light, 1.5 miles SW of Perry Island Light, 1 mile NE of Culross Island Light, 0.5 mile S of Point Pigot Light, 0.5 mile N of Decision Point Light, 0.5 mile N of Trinity Point Light, and thence to Whittier, clearing the S shore by 0.5 mile until up to the waterfront. **Caution:** Mariners are advised to adhere to the general principles for

WHITTIER, ALASKA
WHITTIER
DELONG PIER
PASSAGE CANAL
BUSH BANKS
EMERALD BAY
EMERALD ISLAND
TRINITY POINT
BUR POINT
SHOTGUN COVE
CHUGACH NATIONAL FOREST
1975


WHITTIER, AL
N
1975
ALASKA STATE
FERRY TERM
DELONG

navigation when entering, departing, or crossing a traffic separation scheme. (See Traffic Separation Schemes, chapter 1.)

(524) **From the W via Elrington Passage.** Clear the E side of Evans Island by 1 mile, thence 0.5 mile E of Pleiades Light, thence 2 miles E of Crafton Island Light, thence 1.5 miles SW of Perry Island Light, thence the same as from the S to Whittier.

(525) Vessels from Valdez usually use Perry Passage when going to Whittier.

(526) **Tides and currents.**–The diurnal range of tide at Whittier is 12.3 feet. The currents have little velocity in Passage Canal.

(527) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(528) Vessels en route Whittier or Valdez meet the pilot boat as follows:

(529) (A) oil tanker traffic-about 3.6 miles SW of Bligh Reef Lighted Buoy 6 (60°50.5'N., 146°54.4'W.); or

(530) (B) nonoil-tank traffic-about 2.3 miles N of Busby Island Light (60°53.7'N., 146°49.0'W.).

(531) The pilot boat can be contacted by calling 'BERING' on VHF-FM channels 10 and 16, or on 4125 kHz from 1300 to 1400 daily.

(532) **Towage.**–One 2,000 hp tug is available at Whittier.

(533) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(534) **Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(535) **Wharves.**–There are two deep-draft facilities, two railroad-car barge facilities, a ferry dock, and a small-boat harbor at Whittier. For a complete description of the port facilities refer to Port Series No. 38, published and sold by the U.S. Army Corps of Engineers. (See appendix for address.)

(536) **DeLong Pier**: at the E end of Whittier; 675 feet of berthing space; 45 feet alongside; deck height, 22 feet; receipt of petroleum products; owned by The Alaska Railroad; operated and used by the U.S. Army as a fuel pier.

(537) **Alaska Railroad Wharf:** 550 yards WSW of DeLong Pier; 1,000-foot face with about 30 to 40 feet alongside; deck height, 22 feet; mobile crane; 32,000 square feet of covered area; receipt of general cargo, fish, and mooring of fishing boats; owned and operated by The Alaska Railroad.

(538) Railroad-car barge facilities are at each end of the marginal wharf.

(539) **Alaska State Ferry Terminal** is about 100 yards NW of the marginal wharf. The approach channel to the terminal is reported dredged to 20 feet. The ferry terminal is owned and operated by the State.

(540) **Whittier Small-Boat Harbor,** 0.25 mile W of the ferry terminal, is used mostly by pleasure craft and some fishing vessels. The harbor has about 344 slips; the **harbormaster** assigns berths. The harbormaster's office monitors VHF-FM channel 16.

(541) A floating breakwater, marked by a light on its W end, restricts the entrance to less than 80 feet. In 1973, depths of 15 feet were reported available throughout the harbor.

(542) Gasoline, diesel fuel, water (during summer), electricity, dry storage, launching ramp, small-boat grid, and a 30-ton boatlift are available, but there are no repair facilities. The harbor is owned by the State and operated by the city. A restaurant and a small grocery are in town.

(543) **Communications.**–Landline telephone service is available. The Alaska State Ferry makes daily stops in the summer, but offers no service in winter. The Alaska Railroad transports automobiles to the Seward-Anchorage Highway and has passenger service to Anchorage daily in the summer and biweekly in the winter. Charter air service is available in the summer.

(544) **Charts 16705, 16709.–Port Nellie Juan** extends 23 miles SW from its entrance between Culross Island and the mainland to the S. **Applegate Island,** on the NW side of the entrance, is low, flat, and wooded. **Port Nellie Juan Light** (60°35.9'N., 148°06.0'W.), 23 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the N end of the point on the SE side of the entrance.

(545) Port Nellie Juan is divided into three right-angled reaches into which many glaciers discharge. The innermost reach is **Kings Bay.** Midchannel depths of more than 100 fathoms are available to near the head. In general, the reaches are deep close to the shores which are indented by numerous bays and small inlets.

(546) Areas in front of the glaciers should be approached with caution. The moraines are often very large, and the water over them shoals rapidly to 1 fathom or less. This is particularly true at the head of Kings Bay where the water is shoal 0.2 to 0.5 mile from shore, then deepens rapidly to more than 50 fathoms.

(547) **McClure Bay,** the first of two bays which indent the SE shore of the first reach, is deep and narrow and extends S for about 5 miles. It is from 80 to 100 fathoms deep, free from hidden dangers, and has bold shores. The upper part of the E arm at the head of the bay is foul. Vessels requiring little swinging room may anchor at the entrance of this arm in 18 fathoms, mud bottom. The W arm is clear in midchannel and affords shelter for small vessels.

(548) An abandoned cannery and wharf are in the cove on the E side of McClure Bay near the entrance. The wharf, in extremely poor condition and with hidden piles which cover at high water, is not recommended. A rock, with little water over it, is on the N side of the cove just E of the wharf. The cove accommodates only small craft.

(549) **Blue Fiord,** the second bay, is at the head of the first reach and extends S about 4 miles to the moraine of **Ultramarine Glacier.** The shores of the fiord are steep-to and depths in midchannel are 33 to 100 fathoms.

(550) **Derickson Bay, Deep Water Bay,** and **Greystone Bay,** are three prominent bays along the S shore of the middle reach of Port Nellie Juan. Along the N shore of this reach are long and narrow East Finger and West Finger Inlets, with Shady Cove midway between them.

(551) **Nellie Juan Glacier,** at the head of Derickson Bay, is the most active glacier in the area and the bay is often filled with small icebergs.

(552) **Anchorage.**–Because of the great depths, there are few anchorages in Port Nellie Juan. Indifferent anchorage for large vessels can be found in the bight just inside the point on the SE side of the entrance. The S of the two coves in this bight has a wide, even, gravel shore that is excellent for beaching a small vessel.

(553) Another indifferent anchorage is available for vessels up to 250 tons 0.7 mile SW of **Division Point** between Blue Fiord and Derickson Bay. Depths of 18 fathoms can be found 300 yards off the entrance to a small indentation. The thin layer of mud over rocky bottom is only fair holding ground.

(554) Small craft can find indifferent anchorage in some of the bights on the NW side of the first reach. The best of

these is in the area W of **Mink Island** where the depth is about 15 fathoms, mud bottom. Good anchorage is available for vessels up to 300 tons in the upper end of West Finger Inlet in 15 fathoms, and in Shady Cove, 14 fathoms in the middle and 8 fathoms near the head, mud bottom.

(555) **Main Bay,** 4 miles SE of Port Nellie Juan, is deep and generally clear away from the shores, but affords no anchorage. Foul ground makes off both entrance points.

(556) **Falls Bay,** 2 miles SE of Main Bay, affords no anchorage and is open to the prevailing NE weather. The main part of the bay is clear and deep. Rocks make out from the points at the entrance, contracting it to a width of 0.2 mile in which the least found depth is about 12 fathoms.

(557) **Crafton Island** is 1 mile long and wooded. At its N end are rocky bluffs about 100 feet high, while its S part is lower and has sandy beaches in places. Two low islets with sandy beaches are off its S end. **Crafton Island Light** (60°30.7′N., 147°55.9′W.), 70 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark at the NE end of the island.

(558) Crafton Island is surrounded by foul ground to a distance of about 0.5 mile on its E and S sides, where no sounding has been done. An exceedingly broken area extends over 2 miles SE from the island. Rocks, bare at about half tide, are 1 mile SE from the S end of the islets. Vessels should avoid all broken areas in this vicinity where depths less than about 50 fathoms have been found.

(559) The passage W of Crafton Island is foul along the shore of the islets, and three rocks which uncover are in the middle of the S entrance. This passage should be used only by small craft, proceeding with care and preferably at low water. The channel favors the W shore from the S entrance until abreast the middle of Crafton Island.

(560) The clearer channel to Eshamy Bay follows the shore N from Point Nowell and is about 0.8 mile wide. Differences of 50 fathoms between adjacent soundings are not uncommon in this locality. Foul ground extends 350 yards N, and rocky broken ground of 14 fathoms, or less, extends 0.6 mile N from the S point at the entrance of Eshamy Bay.

(561) **Eshamy Bay,** between Point Nowell and Crafton Island, affords anchorage only for small craft in 8 to 11 fathoms, in the small cove back of the islands and rocks in the SE corner of the bay. The better entrance is through the middle of the deep narrow channel between the small islands and the E shore. **Eshamy Lagoon** extends W from Eshamy Bay, but its foul entrance with strong currents makes it inaccessible for strangers.

(562) **Point Nowell,** 4.5 miles S from Crafton Island Light, is a small wooded hook, about 50 feet high, back of which the land rises abruptly. The cove, formed by the hook, is about 300 yards in diameter and apparently clear, and affords anchorage for small craft in about 8 fathoms.

(563) **Knight Island** (see also chart 16700), on the W side of Prince William Sound, is 22 miles long and very rugged, the peaks rising to 3,261 feet. It is wooded to about 1,000 feet, and above this is grass covered. Disk, Ingot, and Eleanor Islands are mountainous and sparsely wooded islands that extend 6 miles N from Knight Island to Point Eleanor, the N end of the group.

(564) **Eleanor Island** has bluff, rugged shores. Broken ground extends 0.4 miles N and NW from **Point Eleanor** the N point of the island. **Point Eleanor Light** (60°34.8′N., 147°33.8′W.), 45 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the point. **Northwest Bay,** on the NW side of Eleanor Island, is deep and clear. Anchorage for small vessels is available in the S arm of the bay, about 0.4 mile from the head in about 20 fathoms.

(565) Near the E point of Eleanor Island, 1.8 miles S of Point Eleanor, is a rocky islet with a few trees and with foul ground on its shore side. A bare rock 0.2 mile S of the islet should be given a berth of 0.3 mile. A group of prominent bare rocks, close together and about 12 feet high, is 0.6 mile off the SE point of Eleanor Island. Between them and Eleanor Island is broken ground with depths of 6 to 7 fathoms. A bare rock about 5 feet high is 0.6 mile SW of the group; it should be given a berth of over 0.4 mile from the SE.

(566) **Upper Passage,** separating Eleanor and Ingot Islands, is generally deep and suitable for small craft. **Block Island,** 1 mile long with its N end joined at low water to Eleanor Island, narrows the S part of the passage to about 400 yards. About 600 yards SE of Block Island is a ledge with 5 fathoms over it, possibly less.

(567) **Entrance Island,** high and wooded, is 0.3 mile S of Eleanor Island and on the N side of the S approach to Upper Passage. It is surrounded by deep water.

(568) **Sphinx Island,** on the S side of the S approach to Upper Passage and 0.4 mile E of Ingot Island, is high and wooded, and surrounded by deep water. About 0.9 mile SE of Sphinx Island is a rocky area with a least known depth of 18 fathoms.

(569) **Ingot Island** is between Upper and Lower Passages. A prominent high wooded island is 0.2 mile off the NW end of Ingot Island. Two small bare rocks, close together and nearly awash at high water, are 0.5 mile SE from the S point of Ingot Island. Broken ground extends 0.5 mile SE from the rock to a ledge covered 3¾ fathoms.

(570) **Disk Island** is separated from Ingot Island on the E by **Foul Pass,** a narrow passage blocked by reefs. A landlocked bay with two narrow entrances makes into the W side of the island. An excellent anchorage for small craft can be found in the bay in 5 to 13 fathoms, mud bottom, with good shelter from all winds. Enter through the S entrance which is reported to be about 80 feet wide and has a least depth of 3 fathoms. It is reported that the N side of the S entrance should be favored to avoid a ledge which is submerged at high water and extends about 10 to 15 feet into the channel. The best anchorage is reported to be in a bight on the E side of the bay.

(571) **Lower Passage,** between Ingot Island and the N end of Knight Island, is a deep navigable channel suitable for small vessels. Broken ground, on which the least known depth is 6½ fathoms, extends into the passage 0.2 mile from the W entrance point of Louis Bay. A rock that uncovers at half tide, is 350 yards from the W shore, 0.8 mile inside the NW end of the passage. Foul ground extends from this rock to the head of the cove, 0.5 mile SW.

(572) A rock covered 4½ fathoms, possibly less, is about 0.4 mile NW from the N end of Disk Island. Another rock with 5 fathoms over it is about 0.5 mile from Ingot Island and over 0.7 mile 042° from **Passage Point,** the N end of Knight Island. These rocks are well out of the usual track of vessels going through Lower Passage.

(573) **Louis Bay** indents the NE side of Knight Island about halfway through Lower Passage, about 2.2 miles S of Passage Point. The bay affords anchorage for small vessels 250 to 300 yards from the head of either of its two arms, in about 15 fathoms. The W arm is clear so far as is known.

(574) The E arm of Louis Bay has a very broken bottom, and small vessels entering should proceed with caution. A rock covered 5 feet is 175 yards from the E shore and 350 yards N from the entrance of the E arm. The arm is 0.1 to 0.2 mile wide; a ledge makes out about 30 yards from the wooded islet on the W side of the entrance. When inside the entrance, favor the W side to avoid three rocks which bare at lowest tides.

(575) **Herring Bay,** at the NW end of Knight Island, has no desirable anchorage and is characterized by much foul ground and very broken bottom, with deep water close to the shores and dangers. Vessels should proceed with caution, especially in the vicinity of broken areas with depths less than about 20 fathoms, and preferably at low water. The entrance is clear except along the E shore, which is foul. A prominent rock about 4 feet high is near the center of the bay; the best channel to the upper part of the bay is E of the rock. Water can be obtained from a fall in the SE arm.

(576) **Herring Point,** the N end of a narrow ridge about 1,000 feet high, forms the W side of Herring Bay.

(577) **Smith Island,** near the center of Prince William Sound, is high and wooded, and lowest at its SW end. Broken rocky bottom extends 3 miles NE from Smith Island. A lighted bell buoy is 0.3 mile S of a 7-fathom patch, 1 mile E of the island.

(578) **Little Smith Island,** close W of Smith Island, is bluff, high, and wooded. Rocky patches of 4¾ to 16 fathoms are about 1.5 miles N of the island. A rocky area of 9 to 10 fathoms extends 1 mile S from the island.

(579) **Seal Island,** 5.5 miles S of Smith Island, is wooded, high, and round. **Seal Island Light** (60°25.8'N., 147°24.9'W.), 45 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the NW side of the island. Close to the E end of the island are two bare rocky islets, and about 0.1 mile off the W end is a small rock which uncovers 8 feet.

(580) Rocky, broken areas extend 1 mile NE and N from Seal Island. **Pennsylvania Rock,** 1 mile N of the island and marked by a buoy, is covered 2¼ fathoms. About 0.8 mile SW of the island is a 5¾-fathom rocky area.

(581) Vessels generally use the channel between Seal and Smith Islands rather than the channels to the SE.

(582) **Chart 16700.–The W entrance of Prince William Sound** between Cape Cleare and Cape Puget is divided into a number of passages between the islands. They are described in the following order: Montague Strait, Latouche Passage, Elrington Passage, Prince of Wales Passage, BainbridgePassage, and Knight Island Passage.

(583) **Charts 16701, 16709.–Montague Strait,** between Montague Island on the E and Latouche and Knight Islands on the W, is the broadest of the passages W of Montague Island leading from the sea to Prince William Sound. The strait affords an unrestricted channel 4.5 miles wide. Below the N end of Latouche Island the strait is seldom used as vessels generally proceed via Elrington Passage. Above that point the regular steamer route to the E part of Prince William Sound is via the passage W of The Needle, Green Island, and Seal Island, thence through the passage between Seal and Smith Islands. (See also chart 16705.)

(584) **The March 1964 earthquake may have caused bottom uplift throughout Montague Strait, Shoaling and new dangers may exist requiring extreme caution until a complete survey is made of this area.**

(585) The W side of Montague Island is heavily wooded to about 900 feet. Generally rugged with many deep, steep-walled recesses near its high levels, it retains numerous patches of snow and ice throughout the summer.

(586) **San Juan Bay,** an open bight just N of Cape Cleare, has a sand beach at its head that is backed by a large tidal swamp that drains through a small stream. Landings in the bay are usually difficult because of the surf.

(587) **Stair Mountain,** just N of San Juan Bay, is a prominent conical-shaped 1,595-foot-high peak which shows unmistakably from the S and SW. The summit is bare and the slopes have a scattering growth of trees.

(588) **Point Bryant** is a rounding point of high eroded bluffs, about 3 miles N of San Juan Bay. A rock, awash at extreme low tide, is about 300 yards off the point. The rocky shore is fringed with heavy kelp.

(589) **Macleod Harbor,** on the E side of Montague Strait, 6.5 miles N from Cape Cleare, is free from dangers and an excellent anchorage protected from all directions except the SW. **Point Woodcock,** on the N side of the entrance, is a rocky bluff about 50 feet high and wooded on top. The point is fringed by a rocky, kelp-covered reef. The S entrance point is gently rounding. The head of the harbor is marked by extensive mudflats.

(590) **The March 1964 earthquake caused a bottom uplift of 31.5 feet in Macleod Harbor. Shoaling and new dangers may exist requiring extreme caution until a complete survey is made of the area.**

(591) Large vessels entering Macleod Harbor favor the N shore and anchor in 14 to 17 fathoms, muddy bottom, about 0.3 mile off the shingle beach 1 mile from the head of the bay. In making this anchorage, care should be taken to avoid the mudflats which rise very sharply. Severe williwaws draw down through the harbor, but the holding ground is good and the anchorage is safe. Small craft find anchorage farther in close to the N shore and to the head of the bay in 4 to 10 fathoms, mud bottom. Small-craft mooring piles at the head of the harbor, are now dry at low water because of the upheaval caused by the March 1964 earthquake. Drastic changes have occurred, and the overall size of the bay is greatly reduced.

(592) **Hanning Bay,** indenting the W side of Montague Island 13 miles N of Cape Cleare, is a good anchorage with E winds. Shoals extend nearly 0.4 mile off from the streams at the NE and SE parts of the bay, and a reef extends 0.2 mile from the point on the E side. A dangerous sunken wreck and a 1¾-fathom spot are about 0.5 mile off the S shore just inside the entrance. The best anchorage with S winds is about 0.4 mile from the S side, with Danger Island open from the S point at the entrance bearing 258°, and **Point Bazil,** the N point at the entrance, bearing between 005° and 348°, in 15 to 16 fathoms, sticky bottom. With NW winds, a better berth can be had 0.3 to 0.4 mile off the cove on the N side, 0.6 mile inside the entrance, in 5 to 8 fathoms, hard bottom. When entering, give the points at the entrance a berth of 0.4 mile. In 1965, a 292-foot survey vessel found secure anchorage in this bay.

(593) **The Needle** is a flat-topped, steep-sided rock, about 45 feet high, in Montague Strait 3.8 miles from the nearest point of Montague Island and 5.5 miles SE from Point Helen, the S extremity of Knight Island. Rocks that uncover are close NNE and SSW of The Needle. A shoal with a least depth of 3¼ fathoms and 6 fathoms at both ends extends NE about 2 miles from a point about 0.5 mile S of The Needle. Two shoal spots, 7 and 7½ fathoms, are close SW and W of the S extremity of the shoal, and a shoal area, 5½ to 8½ fathoms, is about 0.7 mile NNE of The Needle.

(594) **Little Green Island,** heavily wooded and about 100 feet high, is 6 miles N of The Needle. A fringe of rocks surrounds the island and a kelp-marked reef, baring at various stages of the tide, extends 1.2 miles off the S end of the island. A rock, covered 2¾ fathoms, is 1.8 miles SW of the island, and two rocks that uncover and have little kelp on them are 1.5 miles E of the island and close to the 50-fathom curve.

(595) **Green Island,** between Knight Island and the N part of Montague Island, is wooded. The highest elevations are near the E side of the island, and slope gradually to the N and S ends. Very foul ground surrounds the island. Two wooded islets, 100 feet high, several small islets, and numerous rock and shoal spots are along the NW shore of Green Island. These include a prominent outlying rock, 25 feet high, 1.2 miles NW of Putnam Point. A small rocky islet, 15 feet high, is about 1 mile SW from the sharp point forming the W end of Green Island.

(596) **Gibbon Anchorage** is a secure harbor for craft up to 500 tons in the cove about the middle of the NW side of Green Island. Passing 0.3 mile S of the outlying prominent 25-foot-high rock, steer **126°** for **Putnam Point,** the prominent wooded point with a small bluff on the SW side of the cove. When about 0.2 mile from shore, steer more E and pass midway between Putnam Point and the rock, awash at high water, 400 yards N of the point. Anchor in the cove SE of the rock in 6 to 8 fathoms. A rock bares at half tide 175 yards NE of the point W of Putnam Point, and the S of two rocks, bare at extreme low water, is 0.6 mile 133° from the outlying 25-foot-high rock.

(597) **The March 1964 earthquake caused a bottom uplift of 7.2 feet in Gibbon Anchorage. Shoaling and new dangers may exist requiring extreme caution until a complete survey is made of the area.**

(598) **Passage between Green and Montague Islands.**–The middle of the E side of Green Island is characterized by a prominent sand and gravel point, sparsely wooded. A group of five rocky islets is 1 mile off this point. **Channel Island,** 62 feet high and the highest of the group, is tree covered. A sandspit, terminating in low rocks, extends 0.4 mile NE from this group.

(599) The bottom is very irregular between Channel Island and Montague Island. Several 5¼- to 10-fathom spots on which there may be less water, were found in this area. The best water apparently is about 0.3 mile SE of the island.

(600) **Caution.**–The area between Green Island and Montague Island is reported to have many uncharted rocks.

(601) **Port Chalmers,** on Montague Island 5 miles S of Graveyard Point, is S of **Gilmour Point** and extends NE about 1.2 miles. At its NE end are two small lagoons, the outer one having about 3½ feet of water along its S shore.

(602) A small wooded island, 165 feet high, is 1 mile SW of Gilmour Point. A rock, 10 feet high, is SE of the island, and a kelp-marked rock that uncovers 4 feet and a 1¼-fathom rocky shoal are about 0.5 mile N of the island; a 1½-fathom rock is about 0.4 mile farther N.

(603) The approach to Port Chalmers is between the island and the 1¼-fathom shoal. A group of kelp-marked rocks that uncover 3 feet is 0.4 mile inside the island, on line with the head of the port. The group is passed to the N in entering. A reef, covered at extreme high tide, makes out 150 yards from the N shore, 0.6 mile E of Gilmour Point.

(604) Anchorage for small craft can be had in all weather at the head of Port Chalmers, between the reef and the lagoon entrance. There is excellent holding bottom of mud in 6 to 10 fathoms. On the upper half of the tide small craft drawing not more than 5 feet enter midchannel into the lagoon at the head of the port; they can lay in the lagoon at all times in any weather, except during extreme ranges of tide. A range (astern) of Channel Island off Green Island with Horn Mountain on Knight Island, can be used to pass 400 yards N of the 165-foot-high island and avoid the dangers in the approach. The rock 0.4 mile NE of **Wilby Island,** uncovers 2 feet. Another rock, which uncovers 1½ feet, is 0.8 mile WSW of Wilby Island. **Mariners should exercise caution in navigating these waters. Numerous shoals and rocks charted at 1 to 3 fathoms have been seen to bare at minus tides because of an uplift of about 11 feet caused by the March 1964 earthquake.**

(605) Small cannery tenders frequently anchor in 12 to 14 fathoms about 0.2 mile inside the 95-foot-high island SW of the 165-foot-high island. To enter this area pass midway between the two islands.

(606) In 1965, a 292-foot survey vessel anchored securely in a 40-knot wind, 1.9 miles 290° from Gilmour Point, in 20 fathoms. Later, winds of 50 and 60 knots caused some dragging in this location.

(607) The small bay just N of Gilmour Point offers good protection and anchorage in 2 to 8 fathoms, mud bottom. The entrance is clear of dangers on a midchannel course.

(608) **Stockdale Harbor,** just S of **Graveyard Point,** has two small tree-covered islets in the S part of the harbor. Its N half is clear except for a kelp-marked 1¼-fathom shoal 0.4 mile off the N entrance point. Anchorage can be had in 15 to 20 fathoms near the first bight in the N side of the harbor. Small boats can anchor at the head of the harbor. The chain of detached shoals and rocks extending along the middle of the harbor N of the islets must be avoided.

(609) A 2¼-fathom rock, lightly marked by kelp, is 1.3 miles SW of Graveyard Point.

(610) **Montague Point** is the large rounded N end of the W side of Montague Island. The shoreline is foul from Graveyard Point to Montague Point.

(611) **Applegate Rock** and the surrounding reef area were substantially uplifted during the March 1964 earthquake. Applegate Rock, marked by a light, now bares about 10 feet at high water and the reef bares at high water for a distance of about 0.5 mile, with many off-lying rocks baring at low water. The area should be avoided. At the NE end of this area is a 4½-fathom spot 3.5 miles 162° from the summit of Seal Island. Detached from the area's W limit is a 2½-fathom spot 5.2 miles 196° from Seal Island summit.

(612) The passage between Seal Island and the reef area has ample depth for a width of about 2 miles. The broken bottom within 1.5 miles of Seal Island and that adjacent to the reef area should be avoided.

(613) The passage between the reef area and Green Island has ample depth for a width of about 1 mile. The 9-fathom spot and the broken bottom in its vicinity, about 2 miles NW of Green Island, should be avoided. The 25-foot-high rock 1.2 miles NNW of Putnam Point is a good leading mark in entering the passage from N. Heading for this rock on course **222°** until about halfway through the passage, a vessel will be assured of deep water.

(614) Obtaining radar fixes in this area is reported to be extremely difficult as Applegate Rock and the N side of Green Island give poor returns.

(615) **Latouche Island,** on the W side of Montague Strait, is wooded to about 500 feet, and above this is covered with moss and bushes, except the highest peaks, which are bare. The E shore is precipitous and the 100-fathom curve is less than 0.3 mile off in places.

(616) **Danger Island,** 1.4 miles S of Latouche Island, is low and wooded. The SE point of the island is surrounded by reefs and rocks, and a kelp bed extends from Latouche Island to Danger Island. There is visible evidence on the nearby shorelines that this area uplifted 12 to 15 feet because of the March 1964 earthquake, and consequently passage between the two islands should not be attempted.

(617) **Point Helen,** the SE extremity of Knight Island, is marked by **Point Helen Light** (60°09.2'N., 147°45.8'W.), 35 feet above the water and shown from a skeleton tower with a red and white diamond-shaped daymark.

(618) **Hogan Bay,** on the E side of Knight Island, 2.5 miles N of Point Helen, has anchorage in the middle, 0.6 mile inside the entrance, in 16 to 20 fathoms. The bottom is rocky and uneven, and the anchorage is exposed E. A rock, covered 1¾ fathoms, is about 0.2 mile off the N shore of the bay and about 0.8 mile inside the entrance. Small craft can pass through the narrow channel at the head of the bay and find secure anchorage in the inner cove in 12 fathoms or less. The spit on the W side of the channel is bold, and should be favored when entering the inner cove.

(619) **Snug Harbor** is on the E side of Knight Island, 6.7 miles N of Point Helen. Its W arm is 0.3 mile wide and clear near midchannel, and has secure anchorage at its head in 12 to 17 fathoms. Anchorage, exposed to N and NE winds, can be had in the broad cove on the S side of the harbor in 12 to 15 fathoms, rocky bottom. **Discovery Point,** the S entrance point to Snug Harbor, is bold and high.

(620) In 1965, an uncharted 15-fathom-deep pinnacle was discovered 1.5 miles 040° from Discovery Point.

(621) **Marsha Bay,** 5 miles N of Discovery Point, has a crooked narrow entrance and is suitable only for small craft. The depths are great except at its N end, where anchorage can be selected in 15 fathoms or less. The entrance is between two submerged rocks, and the channel then leads S of the islands which choke the mouth of the bay. Enter in midchannel between the outer island and the S point of the bay, then favor the S point of the islands when passing through the narrowest part of the channel. A sunken wreck is just W of the narrowest part of the channel.

(622) **Manning Rocks,** about 2 miles off the entrance to Bay of Isles, are three pinnacles which, because of the 1964 earthquake uplift, are now bare at low water. Surrounded by deep water, they are the worst dangers on the E side of Knight Island. Between Manning Rocks and the foul ground in the entrance to Bay of Isles the bottom is very irregular, although the least depth found is 8 fathoms. This area should be avoided.

(623) **Bay of Isles,** on the E side of Knight Island, has numerous islets and pinnacle rocks, submerged and awash, and is suitable only for small vessels proceeding with caution and preferably at low water. Secure anchorage is available in **South Arm** and **West Arm,** the latter being easier of access. Depths in the bay are great, and the deep water extends close to the rocks, which are not marked by kelp.

(624) Foul ground extends 0.5 mile SE from the N point in the approach to Bay of Isles. At the end of the foul ground is a rock with 10 feet over it, 0.9 mile 073° from an island near the N shore.

(625) To enter Bay of Isles, pass in midchannel N of the islets in the middle of the bay. Continue 0.5 mile past the islets, and pass in midchannel W of the islands near the S shore. Then keep about 150 yards off the N shore in entering West Arm. Anchor in the middle of the broad part of the arm in 9 to 11 fathoms.

(626) **Chart 16702.–Latouche Passage** has its seaward entrance between Danger Island and Elrington Island. The entrance bar, with depths of 5½ to 11 fathoms, has sometimes been crossed by large vessels proceeding W from Latouche. The recommended route, however, is by way of Elrington Passage and the N part of Latouche Passage. A 2¾-fathom spot and a reported 4-fathom spot are 0.3 mile and about 1.2 miles, respectively, W of Danger Island.

(627) Occasionally with W winds large pieces of glacial ice drift into Latouche Passage from Knight Island Passage.

(628) Latouche Passage, E of Elrington Island, is 7 miles long and 0.7 to 1 mile wide with depths under 30 fathoms in most places. Anchorage can be selected nearly anywhere in this channel in suitable depths, but it should be avoided in strong S winds. Avoid the E part of the passage in the vicinity of Izmaylov Island, the crescent-shaped islet 2.2 miles SW of Chicken Island. Much kelp is in the passage back of the islet.

(629) From **Point Grace,** the N point of Latouche Island, to the N end of Elrington Island, a distance of 5 miles, Latouche Passage is about 1.8 miles wide, with deep water. A wooded islet, with a grass-covered rock close to its N end, is near **Evans Island** and 0.8 mile N of **Bishop Rock.**

(630) **Latouche,** on the W side of Latouche Island 2.3 miles S of Point Grace, is the site of the abandoned copper mine of the Kennecott Copper Corp. The buildings are in ruins.

(631) The cove immediately E of **Powder Point** is shoal, and a reef makes out 100 yards from the point. Anchorage can be had about 600 yards N of Powder Point in 10 to 15 fathoms.

(632) A rock with 2½ fathoms over it is off the point next S from Powder Point.

(633) **Chicken Island,** 3.5 miles SW of Point Grace, is separated from Latouche Island by a pass 350 yards wide with a depth of only 4 feet.

(634) **Horseshoe Bay** is on the W side of Latouche Island, 4.5 miles SW of Point Grace. Its S half is shoal; small craft entering close to the N point of the bay, can anchor in its N end in 18 to 20 feet. Just N of the S point of the bay is a rock covered at high water. Vessels can anchor about 0.3 mile off the entrance in 16 to 18 fathoms.

(635) **Elrington Passage,** W of Elrington Island, is generally used by vessels proceeding between Prince William Sound and points to the W. It is 8 miles long, 0.5 to 1 mile wide, deep and clear. Anchorage is not easily found because of the great depths. The passage is well marked.

(636) **Currents.**–The flood current sets NE and the ebb SW with a velocity of about 1.5 knots.

(637) **Elrington Island,** high and mountainous, is between Latouche Passage and Elrington Passage. The SW end of the island has three prominent points between which are South Twin Bay and North Twin Bay.

(638) **Point Elrington,** the SW end of the island, is a small hill, high and wooded, with cliffs at the water, and is joined to the island by a sand and gravel neck just above high water. A hill, 1,060 feet high, 1.4 miles E of the point, has a low divide about 100 feet high at the E end.

(639) **Point Elrington Light** (59°56.2'N., 148°14.9'W.), 30 feet above the water and shown from a skeleton tower with a red and white diamond-shaped daymark, marks the extremity of the point.

(640) **South Twin Bay** is free from dangers and affords convenient anchorage in 17 to 20 fathoms, hard bottom with patches of sand and gravel. It is exposed to W and SW winds.

(641) **North Twin Bay** is free from dangers except for a rock awash at low water about 250 yards off the S shore 0.5 mile NE of the S entrance point. Anchorage can be found in the center of the bay in 13 to 17 fathoms. Of the two bays, the best shelter is usually found in the S one.

(642) The N point at the SW end of Elrington Island is a high hill, connected with the island at its SE end by a long, low, wooded neck. **Lonetree Point,** the most N extremity of the point, is marked by a prominent lone tree and a light, 30 feet above the water, shown from a skeleton tower with a red and white diamond-shaped daymark.

(643) On the SE end of Evans Island is a light, 20 feet above the water, shown from a small house with a red and white daymark.

(644) A high island is in the bend at the S end of the passage close to Elrington Island, from which its SE point is separated by a narrow pass dry at low water. Anchorage in about 34 fathoms with mud bottom and limited swinging room is reported S of the high island in what is locally called **Fox Farm Bay.** This anchorage offers good protection in most weather.

(645) A pyramidal pinnacle rock, about 8 feet high with grass on top, is about 250 yards off the N point at the SW entrance to Elrington Passage, about 1.4 miles NE of Lonetree Point Light. A grass-covered rock, about 10 feet high with some brush on its summit, is near the angular mountain point on the E side of the passage, 4 miles from the N entrance. In the SE angle of the passage, 1.4 miles S of the grass-covered rock, anchorage can be had in 5 to 20 fathoms, muddy bottom, depending on the swinging room required.

(646) The N end of Elrington Passage is marked by **Elrington Passage Light** (60°02.8'N., 148°00.5'W.), 25 feet above the water and shown from a skeleton tower with a red and white diamond-shaped daymark, on the S extremity of the island W of Bettles Island.

(647) **Sawmill Bay** indents the E side of Evans Island near the N entrance to Elrington Passage. The end of the long peninsula on the SE side of the inner part of the bay is marked by a light, 14 feet above the water, shown from a skeleton tower with a green square daymark, and visible through the entrance N of Bettles Island. The entrance from Elrington Passage is 700 yards W of Elrington Passage Light between two islands W of Bettles Island; a buoy marks a reef about 0.5 mile NW of Elrington Passage Light which uncovers 3 feet.

(648) A reef covered 3¼ fathoms is in the N approach, 1.8 miles E of Sawmill Bay Light. A rocky 8½ fathom patch is 900 yards N of the peak of Bettles Island.

(649) **Johnson Cove,** on the NE side of Sawmill Bay entrance, has an abandoned saltery at its head. The cove is foul with 8 feet in the basin at its head.

(650) **Bettles Island,** the largest of the high wooded islands at the entrance to Sawmill Bay, has foul ground along the N shore.

(651) **Local magnetic disturbance** was reported in Sawmill Bay and in the waters between Elrington and Bettles Islands in 1974. Extent of the disturbance is not known.

(652) **Crab Bay** is a small indentation on the N shore of Sawmill Bay. A saltery just inside the W entrance point has a wharf that is in ruins. A reef covered 1 fathom is 200 yards SE of the ruins.

(653) **Port Benney** was formerly the site of a saltery just W of Crab Bay.

(654) **Port Ashton,** on the NW shore of Sawmill Bay, has been destroyed by fire except for a small wharf suitable for vessels up to 50 feet long. The wharf had about 12 feet alongside in 1966. A group of rocks, awash at extreme low water, are about 115 yards offshore and about 260 yards NE from the wharf.

(655) **Port San Juan** is at the SW end of Sawmill Bay. A wharf with a 200-foot face on a heading of 354°, had a least depth alongside of about 30 feet, in 1966. A waterfall is behind the fish hatchery.

(656) A rock covered ½ fathom, is 700 yards E from the wharf; a buoy is 100 yards N from it. Another rock, covered 1¼ fathoms, is 325 yards NE from the wharf; a buoy is about 175 yards S of it. In the approach to this wharf are some spots with less than 27 feet over them.

(657) Careful maneuvering is required for a large vessel to get away from this wharf safely. The practice is to swing the stern out and back toward the island before turning.

(658) **Anchorage.**–Sawmill Bay has no good anchorages. Vessels sometimes anchor between the oval-shaped island and the cannery, but the holding ground is poor.

(659) Sawmill Bay can be entered by either the NE or the SW entrance. The former is recommended because of its greater width. In proceeding toward the SW end of the bay, vessels can pass on either side of the small oval-shaped island in the middle of the bay. If passing on the N side, the island should be favored to avoid the rocks off Port Ashton.

(660) **Tides and currents.**–The diurnal range of tide in Sawmill Bay is 11.3 feet. Little or no current exists in the bay.

(661) **Prince of Wales Passage,** between Evans Island and **Bainbridge Island,** is between 10 and 11 miles long and from 0.5 to 2 miles wide. It offers a direct route from Knight Island Passage for vessels bound SW along the coast; otherwise Elrington Passage is more direct and is generally used.

(662) Prince of Wales Passage has several dangers. The principal channel at the N entrance is E of Flemming Island and the 2¼-fathom shoal about 0.5 mile S of the island, then W of Iktua Rocks. A foul area with a depth of 8½ fathoms is about 500 yards offshore and about 0.5 mile S of the prominent point on the E side of Bainbridge Island, about 2.7 miles S of Flemming Island. Pass about 0.5 mile offshore to avoid the foul area, then follow off Bainbridge Island at a distance of 500 yards, pass the broken ground about 4 miles S of Flemming Island and head for **Amerk Point,** the prominent low sand point with a fringe of trees, 3 miles farther S on Bainbridge Island.

(663) The channel W of **Flemming Island** has considerable foul ground and should be avoided by strangers, except possibly small craft proceeding with caution and preferably at low water. Good anchorage in 4 to 16 fathoms, mud bottom, is W of the S end of Flemming Island at **Panhat Point** on Bainbridge Island. To enter the anchorage area from the S, pass 300 yards off the point on the N course until 500 yards N of the point, head W and then S to the anchorage.

(664) **Gage Island,** wooded and with a group of partly bare rocks off its S side, is 0.5 mile N of Flemming Island and is a good mark for the N entrance of Prince of Wales Passage.

(665) **Ship Island,** with a few trees, is the S of two on the E side of Flemming Island. A reef bare at low water extends 225 yards SE.

(666) **Iktua Bay** opens to the N on the E side of the passage about 1.5 miles S of Flemming Island. The bay, 1.5 miles long, is about 0.6 mile wide at the entrance and narrows to about 0.4 mile midway of its length. The E shore of the bay has several off-lying dangers and may be followed 300 to 350 yards offshore to the head of the bay and anchorage in 3 to 14 fathoms, mud bottom. The W shore of the bay may be followed about 200 yards off for 0.7 mile until abeam of the S of two small islets. Good anchorage for small craft in 2 to 10 fathoms, mud bottom, is E of these islets.

(667) **Iktua Rocks,** a group of bare rocks, highest about 3 feet, are 0.4 to 0.5 mile off Evans Island and 1.5 miles S of Flemming Island.

(668) **Guguak Bay** is on the E side of the passage about 1.3 miles S of Iktua Rocks. A rock that bares at half tide marks the W side of the narrow entrance. Rocks, that uncover, are across a narrow portion of the bay, about 0.2 mile S of the entrance. There is anchorage in 3¾ to 7 fathoms outside the bay entrance.

(669) Several wooded islands are on the E side of the passage from 3.2 to 5 miles S of Flemming Island. The area between them and Evans Island is foul and the tidal currents have a velocity of 2 to 3 knots. Near midchannel W of the middle island is an area of broken ground about 0.7 mile long on which the least depth found is 5¼ fathoms. It

should be avoided by vessels; the better channel follows the W shore. The broken area with depths less than 3 fathoms, 1 mile farther S and extending 0.3 mile from the S shore, should be avoided.

(670) The only good anchorage in Prince of Wales Passage is in circular **Squirrel Bay,** at the SW point of Evans Island. Anchorage can be found near the center of the bay in 12 to 22 fathoms, sand and gravel bottom of fair holding qualities.

(671) Glacial ice is sometimes discharged through Prince of Wales Passage.

(672) **Currents.**–Off Amerk Point at the narrowest part of the passage, the flood sets N at a velocity of 0.8 knot and ebbs SW at a velocity of 2.5 knots. Between Flemming and Evans Islands at the N end of the passage the velocity is from 1.5 to 2 knots.

(673) **Bainbridge Passage,** between Bainbridge Island and the mainland, extends NE for 10 miles from Port Bainbridge to Knight Island Passage. Bold **Point Waters,** 5 miles N of Point Pyke, is on the mainland side of the entrance from Port Bainbridge.

(674) Two outlying dangers are in the passage. A ledge that uncovers 3 feet is about 200 yards off the point about 3 miles S of **Point Countess,** the NW point at the E entrance to Bainbridge Passage. Another ledge that uncovers 4 feet is about 250 yards off the N shore, 1.8 miles E of Point Waters, the NW point at the W entrance to the passage. Although there is deep water between both these ledges and the N shore, vessels should pass SW of them.

(675) A recommended anchorage in the passage is in the small bay about 2.2 miles S of Point Countess. Care should be taken, however, to avoid the rock that uncovers 6 feet in the middle of the bay and the ledge that extends off the NE entrance point.

(676) **Currents.**–The tidal current in Bainbridge Passage floods NE at a velocity of 3.1 knots and ebbs SW at 2.4 knots.

(677) **Chart 16700.–Knight Island Passage,** on the W and S sides of Knight Island, is used by vessels calling at bays on the W side of Knight Island. With E winds it offers a smoother channel from Latouche Passage to the N end of the Naked Island group than the generally used route E of Knight Island.

(678) From its N entrance between Herring Point and Crafton Island, where it is 5 miles wide, the passage extends S for about 16 miles to Pleiades Islands, with a least width of 2 miles at the SE end of Chenega Island. The channel leads E of the Pleiades, where it is 1.2 miles wide between them and Point of Rocks. From these islands the passage has a SE trend for 10 miles, with widths of 3 to 4 miles, to Montague Strait between Point Helen and the N end of Latouche Island.

(679) The depths in the passage range from 40 to 400 fathoms. The W side is generally bold, except for the bight between Crafton Island and Point Nowell. From Lower Herring Bay to Pleiades Islands, the E shore is foul for 0.8 mile off, with islands, rocks, and reefs. The bays on the W side of Knight Island are not good anchorages. Small craft can anchor in nearly all the arms of the bays, but the bottom is generally rocky.

(680) **Pleiades Islands,** in the middle of the bend in Knight Island Passage, are a chain of seven wooded islands 1 mile long. The southernmost and largest is about 90 feet high. The rock, about 400 yards W of the middle of the chain, bares at low water. Two large rocks, covered 3 feet, are reported on the 9-fathom bank about 200 yards E of the N end of the southernmost island. **Pleiades Light** (60°14.4'N., 148°00.5'W.), 30 feet above the water, is shown from a small house with a red and white diamond-shaped daymark on the N end of the northernmost island of the group.

(681) **Currents.**–The tidal currents in Knight Island Passage have a velocity of 1 to 2 knots.

(682) **Ice.**–Considerable glacial ice has been seen in the passage S of Pleiades Islands. It comes E between Point Countess and Chenega Island, and drifts as far as Latouche Passage with the ebb.

(683) **Chart 16702.–Little Bay,** on the S side of Knight Island, 1.8 miles NW of Point Helen, has no known dangers except for the rocks awash close to the head. The depths are 13 to 18 fathoms, rocky bottom, and it is a fair anchorage except with S winds.

(684) **Mummy Bay,** in the S end of Knight Island, is deep and clear, but rocks extend 0.3 mile from the head. Small vessels can anchor 0.5 mile from the head in 15 to 20 fathoms. **Northeast Arm** is an anchorage for small craft.

(685) **Thumb Bay** is a small inlet opening into the S part of Mummy Bay. The bay affords anchorage for small vessels in 12 to 22 fathoms with limited swinging room and rocky bottom. No swell makes in the anchorage and the holding ground is good. The anchorage is protected from winds from all directions except NW.

(686) **Lucky Bay** and **Italian Bay** are unimportant inlets on the S shore of Knight Island between Long Channel and Mummy Bay.

(687) **Chart 16704.–Squire Island** and Mummy Island, two large islands on the E side of Knight Island Passage, are separated from Knight Island by Long Channel. Squire Island, the S one, is the higher of the two. A drying ledge is 0.3 mile SW from **Squire Point,** the S end of the island. A rock awash is about 0.2 mile W of the drying ledge. Two small islands are 0.3 mile off the W side of Squire Island, and from these islands a large reef extends 0.4 mile W to **Point of Rocks,** the latter awash at high water. The channel between Mummy and Squire Islands leading into Long Channel has rocky, broken bottom, and should be used with caution.

(688) **Long Channel** is a deep inside passage for small craft from Drier Bay to the S part of Knight Island Passage. It is 4.5 miles long and the midchannel is clear as far as known. The channel is generally 0.3 to 0.4 mile wide, but narrows to 175 yards abreast Mummy Island and to 50 yards 0.8 mile from the N end of Squire Island. A rock, covered at high water, is in the N entrance 0.3 mile E from the N end of Mummy Island. The tidal currents have little velocity.

(689) **Copper Bay,** on the E side of Long Channel, is abreast the N end of Squire Island. Its entrance is very narrow and foul, and suitable only for small craft with local knowledge. The tidal currents have considerable velocity in the entrance.

(690) **Mummy Island,** on the S side of the entrance to Drier Bay, is high and wooded; on the S half of the island are patches of grass. Reefs extend 0.3 mile SW from the N end of the island, and wooded islets with reefs around them extend 0.6 mile W from the middle of the island.

(691) **New Year Islands** are on the N side of the approach to Drier Bay. They are wooded, and the largest is 200 feet high. A light, 23 feet above the water and shown from a skeleton tower with a red and white diamond-shaped daymark, is on the most S timbered island of the group. Bare reefs extend 250 yards SW from the light. Rocks that uncover are 500 yards 019° from the N island, and are a serious danger in the channel between New Year Islands and the islands to the N.

(692) **Drier Bay** has its main approach between New Year Islands and Mummy Island. The SE shore of the bay is indented by a number of smaller bays and coves. Drier Bay has been examined from the 50-fathom curve at the entrance to the head of the N arm and found to be clear of dangers except those charted.

(693) Strangers may have some difficulty in recognizing the entrance to Drier Bay, as there are several groups of islands on the E side of Knight Island Passage, both N and S of the entrance. Approaching from N, the island in the mouth of Johnson Bay is a good mark. The chart is the guide.

(694) **Clam Islands,** two in number, low and wooded, are between New Year Islands and **Rocky Point,** the N point of Drier Bay. A rocky patch with 3¾ fathoms over it is 0.3 mile S from Clam Islands, about in the middle of the entrance.

(695) **Range Isle,** small and wooded, is close to the N side of Drier Bay and 2 miles E of New Year Islands. The line of Range Isle just clear of the N shore E of it, leads about midway between Mummy Island and New Year Islands, and is sometimes used as a range for entering the bay.

(696) **Cathead Bay** is on the S side of Drier Bay, 2 miles from Mummy Island. Two Islands are in the upper part of the bay. The soundings taken indicate deep water, but it has not been thoroughly surveyed. In the entrance of the bay, 0.1 mile from the W side, is a rock with ¾ fathoms over it.

(697) **Cathead Shoal,** with a least known depth of 3½ fathoms, is about 500 yards NE from **Cat Head,** the point on the W side of Cathead Bay entrance. Entering Cathead Bay, favor the E side to avoid Cathead Shoal and the ¾-fathom rock, then proceed with caution on either side of the islands at its head.

(698) **Mallard Bay,** on the S side 2.5 miles inside Mummy Island, is foul for a distance of 0.2 mile from its head. Approaching with care, anchorage can be made 0.4 to 0.7 mile from the head in 17 to 26 fathoms. No swell makes into the anchorage, but williwaws are possible during heavy SE weather.

(699) **Barnes Cove** is obstructed by ledges at its entrance, and shoals make out from the shores. Small craft entering with care can find good anchorage in 8 fathoms. Vessels can anchor 300 to 500 yards off the entrance in 20 to 22 fathoms.

(700) The point on the NE side of Barnes Cove is prominent and high, with bare rocky slides. A reef extends 150 yards off the NW side of this point.

(701) **Chase Island,** small and wooded, is 700 yards from the NW side of Drier Bay and 1.8 miles E of Range Isle. A ledge that bares extends 300 yards S from Chase Island.

(702) A rock awash at half tide is 0.4 mile NE of Chase Island. Another rock bares at lowest tide between the half-tide rock and Mountain Point.

(703) **Northeast Cove,** at the head of Drier Bay, is small and has shoals at its entrance and also inside for 0.1 mile from its head. Small craft entering with care can find good anchorage in 4 to 5 fathoms. Vessels can anchor 300 to 500 yards off the entrance in 17 to 20 fathoms. A rock with 2¾ fathoms over it is about 300 yards offshore, 500 yards W from the entrance. Anchorage can be selected about 0.3 mile from shore in the N end of Drier Bay, in about 20 fathoms.

(704) **Port Audrey** is the N arm of Drier Bay. A rock covered 1¾ fathoms is about 500 yards S of the entrance to the lagoon at the head of the arm. The lagoon has depths of 7 feet in the entrance and good anchorage inside for small craft in 6 to 10 fathoms. A flat extends out 250 yards from the head of the lagoon. Violent winds blow in and out of Port Audrey.

(705) **Squirrel Island,** 1 mile N of New Year Islands and 0.5 mile from the E shore, is the northernmost of the islands extending 1.5 miles N of the entrance to Drier Bay. It is high and wooded.

(706) **Johnson Bay** is suitable only for small craft; strangers should enter at low water only, and proceed with caution in the vicinity of all broken ground. A wooded island is in the mouth of the bay. The entrance, N of the island, is about 125 yards wide between reefs that bare. The axis of the channel is about 125 yards from the N shore. From Knight Island Passage, a course for the N point at the entrance in range with a pyramidal peak of black rock, 2,090 feet high, above the head of the bay, will lead between the outlying dangers to the entrance. Water can be obtained from a fall near the head.

(707) A covered rock, dangerous for small craft, is 0.1 mile S of **Aguliak Island.**

(708) **Charts 16701, 16705.–Channel Rock,** a prominent. bare, black rock about 6 feet high, is about 1 mile off the entrance of Lower Herring Bay, and is a good mark for Knight Island Passage. A rock that uncovers is 1.4 miles 025° from Channel Rock and 0.6 mile from the shore of Knight Island. From this rock S, the E side of Knight Island Passage is very broken and foul, with deep water extending close to the dangers.

(709) **Lower Herring Bay** is suitable only for small craft. The best entrance is E of Channel Rock. The principal danger in the bay is a rock that uncovers 9 feet which is in the middle, 600 yards from the E end of the bay. The passage between this rock and the point N, between the two arms, should be used with caution. A midchannel course should be followed in the arms. Small craft can anchor in the cove on the S side 1.2 miles inside the entrance of the bay, in not less than about 10 fathoms. Water can be obtained in this cove from a fall.

(710) A narrow deep passage, suitable for small craft, follows the shore inside the islands between Lower Herring and Johnson Bays. Strangers should take it at low water and exercise care. In 1968, a reef was reported at the entrance to Lower Herring Bay in 60°22′55″N., 147°52′00″W., and, in 1974, a 1¼-fathom spot was found about 0.4 mile SW of the reef in 60°22′42″N., 147°52′42″W.

(711) **Chenega Island,** on the W side of Knight Island Passage, has a bold but fairly regular shore bordering on Knight Island Passage. Its highest summit is near the center. The S shore of Chenega Island is indented by several small bays where small vessels can find anchorage and shelter from the prevailing NE storms.

(712) **The March 1964 earthquake caused a bottom uplift of 4.9 feet at Chenega Island. Shoaling and new dangers may exist requiring extreme caution until a complete survey is made of the area.**

(713) **Chenega,** an abandoned village, is at the head of a cove indenting the S end of the island, which is marked by three small wooded islets. A rock bares 4 feet 150 yards N of the northernmost islet. A school and church in the village were reported in ruins in 1966. There is a prominent landslide back of the abandoned village.

(714) Small vessels can anchor in the cove fronting Chenega, in 5 to 15 fathoms, soft bottom. The anchorage is only partly protected from the S by the entrance islets and is not recommended in S weather. To enter, pass 300 yards W of the entrance islets on a **000°** course until within 300 yards of the shore, then swing sharply to the right and head for the cross on the church in ruins. Anchor in a suitable depth.

(715) **Whale Bay** indents the mainland 4 miles SW of Chenega. A low portage at the head of the W arm connects

with the head of Port Bainbridge. The bay is deep, but small craft can find anchorage along the E shore of the S arm, and in 6 to 10 fathoms, mud bottom, in the small bight in the N side of the W arm; the latter is a very good anchorage and is directly off a bare cliff that is visible for some distance. Ice from Icy Bay often obstructs the entrance to Whale Bay.

(716) **Dangerous Passage** separates Chenega Island from the mainland. The N entrance of the passage is obstructed for a distance of about 0.6 mile off the N end of Chenega Island by a group of islets and rocks, including **Junction Island,** which is high and wooded. The northernmost obstruction of the group is a rock awash at low water. It is difficult to pick up the N entrance at night.

(717) About 5.5 miles from the N entrance, Dangerous Passage is restricted by an island and a group islets. **Delenia Island,** in the middle of the passage, is wooded. A small grassy islet is 350 yards N of Delenia Island; a 3½-fathom shoal is 450 yards N of the grassy islet. The deepest and straightest channel is between this shoal and the nearby W shore of Dangerous Passage, and is 225 yards wide. The channel to the E and S of Delenia Island is wider, but a rock, bare only at lowest tides, must be avoided. The rock is 250 yards E from the grassy islet.

(718) The best anchorage in Dangerous Passage is in the vicinity of Delenia Island. There is good holding ground about 0.3 mile SW of the Island in 15 to 20 fathoms.

(719) **Granite Bay,** on the N side of the N entrance to Dangerous Passage, has irregular depths and is not recommended for anchorage.

(720) **Paddy Bay** is about 3 miles SW of Granite Bay. A rock awash at low water, is 330 yards W of the S end of the island near the head of the bay, and near the middle of the entrance to the NW arm. The bay affords anchorage for moderate-sized vessels in either of the two arms at the head.

(721) **Masked Bay** indents the Chenega Island shore of Dangerous Passage opposite Paddy Bay. The wooded islets in the entrance leave a channel only 100 yards wide. Small vessels will find excellent anchorage in the bay, but local knowledge is required to anchor.

(722) **Ewan Bay** indents the N shore of Dangerous Passage about 5 miles from the N entrance. Several rocks and islets fringe both shores of the bay, but midchannel is deep and clear. The entrance to the lagoon at the head of the bay is obstructed by rapids. Small vessels can anchor at the head of the bay, but it is rather deep.

(723) **Jackpot Bay** is about 3 miles SW of Ewan Bay. **Jackpot Island,** wooded, is near the middle of the entrance. The narrows, 1.5 miles above the entrance, have a width of 250 yards. At the upper end of the narrows, a midchannel rock uncovers 8 feet. This rock is on range with the E tangent of the narrows and the highest point of Jackpot Island. Depths in the bay are generally too deep to anchor. Small craft can find good all-weather anchorage in either of the two basins in the N part of the bay; the entrances are narrow but free of dangers.

(724) **Charts 16700, 16701.–Icy Bay,** at the SW extremity of Dangerous Passage, is separated from Port Bainbridge by a narrow neck of land of moderate height. **Verdant Island,** a precipitous, high, wooded island is off the E entrance point. Active glaciers in **Nassau Fiord** and at the head of Icy Bay keep the bay filled with ice most of the time, and make it dangerous for small boats to enter. Anchorage and good shelter from ice can be found in **Gaamaak Cove** on the W shore of Icy Bay, 0.8 mile N of the entrance to Nassau Fiord.

(725) **Ice.**–All the bays in this vicinity are likely to freeze over in cold weather. The ice floes from Icy Bay at times make navigation difficult W of the Pleiades Islands and extend N into Dangerous Passage. The discharge is continuous but irregular in volume, and is mainly SE. When heavy it blocks the entrance to Whale Bay and passes S of the Pleiades Islands. Isolated bergs of considerable size frequently drift E as far as Latouche and are a menace to navigation. Ice floes have been known to pass S through Bainbridge Passage and then N into Prince of Wales Passage. No ice has been observed E of Delenia Island.

(726) **Chart 16683.–Procession Rocks,** 4.3 miles N of Point Elrington Light, are a group of jagged rocks, the highest rising to about 70 feet. There are four principal rocks, with a number of smaller rocks and reefs surrounding them. Deep water extends close up to the rocks. Fish pens are about 1 mile W of the rocks at the entrance of Port Bainbridge.

(727) **Port Bainbridge** is a deep body of water that extends about 12 miles N from a line joining Cape Puget and Procession Rocks. Depths of over 100 fathoms are carried nearly to the head of the bay.

(728) **Point Pyke,** the E entrance point to Port Bainbridge, is a prominent headland that rises almost vertically.

(729) At the head of Port Bainbridge, the W arm extends about 1.5 miles to the N. The water in this arm is deep, but the entrance is blocked by a gravel bar with a least depth of about 1½ fathoms. The best water is close to the E entrance point.

(730) **Bainbridge Glacier,** about 1 mile wide, discharges into Port Bainbridge opposite Bainbridge Passage.

(731) **Auk Bay,** on the W side of Port Bainbridge, opposite Point Pyke, is small but affords good anchorage in 20 fathoms, muddy bottom. A rock that uncovers is about 150 yards off the N shore, 1 mile inside the entrance. The S entrance point is marked by a prominent pinnacle rock.

(732) A prominent brown rock about 10 feet high is 0.3 mile offshore, 2.5 miles N of Cape Puget.

(733) **Chart 16702.–Swanson Bay,** a long narrow bay just N of Point Pyke and extending 3.5 miles to the E, is deep, but no good anchorages are available. Indifferent anchorage can be found near the head of the bay in 28 to 30 fathoms, mud bottom.

(734) **Hogg Bay,** about 2 miles N from Point Pyke, is the largest bay in Port Bainbridge. It is free from dangers except for a rock that uncovers 3 feet, 0.2 mile off the N shore about 1 mile inside the entrance, and a rock awash at low water 180 yards off the S shore, 1.7 miles from **Swanson Point.**

(735) Fair anchorage can be had near the head of the bay at the entrance of the N arm, in 25 fathoms, hard bottom, with patches of sand and gravel. Small craft can find excellent shelter at the head of the N arm. A beach suitable for beaching small craft is behind the N island near the entrance to the N arm.

(736) Bainbridge Passage was discussed earlier in this chapter.

(737) **Chart 16683.**–The coast between Cape Puget and Cape Resurrection is high and rugged, with numerous glaciers showing in the valleys. No shelter is available except in Day Harbor, where the anchorage is very good. The coast is clear except for a few rocks extending not more than 0.3 mile offshore. The first range of mountains varies from about 2,000 to 3,500 feet in height, while the back range is about 5,000 feet high. Much of the hinterland is covered by an ice cap.

(738) A constant current sets SW along the Kenai Peninsula. (See remarks on currents in chapter 3.)

(739) **Caution.**–A danger zone of an air-to-air gunnery practice area is in **Blying Sound.** (See **334.1300**, chapter 2, for limits and regulations.)

(740) **Cape Puget** is a prominent headland with an eroded bluff. At the foot of the slope is a conical rock that is prominent from the E or W. Several bare rocks are off the cape, the farthest being about 0.2 mile.

(741) **Puget Bay,** the first indentation W of Cape Puget, is funnel shaped and extends N for about 6 miles. The bay is deep throughout and free from dangers except for rocks and reefs close inshore.

(742) **Goat Harbor** is an inlet on the E side of the bay about 4 miles from Cape Puget. It affords good anchorage in 12 to 14 fathoms, sticky mud bottom, but is exposed to the swell from the SW. A gravel and shingle bar with a least known depth of 5½ fathoms extends across the entrance. A rock awash is 0.2 mile W of the small islet off the N entrance point. Near the head of Puget Bay, and on the E side, is a small cove that affords shelter for small craft. A rock awash is about 100 yards off the S entrance point.

(743) **Cape Junken** is a bold, rounding headland with eroded bluffs and landslides. At the foot of Cape Junken are two steps that show up prominently from offshore. In thick weather this feature is valuable in identifying the cape.

(744) **Johnstone Bay** is a large open bight W of Cape Junken. A black sand beach is across the head of the bay. Deep water extends close up, there being 50 fathoms within 0.5 mile of the beach. **Excelsior Glacier** terminates 0.5 mile from Johnstone Bay and drains through a stream at the E end of the sand beach. A small cove with a shingle beach is at the E entrance to the bay, but it is wide open to the SW and affords little shelter. A black rock, 35 feet high, marks the W entrance, and there is a low rock nearly awash at the E entrance.

(745) **Cape Fairfield** is a bold, rounding cape with eroded bluffs and many rockslides. A large pinnacle rock, 126 feet high, is off the SE pitch of the cape.

(746) **Whidbey Bay,** a large open bight just W of Cape Fairfield, has a black sand beach at the head. About 3 miles up the valley is a prominent hanging glacier.

(747) Depths shoal to 12 fathoms about 1 mile from the sand beach, and anchorage can be had in black sand and glacial silt. Both sides of the bay are foul, with numerous rocks and reefs extending 100 to 200 yards off the rocky beaches. A stream enters at the W end of the sand beach.

(748) **Cape Mansfield** is bold, with high eroded bluffs and rockslides. A small pinnacle rock awash at high water is about 0.3 mile off the cape. Deep water is close up to this rock.

(749) Just W of Cape Mansfield is a small cove with a sand beach at its head. Except for this sand beach, the shore between Cape Mansfield and Day Harbor is rugged, with high bluffs and rockslides. Numerous rocks are at the foot of the bluffs and close offshore.

(750) **Day Harbor,** a spacious body of water just E of Resurrection Bay, is free from dangers except close inshore. Deep water extends to the head of the bay, which is formed by the moraine of **Ellsworth Glacier.** This glacier shows up prominently when entering the bay.

(751) **Fault Point,** the E entrance point to Day Harbor, terminates in a narrow point showing several remarkable faults in the rock formation.

(752) **Anchor Cove,** about 2 miles N from Fault Point, is a small cove affording excellent shelter for small craft. A short distance off the E shore of the cove near its head is a reef awash at high water. The shores are heavily wooded.

(753) **Bowen Anchorage,** 4 miles N of Fault Point, affords the best anchorage in Day Harbor. It is about 500 yards wide at the entrance and narrows gradually to the head of the cove. Anchorage can be had in the center in 14 fathoms, sticky mud bottom. In the entrance is a small reef cleared to 25½ feet. Bowen Anchorage is suitable for a vessel up to about 400 feet long.

(754) Deep water extends close up to the head of Day Harbor, and the 50-fathom curve is about 350 yards offshore. A flat in the NW corner of the bay, NW of Bowen Anchorage, affords anchorage 0.4 mile offshore in 15 to 18 fathoms.

(755) **Talus Bay** is a small cove on the W shore of Day Harbor, affording anchorage in 10 to 15 fathoms, but it is exposed to the SE. A rock bare at low water is about 100 yards off the E entrance point.

(756) **Safety Cove** is a small deep cove about 1 mile S of Talus Bay. Anchorage can be had in the center of the cove in 25 to 30 fathoms.

(757) **Killer Bay,** a small cove about 2 miles S of Safety Cove, is too deep for convenient anchorage, with 32 to 39 fathoms in the middle of the bay. A rock, 15 feet high, is about 100 yards off the S entrance point.

(758) **Driftwood Bay** is about 3 miles N from Cape Resurrection. It is about 0.5 mile wide at the entrance and is free from dangers. Anchorage can be had in the middle of the bay in 25 to 30 fathoms, hard bottom. Small craft will find excellent shelter in a bight in the S shore of the bay.

(759) **Chart 16682.–Cape Resurrection** (59°52.1'N., 149°17.0'W.), at the E entrance to Resurrection Bay, is a precipitous headland of solid rock, with little vegetation except some trees on the lower slopes. From the E two dome-shaped peaks, the N one the higher, show at the end of the cape, and a low saddleback of the peaks rises to higher mountains farther N. These are the only dome-shaped peaks in the vicinity, which assures easy recognition of the cape.

(760) **Barwell Island,** 0.4 mile S from Cape Resurrection, is small, bare, rounded, precipitous, and high.

(761) The passage between Barwell Island and Cape Resurrection is deep and clear, midchannel depths ranging from 45 to 48 fathoms. This passage is reported to be dangerous for small craft in E weather because of tide rips, confused seas, and seas bouncing back off the cliffs of Cape Resurrection.

(762) **Resurrection Bay** extends about 16 miles inland N from Cape Resurrection. The depths are great throughout, and there are no dangers in the usual track of vessels. A flat extends 0.5 to 0.6 mile from the entire N shore at the head of the bay. The shores and islands are steep and high, with precipitous slopes in many places. The valleys are wooded up to about 1,000 feet. Anchorages, few and indifferent because of the great depths, are subject to strong williwaws.

(763) **Harding Gateway,** the S entrance to Resurrection Bay, is between Cheval and Rugged Islands.

(764) **Seal Rocks,** the southernmost land feature in the W approach to the bay, are a group of four small, rocky islets. The northernmost and largest is 278 feet high and has an arch through the middle. **Seal Rocks Light** (59°31.2'N., 149°37.8'W.), 285 feet above the water, is shown from a small house with a diamond-shaped red and white daymark on the summit of the largest islet.

(765) **Lone Rock** stands well SW of Chiswell Islands and is a good mark. It is a round rock, 154 feet high, and has a rock covered at high water, about 0.1 mile N of it. The passage between Seal Rocks and Lone Rock is clear and is frequently used by vessels between Resurrection Bay and the coast SW.

(766) **Chiswell Islands,** a group of high precipitous, rocky islands, on the W side of the approach to Resurrection Bay,

are sparsely wooded, most have off-lying rocks, and there are strong tidal currents between them.

(767) **Pilot Rock,** 9.5 miles SW of Cape Resurrection, is a bare, rounded, rocky islet about 100 feet high. **Pilot Rock Light** (59°44.5'N., 149°28.2'W.), 100 feet above the water, is shown from a skeleton tower with a diamond-shaped red and white daymark on the highest part of the rock.

(768) **Agnes Cove,** just W of Cheval Island, is sheltered from the SE, but is too deep for convenient anchorage. However, it is reported that during E gales small vessels can find good anchorage in the E part of the cove.

(769) **Porcupine Cove,** about 4 miles S from Bear Glacier, offers a good anchorage for small craft in all except SE weather. At the head of the cove is a gray sand beach with stumps below the high-water line which indicates that there has been a subsidence of the beach. A detached rock about 30 feet high is 200 yards off the W shore.

(770) **Bulldog Cove,** the first cove S from Bear Glacier, affords a good anchorage for small craft in SW weather. In N weather it is exposed to winds sweeping off the glacier. The best anchorage is in the S bight in about 10 fathoms, sticky mud bottom.

(771) **Bear Glacier,** large and prominent, is on the W shore W of Cape Resurrection. It is inactive and has an earthy appearance.

(772) Toward the E shore in the entrance of Resurrection Bay are three large, high, rugged islands, named in order from S, Rugged, Hive, and Fox. The passages between the islands are deep. Their shores are generally bold, but two rocks bare at low water are about 200 yards off the SE end of Fox Island. **Hive Island Light** (59°53.3'N., 149°22.3'W.), 80 feet above the water, is shown from a pipe with a diamond-shaped red and white daymark on the NE shore of **Hive Island.**

(773) **Marys Bay,** a large cove indenting the S shore of **Rugged Island,** affords fair anchorage in E weather. Anchor in the E part with Pilot Rock about on range with the S entrance point. An Army pier, in poor repair, is on the S shore of the cove. **Rugged Island Light** (59°50.3'N., 149°22.4'W.), 438 feet above the water, is shown from a square frame with a diamond-shaped red and white daymark on the SE end of the island.

(774) **Sunny Cove,** the S bight on the W side of **Fox Island,** is the best anchorage in Resurrection Bay. No ocean swell makes into the cove, and it is sheltered from all but W winds. The williwaws are bad with E winds. The cove, wide and clear, has anchorage in the middle, 300 to 800 yards from its head, in 15 to 25 fathoms, muddy bottom.

(775) Small craft can also anchor in the SE arm of **Humpy Cove,** the two-arm bay on the E shore 1.7 miles NNE of Fox Island. In the winter this bay affords better protection than Sunny Cove, which is bad for small craft in NW weather. The anchorage is in 7 to 8 fathoms, sandy bottom. The narrow bight extending E is filled with a sandflat which bares at low water.

(776) **Thumb Cove,** on the E shore NE from **Caines Head,** is 0.8 mile wide. The cove is subject to strong williwaws in E weather. In N weather, good protection is reported close to the bluff just W of **Likes Creek,** at the N end of the cove. Anchorage can be selected 0.4 to 0.5 mile from its head in 25 to 30 fathoms, soft bottom. A flat makes out 200 to 300 yards from the N shore for a distance of 0.4 mile from its head. The point on the N side of the entrance is marked by a light. Caines Head is marked by a light.

(777) **Seward** is on the W side of the N end of Resurrection Bay. The town is the S terminus of the Government-owned Alaska Railroad. Seward is 1,234 miles from Seattle via the outside route from Strait of Juan de Fuca, and 1,398 miles via the inside passage to Cape Spencer.

(778) **Prominent features.**–Cape Resurrection, Bear Glacier, and the mountains that rise precipitously from the shores of the bay are conspicuous in the approaches, and the 202-foot tower of radio station KRXA on the shore near the waterfront is prominent.

(779) **Channel.**–The approach to Seward is in depths of over 50 fathoms and is clear of obstructions.

(780) **Anchorages.**–Suitable anchorage in 30 fathoms is available for deep-draft vessels at the head of the bay in 60°06.5'N., 149°22.1'W. and in 60°06.5'N., 149°25.3'W.

(781) **Dangers.**–The bay is clear but care should be taken when approaching the head of the bay to avoid the flats that extend 0.6 mile from the head.

(782) Submerged ruins and obstructions may exist in an area about 550 yards channelward of the high water line at Seward.

(783) **Routes.**–Eastward: From the entrance point, 0.6 mile SSW of Barwell Island, set courses to pass 0.6 mile W of the SW part of Fox Island, 0.5 mile E of Caines Head Light, and thence to the waterfront at Seward.

(784) Westward: From the entrance point, 1 mile E of Pilot Rock, set courses to pass 2.5 miles W of the S extremity of Rugged Island, 0.5 mile E of Caines Head Light, and thence to Seward.

(785) **Tides.**–The diurnal range of the tide is 10.5 feet at Seward.

(786) **Weather.**–Winter gales strike suddenly and considerable sea makes into the bay with S winds. At Seward the prevailing wind is from the S from April to September and N during the remainder of the year. The high mountain ranges give some protection, but the region is subject to violent williwaws. The annual snowfall averages 78 inches at Seward.

(787) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(788) Vessels en route Seward meet the pilot boat about 1 mile SE of Caines Head Light (59°59.0'N., 149°23.1'W.).

(789) The pilot boat can be contacted by calling "SEWARD PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(790) **Towage.**- Tug services are available 24 hours a day at Seward and can be obtained through ships' agents.

(791) **Quarantine.**-A U.S. Public Health Service Contract Physician is located at the hospital in Seward. (See appendix for additional information.)

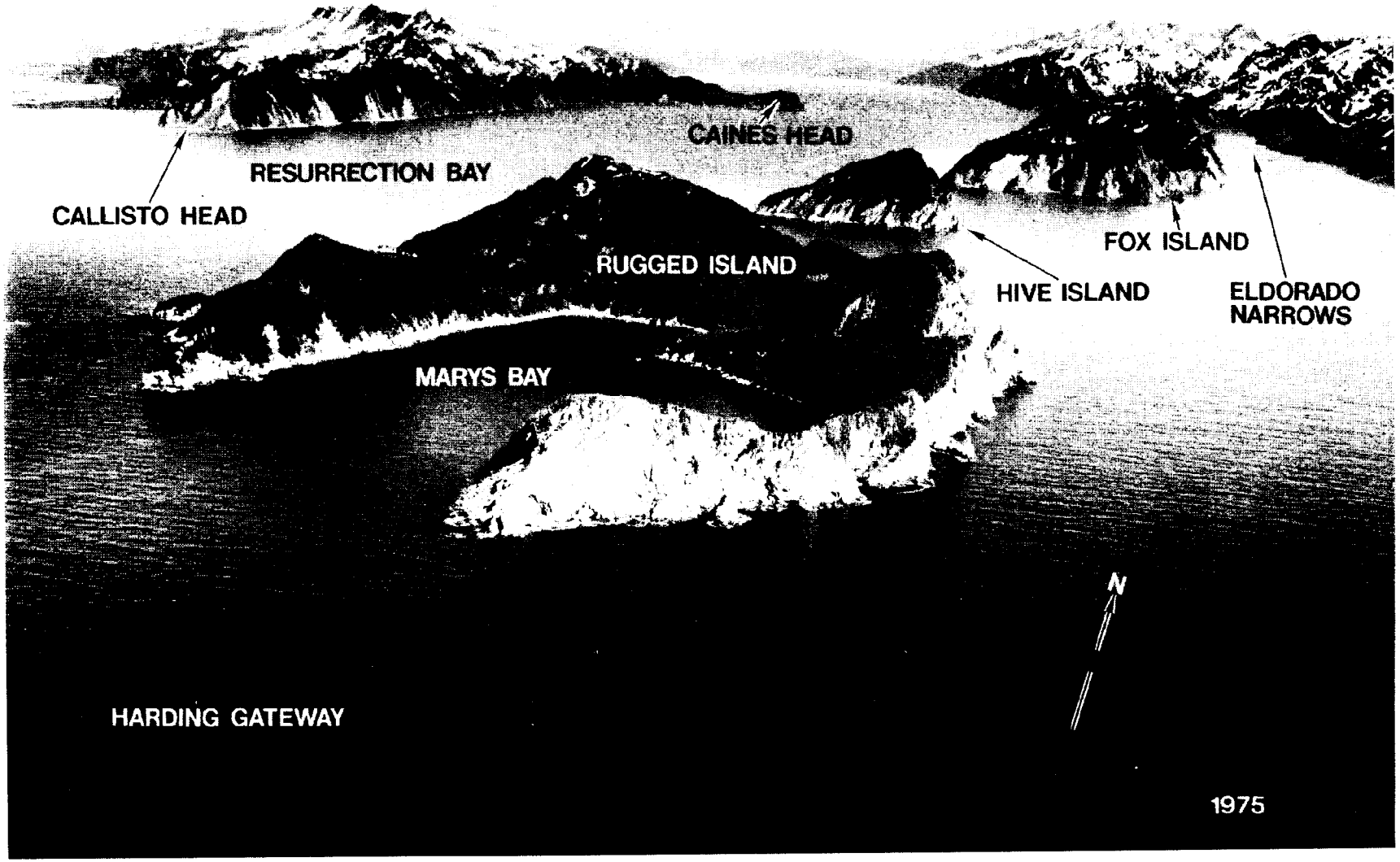
(792) **Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) There is a hospital in Seward.

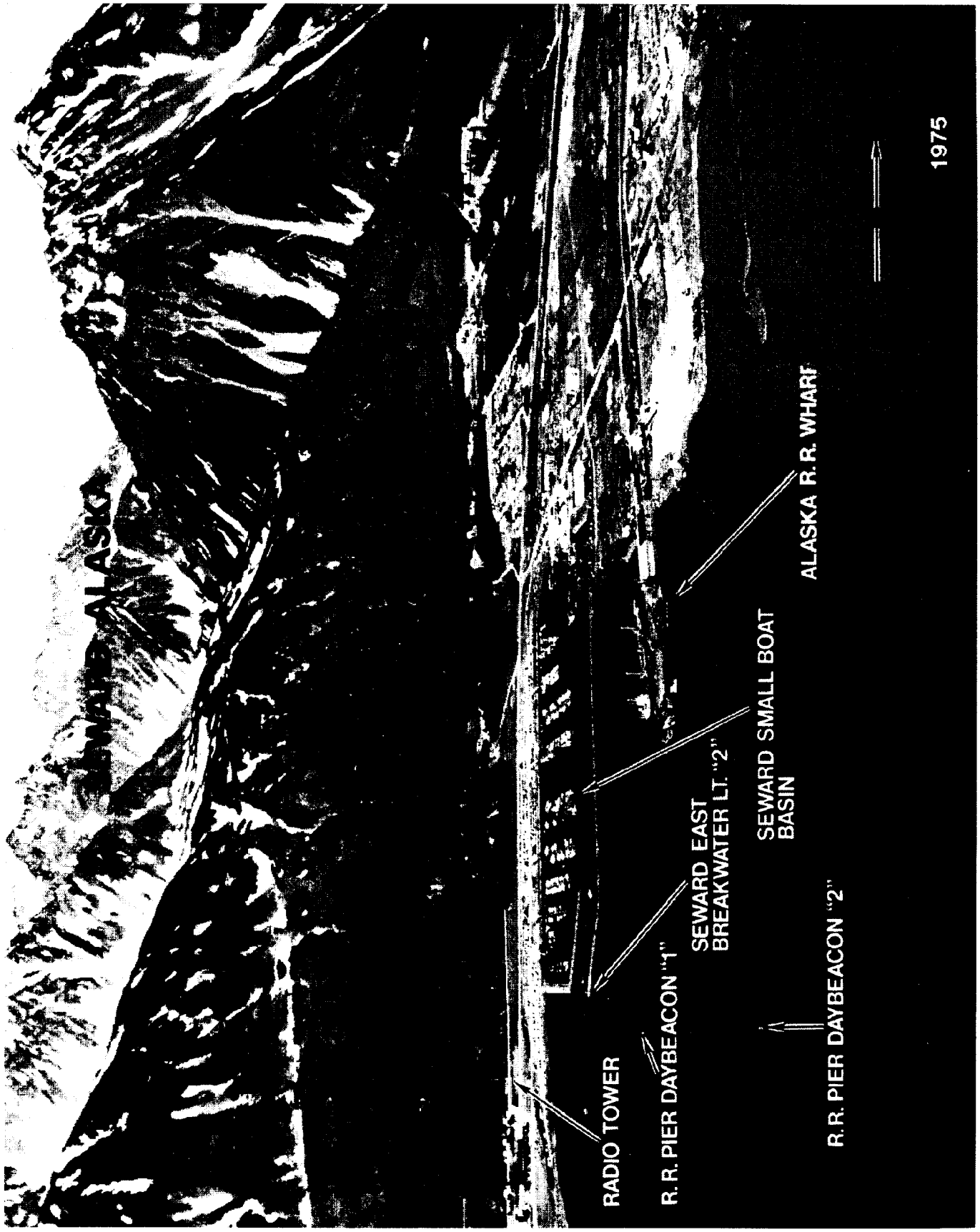
(793) **Coast Guard.**–A Coast Guard cutter is stationed at Seward in the small-boat harbor.

(794) **Wharves.**–Seward has a deep-draft terminal, coal terminal, ferry terminal, small-boat harbor, and many shallow-draft wharves. For a complete description of the port facilities refer to Port Series No. 38, published and sold by the U.S. Army Corps of Engineers. (See appendix for address.)

(795) **Alaska Railroad Terminal and Port Facility:** A pier with a light on the outer corners at the N end of Resurrection Bay; 600 feet of berthing space on each side and a 200-foot outer face; 35 feet alongside; deck height, 24 feet; cranes up to 140 tons, and forklifts up to 30 tons are available; 18,000 square feet of covered, heated storage, 2½ acres of paved and 4½ acres of unpaved open storage area; diesel fuel is piped to W berth, gasoline is available via local tank truck deliveries; water is available; receipt and shipment of containerized and general cargo; receipt of petroleum products;

RUGGED ISLAND, ALASKA




RADIO TOWER
R.R. PIER DAYBEACON "1"
SEWARD EAST BREAKWATER LT. "2"
SEWARD SMALL BOAT BASIN
ALASKA R.R. WHARF
R.R. PIER DAYBEACON "2"
1975

shipment of logs, log cants, and steel products; bunkering vessels; owned by Alaska Railroad and operated by Northern Stevedoring and Handling Corp., and Harbor Enterprises, Inc.

(796) A coal loading terminal dock, about 100 yards W of the railroad pier, extends 1,700 feet from shore. The dock has a 900-foot face and reported alongside depths of 58 feet. The terminal is owned by Suneel Alaska Corp.

(797) **Seward Small-Boat Harbor,** 0.25 mile W of the Alaska Railroad Pier, is protected by breakwaters. The entrance channel is marked by lights and is 120 feet wide. In July 1991, the controlling depths were 12 feet in the entrance channel, except for lesser depths to 7 feet along the edges and 9½ feet in the basin, except for lesser depths along the edges and off the end of the W breakwater. A lighted buoy marks a submerged jetty S of the entrance.

(798) The basin has about 400 berths; however, more than that number of boats use the basin in the summer. Transient spaces are available; the **harbormaster** assigns berths. Vessels over 150 feet long are requested to contact the harbormaster on VHF-FM channel 16 before entering the small-boat harbor. Water (in the summer), electricity, gasoline, and diesel fuel are available. A launching ramp, grid, seaplane float, and a 50-ton boatlift are in the basin. The basin is owned by the State and operated by the city.

(799) The **City Pier, Seward Fisheries Wharf,** and the **Municipal Pier** are at the N end of the small-boat harbor. There is a total of about 1,000 feet of docking space. A depth of 13 feet is alongside Seward Fisheries Wharf and City Pier; 15 feet is alongside Municipal Pier. The deck heights are 18 feet. The facilities are used mostly by fishing vessels and Seward Fisheries, and owned by the city.

(800) **Fourth Avenue City Dock**: 1 mile S of the small-boat harbor and at the S end of Seward; 190-foot wharf with about 35 feet alongside; deck height, 17 feet; five fender pilings that extend 7 feet above the deck are along the face; landing for passenger and vehicular ferry; receipt and shipment of general cargo; owned by the city and operated by the Alaska Marine Highway System and Northern Stevedoring and Handling Corp.

(801) **Note:** Submerged obstructions, caused by the 1964 earthquake, may exist off either end of the wharf.

(802) **University of Alaska Institute of Marine Science Wharf:** 0.1 mile SW of the Ferry Terminal; 150 feet of berthing space; 40 feet alongside; deck height, 18 feet; water (April to June), fuel, and electricity are available for the research vessels using the wharf; owned and operated by the University of Alaska Institute of Marine Science.

(803) **Note:** A section of sheet metal, submerged 3 feet, extends 10 feet SW of the SW end of the wharf. Also, a deep-water intake pipe extends 900 feet seaward from the wharf. Mariners are advised to seek local knowledge before approaching the wharf.

(804) **Seward Marine Services Dock**: 300 yards SSW of the University of Alaska Wharf; 250-foot face; 14 feet alongside; deck height, 18½ feet; receipt of herring and other fish products; owned and operated by Seward Marine Services, Inc.

(805) **Supplies.**–Some marine supplies are available and there are stores in town. Gasoline, diesel fuel, and lubricating oil are available by truck and diesel fuel is available at the Alaska Railroad Terminal and Port Facility.

(806) **Repairs.**–Limited small boat hull and engine repair facilities are available. A 50-ton boatlift is at the Municipal Pier. A shipyard about 1.5 miles S of the ferry terminal has a marine railway that can handle vessels to 140 feet. **Seward Marine Industrial Center**, on the E side of Resurrection Bay, just above the mouth of **Fourth of July Creek**, has a 3,600-ton synchrolift capable of handling vessels to 300 feet. In August 1992, shoaling to 18 feet was reported off the entrance to the Seward Marine Industrial Service facility.

(807) **Communications.**–The Alaska Railroad maintains service throughout the year from Seward to Anchorage and Fairbanks; large amounts of supplies and equipment bound for all parts of Northern Alaska are moved over the railroad. Seasonal passenger service is available. The Alaska Marine Highway System maintains ferry service to Valdez-Cordova and Kodiak-Seldovia-Homer. Charter air service is available. Seward has scheduled highway transportation to Anchorage.

(808) Seward has radio and cable communications with the other Alaska ports and Seattle. Telephone and telegraph communications are maintained.

(809) **Aialik Bay,** W of Resurrection Bay, extends 16 miles inland from the N end of Harbor Island. It is enclosed by rugged mountains and glaciers and is of no importance except occasionally as an anchorage. The shores are steep and high, with precipitous slopes in many places, and are partly wooded in the S part of the bay to an elevation of about 1,000 feet. The N shores are covered with alders in places.

(810) Aialik Bay is deep except for rocks near the shores, and a bar that crosses the bay from the glacial flat fronting **Pederson Glacier.** The least depth found on the bar in midchannel is 18 feet, but it and the broken ground near the shores at the entrance of Holgate Arm are likely to have boulders and less water than charted. As a measure of caution vessels should avoid the passages among the islands in the mouth of the bay. To take advantage of smoother water, small vessels coasting SW from Resurrection Bay sometimes enter the bay at Aialik Cape, pass S of Chat Island, round the N end of Harbor Island, and pass out at Granite Cape.

(811) **Chat Island** is a steep, high, rocky, and wooded island; two conspicuous pinnacles are close to its S shore. Between it and **Aialik Cape** are a smaller island and a number of rocks.

(812) **Harbor Island** is the largest of a group of high, precipitous, rocky, and partly wooded islands in the mouth of the bay and NW of Chiswell Islands. The shores in many places are sheer cliffs, especially the E shore of **Natoa Island,** Midway in the channel between **Beehive Island** and the small island at the SE end of the Harbor Island group is a rock that is awash at lowest tides.

(813) Small vessels proceeding along the coast use the pass locally known as **Petes Pass,** between Harbor Island and the first island to the E. A rock, awash at minus tides, has been reported in the narrowest part of this passage close E of the center. Vessels using this passage should favor Harbor Island when passing through this narrow opening.

(814) **Granite Cape,** the S end of Granite Island, is bold, with almost vertical rocky bluffs. Rocks awash at low water, are a short distance off the cape. Between Granite Cape and the main shore are two small, high, wooded islands; with a rock about 10 feet high between them.

(815) **Twin Islands,** in Dora Passage, resemble each other in contour and are high and wooded. The arch off the S end of the N island is conspicuous.

(816) **Holgate Arm** is the largest indentation on the W side of Aialik Bay. The arm is too deep for anchorage and terminates in **Holgate Glacier.**

(817) **Slate Island,** long, narrow, and high, is close to the W shore near the head of the bay. The head of Aialik Bay consists of sunken rocks and icebergs that are discharged from the glaciers feeding into the bay.

(818) **Coleman Bay, Tooth Cove,** and **Bear Cove,** are bays on the E side of Aialik Bay. None of them afford good anchorage except the SE arm of Coleman Bay. It is reported

that good protection from E and S weather can be had for small craft in about 6 fathoms.

(819) **Anchorages.**–The anchorages in Aialik Bay are few and indifferent because of the great depth. With S weather a swell makes well into the bay.

(820) The best anchorage is in 30 fathoms, good holding bottom, near the head of **Paradise Cove** in **Three Hole Bay,** on the E side of Aialik Bay about 3 miles N of Harbor Island. Small craft find good shelter along the S shore of the cove in 3 to 10 fathoms, mud bottom.

(821) Anchorage can be had in 28 fathoms near the center of the cove on the W side of the bay, W of the N end of Harbor Island. On each side of the entrance to this cove is a sharp conical, high, wooded hill. Close inshore off the point at the N entrance is a sharp pinnacle rock about 12 feet high; about 600 yards NE of this pinnacle is **Hub Rock** which covers at about half tide.

(822) Vessels can find convenient anchorage in the area about 1 mile SE of the S end of Harbor Island. There is good shelter here with winds from N around to SE.

(823) **Ice.**–There are discharging glaciers at the heads of Aialik Bay and Holgate Arm, and ice is frequently driven to Harbor Island by N winds. Holgate Arm and the entire bay above the bar are frequently filled with ice.

(824) **Harris Bay** is about 5 miles NW of the peninsula terminating in **Aligo Point.** The bay is deep throughout. The 50-fathom curve extends to within 0.5 mile of the head of the bay. The upper part of the bay is usually filled with floating ice.

(825) **Granite Island** is a high, long narrow island. Its shores are bold and its slopes are very steep except at the N end.

(826) **Taz Basin** is a remarkable cliff-walled harbor on the SW side of Granite Island about 2 miles from its NW end. It has depths of 18 to 20 fathoms and is an ideal shelter for launches. The entrance is narrow and has a rock 5 feet high in the middle. It is reported that vessels enter on the N side of the rock where there is a depth of about 2 fathoms. Once inside there is plenty of room. The channel S of the rock is shoal and foul with rocks nearly awash at low water.

(827) **Granite Passage,** which leads from Aialik Bay to Harris Bay, is deep and free from dangers. At the narrowest part of the passage, just N of Fire Cove, a ridge with 6¼ to 18 fathoms extends across the passage. The ridge affords convenient anchorage in any but heavy weather.

(828) **Fire Cove** is the southernmost of three coves in the mainland opposite Granite Island. It is deep throughout and affords no satisfactory anchorage. The shores are precipitous and rocky.

(829) **Ripple Cove,** the next cove to the N, is also deep and affords no anchorage except in 28 to 30 fathoms, hard bottom. The third cove is also deep and not suitable as an anchorage.

(830) **Crater Bay** is a large inlet about 1 mile N from the N end of Granite Island. A good anchorage will be found in the bight just E of the projecting point on the S shore, in 25 fathoms, sticky bottom. This anchorage is well protected but is subjected to severe williwaws. In the S cove at the head of Crater Bay is a stream where water can be obtained.

(831) **Cataract Cove,** just N from Crater Bay, is another of the characteristic small deep bays of this region. It is exposed to the S, and is not recommended as an anchorage. Water can be obtained from cascades at the head of the bay.

(832) A terminal moraine bar, about 4 miles N of Granite Island, forms a barrier completely across the head of Harris Bay and separates the bay from **Northwestern Lagoon.** The terminal moraine bar consists of a series of low islands and rocks that bare at low water. The lagoon, unsurveyed, extends about 9 miles NW, has a steep barren island, 1,263 feet high, near its center, and can only be entered by small craft with local knowledge. A steep-walled fiord extends about 3 miles N from this island and heads into **Northwestern Glacier** from which small icebergs are discharged. An inlet over 1 mile long and with shoals at its head is SW of the island. Most of the shoreline of Northwestern Lagoon is barren as a result of the recent rapid recession of the glaciers.

(833) **Harris Point,** a prominent point on the W side of the entrance to Harris Bay, is easily recognized by a succession of rocks and islets that extend 0.3 mile off. The outer rock of this group is 78 feet high.

(834) **Cup Cove** is a small indentation just N of Harris Point. It has depths of 5 to 9 fathoms, mud bottom, and affords good anchorage for small craft except that it is exposed to E winds.

(835) **Sandy Bay** is an indentation about 1 mile long between Harris Point and Two Arm Bay. The depths decrease gradually from 20 fathoms at the entrance to 3 fathoms at the head with sand bottom throughout. It is exposed to the S and suitable for anchorage in fine weather only.

(836) **Two Arm Bay** has Paguna Arm on the N and Taroka Arm on the W.

(837) **Surok Point** is on the E side of the entrance to Two Arm Bay. It is bold and high, with deep water extending close up.

(838) **Paguna Arm** is deep and affords no anchorage except at the very head, where vessels may anchor in 20 to 25 fathoms, hard bottom. There are several coves along the E shore where small craft can find anchorage close to the beach. The shores are steep and precipitous except for a small sandspit on the E shore near the head. There are numerous places in Paguna Arm where water can be obtained.

(839) **Bear Point** is a bold, high point separating Paguna and Taroka Arms. A group of rocks extend 100 yards off the point.

(840) **Taroka Arm** is deep but affords anchorage near the head in 20 to 25 fathoms, hard bottom with occasional patches of sand and mud. Small craft can find shelter in several of the bights along the S shore.

(841) **Cloudy Cape,** on the S side of the entrance to Two Arm Bay, is bold and high. On the coast about midway between Cloudy Cape and Thunder Bay are lines of corrugated strata on two light-gray cliffs.

(842) **Thunder Bay** is 2 miles wide at the entrance, and about 2.5 miles long with the upper end extending in an E direction. Safe anchorage for small craft can be had in the cove at the head of the bay in 10 to 20 fathoms, mud bottom. Water is available from several waterfalls at the head of the bay. A cup-shaped bight on the N side of the entrance to the bay affords anchorage in 12 fathoms, gray sand and rock bottom. A landslide is on the coast about 0.5 mile SW from Thunder Bay.

(843) **Chart 16681.–Black Mountain** (59°32.0′N., 150°11.5′W.), the highest peak between Thunder and Black Bays, has a large granite boulder at its summit.

(844) The point on the N side of the entrance to **Black Bay** is marked by a 660-foot hill; reddish-brown tinted cliffs form the base on its seaward side. The island immediately adjacent to the point is wooded, 150 yards in diameter, and 165 feet high.

(845) The NW arm of Black Bay is not recommended as an anchorage because it is too deep and narrow. The NE arm of the bay is 0.4 mile wide. There is safe anchorage close in near the head in 16 to 20 fathoms, mud bottom. A shoal of

gravel and boulders extends 100 yards offshore on the E side of the head of this arm. The anchorage is subjected to usual williwaws. A high, light-gray granite peak separates the two arms of Black Bay.

(846) The point 1.2 miles S of the W entrance point of Black Bay has a large granite rock about 150 feet high close to the S side. The rock makes a good mark when it is seen clear of the point. Between this point and Black Bay is a low grassy wooded ravine that extends inland from the coast. Between the ravine and Black Bay are rocky, almost perpendicular cliffs several hundred feet high and light gray in color. The open bay to the W of the point is not recommended as an anchorage.

(847) **Nuka Bay** has its main entrance between Pye Reef and Nuka Point. The bay may be entered from the E through McArthur Pass or Wildcat Pass and from the W through Nuka Passage. It extends into the mainland above the passes in two long arms. Good protected anchorage can be found in several small bays and coves. There are several small gold mines in the West Arm and North Arm.

(848) Nuka Bay is generally deep throughout. There is, however, a considerable area of irregular depths, less than 25 fathoms, adjacent to the W shores of the lower bay.

(849) **Pye Islands,** on the E side of Nuka Bay, are three rugged mountainous islands, densely wooded on the lower slopes. **Outer Island,** the outermost and smallest, has a high prominent peak at its E end. A good landmark, this peak is part of a ridge whose top is covered with huge granite boulders. A prominent bare rock, 70 feet high, is 20 yards off the SE shore of the island. A large reef, part of which shows at all stages of tide, is 300 yards S of the rock. A large, bare, granite rock, 82 feet high, is close to the SW point of the island.

(850) A 2½-fathom shoal that breaks is 0.4 mile SE of the E point of Outer Island. A 10-fathom shoal is 1.8 miles 130° from the point, and a 9-fathom shoal is 0.9 mile 200° from the same point.

(851) The S shore of Outer Island is a Steller sea lion rookery site. There is a 3-mile vessel exclusionary buffer zone around the entire island. (See **50 CFR 227.12,** chapter 2, for limits and regulations.)

(852) **Pye Reef,** awash at high water, is 2.1 miles 205° from the high peak of Outer Island. The line of the W ends of Outer Island and Rabbit Island barely clears to the W of the reef, and the line of the E end of Outer Island and Hoof Point on Ragged Island leads 0.4 mile E of it.

(853) **Rabbit Island,** the second of the Pye Islands, is densely wooded. The E shore of the island is bold and rocky, with no dangers except close inshore.

(854) Between Outer and Rabbit Islands is a deep body of water with no good anchorage. At its E end is a small opening called **Kitten Pass.** The pass is between a small islet and a group of three bare rocks to the N. The islet has a few scrub trees on it. A rock, covered 13 feet and marked by kelp, is in the pass; it is nearer to the islet than to the rocks.

(855) **Kitten Pass** is only 65 yards wide. By favoring the group of rocks on the N side, a depth of 5 fathoms can be carried through; but because of strong tidal currents and the narrowness of the pass, it should be attempted only by very small craft, at slack water and with a smooth sea. In rough weather, breakers obstruct the pass.

(856) **Ragged Island,** the third and largest of the Pye Islands, is very mountainous, and is partly wooded on the lower slopes. The island is broken by numerous coves and bights, most of which are too deep to afford good anchorage. The few known dangers around this island are the rocks close inshore; a rock awash at high water 200 yards off the rounding point 1.2 miles N of Wildcat Pass; and the rocks off Hoof Point.

(857) **Hoof Point,** 3.5 miles NE of Wildcat Pass, is the SE end of the E part of Ragged Island. Bold and rocky, it is at the base of a detached hill. A bare granite rock, 105 feet high, 60 yards off the point, makes a good mark. Bare ledges are 400 yards S of the point. A rock, covered at high water 0.5 mile S of Hoof Point, can be cleared to the S by keeping open water showing through Wildcat Pass. Fair anchorage for small craft can be had in the cove behind Hoof Point, in 10 to 20 fathoms.

(858) **Wildcat Pass,** between Rabbit and Ragged Islands, is about 400 yards wide in its narrowest part, and is deep and free from danger. A shoal marked by kelp with a least depth of 6 fathoms over it is in the center of the W approach to the pass, 400 yards W of the line of the W ends of Rabbit and Ragged Islands. This shoal has deep water all around it. In the E approach the only known dangers are the rocks off Hoof Point. In the narrow part of the pass a bank, with 8 fathoms over it, extends from the N point to the center of the pass, but 20 fathoms and over can be found 100 yards off the S point. The tidal currents in Wildcat Pass have an estimated velocity of 4 to 5 knots.

(859) Anchorage can be found in the cove just S of the pass, in 24 to 27 fathoms, rocky bottom. Small vessels can find indifferent anchorage in the cove in the W end of Rabbit Island, close inshore, in 8 to 10 fathoms, rocky bottom.

(860) **Wildcat Cove** is a large arm in the SE shore of Ragged Island, 2.8 miles N from Wildcat Pass, and is the second cove W from Hoof Point. Protected anchorage for small craft can be had about 100 yards from the head of this cove in 11 fathoms, mud bottom. There is also anchorage in 22 fathoms, mud bottom, opposite the indentation on the E shore of the cove.

(861) **Roaring Cove** is a small bight in the W shore of Ragged Island, 2 miles N from the W approach to Wildcat Pass. A small wooded island is on the N side of the entrance, and a wooded point, resembling an island, is on the S side. Partially protected anchorage for small craft can be found in the center of this cove in 4 to 5 fathoms, mud bottom.

(862) **McArthur Pass,** between Ragged Island and the mainland, is about 120 yards wide in its narrowest part but is straight and easily navigated. **McArthur Pass Light** (59°27.8'N., 150°20.1'W.), 45 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the N side of the pass.

(863) There are no known dangers in the approaches, and a clear channel 60 yards wide is in the center of the narrowest part of the pass, with a depth of 6¼ fathoms. Both shores of the pass are lined with thick kelp that extends approximately out to the 5-fathom curve. The bottom is composed of smooth rock and small boulders. A spit of gravel and boulders makes out from the S shore, in the narrowest part, with deep water close-to.

(864) The tidal currents in McArthur Pass have an estimated velocity of 3 to 4 knots. All except low-powered vessels will have little difficulty through the pass at any stage of tide, but E weather and ebb tide may cause dangerous seas in the entrance.

(865) Extensively used by small vessels proceeding along the coast, McArthur Pass affords a shorter and more protected route than the route outside the Pye Islands, and is especially valuable when used in connection with the route through Nuka Passage.

(866) **McArthur Cove** is a large cove in the N side of Ragged Island, 1 mile SW from the narrowest part of McArthur Pass. Large vessels can find good anchorage near the head of this cove in 28 to 30 fathoms, mud bottom; small craft anchor closer inshore in 5 to 10 fathoms, good holding bottom and good shelter. The two small coves on the N side of Ragged Island, W of McArthur Cove, are deep and clear of dangers but are subject to strong williwaws in stormy weather. Indifferent anchorage for small craft can be found in the first cove to W, in the center of the bight near its head, in 16 to 18 fathoms, rock and gravel bottom; or in 11 to 12 fathoms in the bight on the S side of the cove, near the center.

(867) **Morning Cove,** on the S side of the E approach to McArthur Pass, affords protected anchorage for small craft near its head in 10 to 12 fathoms, rocky bottom.

(868) **Chance Cove,** on the N side of the E approach to McArthur Pass, is deep, and is a poor anchorage. **Chance Lagoon,** at the head, has a large flat rock in its entrance. The passage E of this rock is foul, but a depth of 8 feet can be carried into the lagoon through the passage W of the rock, the best water being found by favoring the W side of the passage. Protected anchorage for small craft can be had in this lagoon in 8 to 12 fathoms, mud and rock bottom, but anchors will not hold well in heavy weather. The diurnal range of tide in Chance Lagoon is 11 feet.

(869) Small vessels can find good anchorage in the small bight on the S side of McArthur Pass, close W of the narrowest part, in 7 to 11 fathoms, mud bottom. This anchorage is subject to strong williwaws, and local fishermen prefer to anchor close inshore, in the open bight on the N side of the pass, NW from McArthur Cove, in 10 to 15 fathoms, rocky bottom.

(870) **McCarty Fiord (East Arm),** the NE extension of Nuka Bay, has average depths of over 100 fathoms except for a terminal moraine shoal, with depths of 10 fathoms or less, which crosses the fiord between McCarty Lagoon and James Lagoon. Between the moraine shoal and **McCarty Glacier,** 15 miles N, water depths of more than 150 fathoms have been sounded, but caution should be exercised as the area has not been surveyed. McCarty Glacier, which ends in shoal water at the head of the fiord, discharges occasional small icebergs. The N part of McCarty Fiord is barren because of the recent recession of McCarty Glacier.

(871) The square-shaped bay on the E side of McCarty Fiord, 2 miles N from the W entrance of McArthur Pass, affords indifferent anchorage off its SE side in 12 to 15 fathoms, rocky bottom. The small bight on the NE side of the bay is foul.

(872) **Moonlight Bay,** on the E side of McCarty Fiord, about 1.8 miles from the terminal moraine, is deep and clear. Large vessels can find good anchorage near its head in 15 to 30 fathoms, sticky mud bottom. Small vessels can find better protection in **Midnight Cove,** a long bight making off to E from the N side of Moonlight Bay, but they must avoid a 5-foot shoal about 300 yards off the N side of the entrance.

(873) Good anchorage is available in the middle of the cove, just past the turn, in 9 to 10 fathoms, mud bottom, or near the head of the cove in 14 to 16 fathoms, mud bottom. A spit, bare at low water and covered with boulders, extends out 150 yards from the head of the cove. This cove is the best anchorage for small vessels in McCarty Fiord, as it is doubtful that ice would drift in here in quantity.

(874) The small cove just N from Moonlight Bay has depths of from 5 to 8 fathoms, mud bottom, but with W winds is apt to be filled with ice. A narrow spit, bare at low water and covered with boulders, extends out from the head of the cove for 75 yards.

(875) **McCarty Lagoon,** on the E side of McCarty Fiord and about 1.5 miles N of Moonlight Bay, has not been surveyed. The entrance nearly bares at low water, but shallow-draft vessels can enter at high tide. The tidal currents in the entrance have an estimated velocity of 8 to 12 knots, so that high water slack is the only time to enter. Depths of 15 to 20 fathoms, mud bottom, are reported inside the lagoon. The entrance is narrow, with sand and mud bottom. The lagoon probably freezes over in the winter.

(876) **James Lagoon,** on the W side of McCarty Fiord opposite McCarty Lagoon, is about 1 mile long and 0.8 mile wide. There is a prominent 90-foot dirt cone on the NE side of the entrance. The entrance, about 0.8 mile long, has a least midchannel depth of 3 feet. In entering, favor the W shore to avoid a long sandspit, partly bare at low water, which makes out to S for about 300 yards from the W end of the large, flat, sandy island on the E side of the channel. The tidal currents in the entrance have an estimated velocity of 6 to 10 knots.

(877) Vessels should not attempt to enter James Lagoon except at high water slack. The entrance is often obstructed by ice which is carried through the entrance into the lagoon. The lagoon has general depths of 8 to 15 fathoms, mud bottom. Vessels should approach the shore with caution, since large mudflats make off for a considerable distance, especially along the N shore. The lagoon may freeze over in the winter.

(878) **Harrington Point,** the S tip of the peninsula separating McCarty Fiord and West Arm, is bold and rocky, with rocks close inshore. A bank with a least depth of 10 fathoms is 0.6 mile S of the point. Another bank, with a least found depth of 11 fathoms, is 0.5 mile W of a large rock, 35 feet high, close to the SW side of the peninsula.

(879) **West Arm** of Nuka Bay is about 7 miles long in a NW direction from Harrington Point. **Nuka River** and **Ferrum Creek** empty into **Beauty Bay,** the head of West Arm. A large mudflat makes out from the head of Beauty Bay with deep water close-to. The diurnal range of tide is 11.4 feet in Beauty Bay.

(880) **Shelter Cove,** on the S side of Beauty Bay, is small but affords anchorage with moderate swinging room in 14 to 16 fathoms, mud bottom. At the head of the cove is a grassy flat, in front of which is a large mudflat that covers at high water.

(881) **Diablo Peak,** on the W side of Beauty Bay, is a good mark.

(882) **Yalik Bay,** on the W side of West Arm, opposite Harrington Point, has a shoal with a least found depth of 3½ fathoms in midbay, 1.2 miles from the entrance. Depths of over 20 fathoms can be found all around this shoal, the better channel lying to S. This shoal is the only danger in the bay except rocks close inshore and two rocks, bare at low water, 150 yards off the N shore 0.6 mile from the head.

(883) Anchorage can be had in the center near the head in 14 to 16 fathoms, mud and gravel bottom, but there is limited swinging room for large vessels. Small vessels can find partially protected anchorage in the small bight on the N side of the bay, 0.5 mile from the entrance, in 3 to 5 fathoms, and sand bottom.

(884) A reef makes out for 0.2 mile E from Yalik Point, the S entrance point to Yalik Bay. A least depth of 2 fathoms was found at the outer end of this reef. A rock, covered 1 foot and possibly marked by kelp, is about 0.2 mile off the N entrance point to Yalik Bay.

(885) **Surprise Bay** indents the E side of West Arm. Anchorage can be had 0.3 mile from the entrance to the lagoon at its head, in 17 to 20 fathoms, mud bottom.

(886) **Palisades Lagoon,** at the head of Surprise Bay, has a narrow entrance 40 yards wide and 350 yards long that is too narrow and crooked to be navigated by any except very small vessels. A depth of about 4 fathoms can be carried by favoring the E side of the entrance until past the point on the W side, to avoid a rock lying E of this point; thence favor the W side of the channel into the lagoon. A large sandspit with boulders on it, is on the E side of the entrance of the inner end.

(887) General depths in the lagoon range between 18 to 20 fathoms, mud and rock bottom, and afford secure anchorage. The lagoon may freeze over in winter. **Babcock Creek,** a small stream, empties into the lagoon over a large sandflat that uncovers at low water.

(888) **Ariadne Cove** is behind prominent **Ariadne Island** on the S side of the entrance to Surprise Bay. There is good anchorage for small vessels in this cove in 5 to 10 fathoms, mud bottom, but in the winter, with NW winds, the cove becomes quite rough. There are two entrance channels, one on each side of Ariadne Island. The N entrance has a rock, bare at low water, near midchannel SE of the island; the best water is E of this rock, but care should be taken to avoid reefs that make out from the N shore of the cove.

(889) The W entrance has a shoal of 2½ fathoms in midapproach. A reef bare at low water makes off for 125 yards from the point on the S side of the entrance. The best water in this entrance is found by favoring the island, being careful to avoid a reef awash at high water that extends 60 yards S from the second point from the entrance on the S side of the island.

(890) **Quartz Bay** is on the E side of West Arm, 4 miles NW from Harrington Point. **Beautiful Isle,** a wooded islet with a cluster of bare rocks, is on the S side of the entrance. A shoal with a least depth of 31 feet is 300 yards W. Another shoal is 0.2 mile off the N shore of the entrance. A rock, reported covered 6 feet, is in the S part of the shoal in about the middle of Quartz Bay. Anchorage can be found in the center of the bay, 0.3 mile from its head, in 14 to 18 fathoms, mud bottom. The 10-fathom curve is about 325 yards from shore at the head of the bay. The water shoals very rapidly inside this curve.

(891) **Moss Point** separates Beauty Bay from North Arm. It has a number of grass-covered rocks and wooded islets close-to.

(892) **North Arm** branches off for 5 miles to N from West Arm. A large flat back of the head of the arm is covered with grass and alders, in front of which is a mudflat that covers. Deep water approaches to within 250 yards of the head of the arm and to within 100 yards of the low water line.

(893) **Pilot Harbor** is on the E side of North Arm about 1 mile from its head. A bare rock, 3 feet high, is 275 yards off the S point of the entrance and a submerged rock is 100 yards NE. A large bare rock, 4 feet high, is 125 yards S of a wooded islet close off the N point of the entrance. There is a clear entrance between these rocks. A large shoal area, 200 to 300 yards wide and mostly bare at low water, extends across the head of the bay. Entering in midchannel, a secure anchorage will be found in the middle in 14 to 16 fathoms, mud bottom.

(894) Small vessels can anchor 100 yards to W of the point that resembles a small wooded islet, on the NE side of Pilot Harbor in 5 to 8 fathoms, mud bottom. This is the best anchorage for small craft in North and West Arms in stormy weather.

(895) A small cove, on the W side of North Arm about 1 mile from its head, is very deep and has no anchorage. A large, prominent waterfall, with a sheer drop of about 900 feet, is about 1.5 miles NW from the head of the cove.

(896) **Nuka Island,** on the W side of Nuka Bay, is mountainous and densely wooded on the lower slopes in the N part and grass covered in the S part. The E shore rises precipitously to the mountain tops and is bare shale and talus formation. The W shore, bordering on Nuka Passage, is broken up into numerous bays and coves.

(897) **Nuka Point,** the S end of Nuka Island, is fairly prominent. This point is formed by a peninsula with a high peak near its inshore end. The peninsula is connected with the main part of the island by lowland; from a distance it appears to be an island. The E and S shores rise in sheer cliffs, making a landing impossible. Two rocks about 3 feet high are 0.3 mile off the point E of the peak, and a reef covers the area inshore of them.

(898) **Nuka Rock,** 3 feet high and 20 feet across, is 0.4 mile S of the SE tip of Nuka Point. Irregular depths of less than 25 fathoms extend about 3 miles S from Nuka Point. A rocky patch of 8 fathoms is 1.5 miles ESE from Nuka Rock; another patch of 8 fathoms is about 2.8 miles NE from Nuka Rock, 1.2 miles offshore.

(899) **Pinnacle Rock,** 3 miles NE of Nuka Rock and 0.3 mile offshore, is 68 feet high and the most prominent landmark along this coast. Numerous small rocks and reefs, marked by kelp, are inshore from this rock.

(900) Along the coast between Pinnacle Rock and Nuka Point, and for 0.5 mile N of Pinnacle Rock, are numerous rocks, some of which are 250 yards offshore. About 1.5 miles N of Pinnacle Rock, a small foul bight is filled with a cluster of rocks and islets.

(901) An area with sandy bottom extends about 1 mile S of the bight and offshore from two prominent sand beaches. The bottom is smooth, with gradually increasing depths to the 10-fathom curve, nearly 0.5 mile offshore.

(902) A prominent reef 5.2 miles NE of Nuka Point and 3 miles S of the entrance to Nuka Passage makes a good mark. This reef is formed by two large rocks, 25 and 30 feet high, the outermost being the smaller and 400 yards off the E shore of Nuka Island. Many rocks are along the coast inshore of this reef, but deep water approaches within 200 yards on the offshore side.

(903) The small inlet about 1 mile S from the E entrance to Nuka Passage is the only important indentation in the E shore of the island. Off the N point of the entrance is a prominent wooded islet about 70 feet high, the outer face of which is bare white granite. There are numerous high bare rocks and wooded and grassy islets on both sides of the entrance. The inlet is exposed to SE, and the S side is foul, but small craft can approach its head as follows:

(904) Enter in midchannel and when 200 yards past the wooded islet on the N side, anchor in 6 to 9 fathoms, sandy bottom. If going to the head of the inlet, favor the N side above this anchorage to avoid submerged rocks almost in midchannel. A large sandflat is at the head, with shoal water 125 yards offshore from it. Very small craft can anchor abreast the last point on the S shore, 200 yards from the low-water line, in 2 fathoms, sandy bottom, but there is very little swinging room. This inlet affords fair-weather anchorage only.

(905) For 1.5 miles NW of the inlet there are rocks as much as 250 yards offshore. The last of these is 2 feet high, 300 yards offshore, and makes a good mark for entering Nuka Passage. Deep water is fairly close outside these rocks; the 100-fathom curve is 0.4 mile offshore.

(906) **Nuka Passage,** between Nuka Island and the mainland, is about 12 miles long from the E entrance to the S entrance.

(907) When used with McArthur Pass, this passage affords a shorter and protected route for vessels proceeding along the coast. It is of special use to small low-powered craft. The passage is deep and is easily navigated in clear weather.

(908) In the approach to the E entrance is a bank with a least depth of 8 fathoms 1 mile S of the point on the N side. Between this bank and the N shore of Nuka Island are depths of over 100 fathoms. A shoal, with a least depth of 4¾ fathoms, is in midpassage, 1 mile SW of the N point of the entrance, and nearly 0.5 mile SE of a prominent wooded islet on the N side of the pass. Between this shoal and the S shore are depths of 90 fathoms. About 1.5 miles inside the E entrance, on the N side, is a small cove open to the E; good anchorage is available for small craft in 4½ to 10 fathoms, mud bottom, and water may be obtained from the stream.

(909) **Division Island,** a group of three wooded islands connected at low water, is in midpassage about 2.2 miles from the E entrance. The ship channel is S of the islands.

(910) A rock awash at high water is 180 yards S of the E tip of Division Island. A rock bare at minus tides is in midchannel N of the island. A shoal with a rock awash extends S from the W extremity of the Division Island group, reaching almost halfway across the channel towards Hardover Point.

(911) A near midchannel course, slightly favoring the S shore, is recommended in making this passage. The tidal currents have considerable strength.

(912) From **Hardover Point,** the NW end of Nuka Island, the pass trends S toward Gore Point. About 0.6 mile NW of Hardover Point, on the N side of the channel, a large sand-and-gravel flat extends NW for about 1.5 miles to the foot of the moraine of Yalik Glacier, a prominent mark. Deepwater approaches close to this flat except at its SW end where it is shoal for a considerable distance offshore.

(913) **Home Cove,** 1.5 miles S from Hardover Point, is small.

(914) **Berger Island** is a prominent wooded islet, 25 feet high, about 5 miles S from Hardover Point. The island is the outermost of a group making off from the E shore, and appears from N to be in the center of the channel.

(915) A rock 8 feet high is 250 yards NE from the island, and a reef bare at low water, extends 85 yards off this rock. A rock awash at low water and not marked by kelp, is 1.2 miles 213° from Berger Island.

(916) About 0.6 mile S of Berger Island is a grass-covered islet, 45 feet high and topped by a spruce tree which shows up well from the N or S, but blends into the background when viewed from the W. The spruce tree in range with the W tangent of Berger Island to the N, marks the 3½-fathom spot in the middle of the entrance to Westdahl Cove.

(917) **Westdahl Cove** is 1 mile S of Berger Island. A rocky patch of 13 to 18 fathoms extends nearly across the bay. The anchorage is inside this rocky patch in 22 fathoms, mud bottom. A reef bare at low water and marked by thick kelp, is 0.3 mile W of the S entrance point. A 3½-fathom shoal is in the middle between the entrance points.

(918) **Yalik Glacier** formerly discharged into the W arm of Nuka Passage. There is good anchorage off the SW end of the glacier moraine in 14 to 17 fathoms, soft bottom; however, care should be taken to avoid a 2-fathom rocky shoal about 0.4 mile S of the low waterline of the moraine and about 0.3 mile E of the W shore. An unusual rocky reef, bare at low water, extends 300 yards in a SE direction from the extreme SW end of the moraine.

(919) **Petrof Point,** on the W side of the passage opposite the middle part of Nuka Island, is a prominent, low, rounding point with a wide sand beach.

(920) **Petrof Glacier,** which shows prominently from the S, discharges into the W side of the passage around the base of a prominent ridge about 2 miles S of Petrof Point.

(921) **Brown Mountain,** between Petrof Glacier and Tonsina Bay, is of a distinctive brown shade during the summer and has a prominent round shoulder jutting to the E.

(922) **Tonsina Bay,** 7 miles N from Gore Point, is small and marked by a large island, known locally as **Long Island,** nearly in the center of the entrance. The entrance N of Long Island is preferred, as it is deeper and wider. Firm sandflats are at the head of the bay where vessels of any size can be beached in an emergency. On the N side of the N entrance is a bold wooded islet. About 380 yards S of this islet is a reef awash at high water. Thick kelp extends between the reef and the islet.

(923) A rock awash at half tide is 660 yards 275° from this reef; it is 250 yards S of the N shore, and there is kelp inshore of it. Numerous rocks and islets make off to N from Long Island. The northernmost is a well-defined rocky islet sparsely covered with grass and about 25 feet high.

(924) Entrance should be made at low water when the various rocks and reefs are visible. Anchorage can be had in 22 fathoms, mud bottom, NW of Long Island in the basin formed by Long Island, the islets, and the mainland. Good anchorage for small craft can be had near the head of the bay in 5 to 10 fathoms, sand bottom.

(925) **Front Point,** rising abruptly to 170 feet, is 5 miles NNW of Gore Point, on an island which is separated from the mainland by a narrow band of water about 25 yards wide.

(926) A reef bare at minus tides is 0.4 mile E from the point and there are several covered rocks and kelp patches inshore from this danger. The coast from the S entrance to Tonsina Bay to the bight N of Gore Point has numerous rocks awash at low water, and kelp patches that extend about 0.3 mile offshore.

(927) Anchorage can be had anywhere in the bight N of Gore Point by keeping clear of the kelp and avoiding the rock, which bares 3 feet at low water, 300 yards NE of the well-defined rock point at the W end of the bight.

(928) **Chart 16645.–Gore Point** (59°11.9′N., 151°57.7′W.) is the SE end of a prominent headland on the E side of the entrance to Port Dick. From E and W, the headland has the appearance of an island, with **Gore Peak,** near the middle and a broad, high shoulder at the ends, and separated from the highland N by a narrow gap. The arch in **Arch Rock,** at the E end of Gore Point, shows over a small arc from S, and a folding in the strata in the face of the cliff shows on the S side of the headland.

(929) Within a radius of 1.2 miles of Gore Point, the bottom is very irregular, depths of 14 fathoms being found at that distance off. A depth of 5½ fathoms was found 0.4 mile S of the point in general depths of 10 to 15 fathoms.

(930) The neck joining the headland at Gore Point to the mainland is low and wooded. On the W side of the neck is a cove affording indifferent anchorage with E winds. The S point of the cove is the W end of the headland, and is a shelving ridge of bare rock. Close to this point is a rocky islet, from which rocks, bare at low water, and kelp extend about 200 yards NW. A rock, covered at high water, is about 100 yards from the cliff at the SE end of the cove. A large kelp area extends about 200 yards NW from the rock. The anchorage is in 18 to 25 fathoms, soft bottom, 250 to 300 yards from the beach of the low neck and about 0.3 mile from the cliff on the S side. The water deepens rapidly NW, the swinging room is scant, and the anchorage is uneasy. It is recommended only as a temporary anchorage.

(931) **Port Dick,** W of Gore Point, extends N for 2.5 miles to the junction of its three main arms. Abrupt shoals are within a radius of 2 miles about the point at the W side of the entrance to Port Dick. The areas near the point are foul.

(932) **Takoma Cove** and **Sunday Harbor** are branches of the arm or bay on the E side of Port Dick, 2.5 miles above the entrance. A dangerous reef, covered 1¼ fathoms, is 0.3 to 0.5 mile W from the S side of the entrance to the arm. Takoma Cove is the anchorage generally used in Port Dick. Sunday Harbor has irregular depths and is not recommended as an anchorage.

(933) Anchor in the entrance to Takoma Cove with the shore to the SW open with the point at the W side of the entrance to Port Dick; select a depth of 17 to 18 fathoms, sticky mud bottom. In the lesser depths near the head of the cove, the bottom is rocky and has poor holding quality.

(934) **Taylor Bay,** the N arm of Port Dick, extends in a N direction for 3.5 miles and is 1.5 miles wide at the entrance. Except for rocks fringing the shores, no dangers were found in the bay. A rock, 4 feet high, is 1.5 miles N of the entrance and 130 yards off the first well-defined point on the E shore. At the beginning of the narrows are two rocks, awash at half tide and about 100 yards off the E shore.

(935) At the upper end of the bay is a basin, with depths of 20 to 25 fathoms, surrounded by extensive mudflats.

(936) **West Arm** extends W for a distance of 7.5 miles. There are two coves on the N side of the arm, 1.5 and 4 miles, respectively, from the entrance. The first cove has two islands in the center. Anchorage can be had E of the islands in 16 to 19 fathoms, rock and mud bottom. The westernmost cove is practically bare at low water. At the head of the arm on the S side are two islets, the W one marking the low-water line which extends directly across the arm at this point.

(937) In the SW approach to Port Dick is dangerous **Gore Rock,** covered 1¼ fathoms, 7.5 miles 244° from Gore Point and approximately 3.5 miles from shore.

(938) The second small bay, 5 miles W of Port Dick, has good anchorage for small craft in 15 fathoms and less. Between Port Dick and this bay the shore should not be approached closer than 2 miles, because of rocks awash that extend 1.5 miles off.

(939) **Rocky Bay,** the large bay N of East Chugach Island, is broken by numerous rocks, islets, rocks that uncover, and shoal spots. The depths are irregular and of little use as guides for navigation. For small boats there is sheltered anchorage in **Picnic Harbor,** which is 220 to 300 yards wide. A gravel road connects Picnic Harbor with Jakolof Bay and continues to Seldovia.

(940) Two rocks that uncover 9 feet are 1.2 miles S from the large wooded island in the middle of Rocky Bay. There is also a 2½-fathom spot 1.3 miles SW from the E entrance point of the bay. A sunken wreck is on the NE side of the bay in about 59°14′43″N., 151°23′43″W.

(941) **Windy Bay,** just W of Rocky Bay, extends 3.5 miles W and is 440 yards wide near its head. Good holding mud bottom in 4½ to 8 fathoms near its head is not recommended as a desirable anchorage because of the strong W breeze that draws through the bay. Boats entering this bay should favor the S side, keeping about 440 yards offshore when N of the S entrance point.

(942) **Chugach Bay,** the large bay S of Windy Bay, has a N bight with deep water close inshore, and a W arm, 2 miles long, with good holding mud bottom. This anchorage, which is affected by a strong W breeze that draws through it, can be used by small boats except in E weather. The bottom in the S half of the entrance is broken, with a rocky spot covered 1¾ fathoms.

(943) **Charts 16660, 16640.–Cook Inlet,** on the W side of Kenai Peninsula, merges with Shelikof Strait through a wide unobstructed passage W of the Barren Islands. Leading from the Gulf of Alaska to Cook Inlet are Kennedy Entrance and Stevenson Entrance, N and S respectively of the Barren Islands, and Chugach Passage, inside the Chugach Islands. The distance is 1,254 miles from Seattle to the entrance to Cook Inlet at a point 3 miles S of East Chugach Light, via the outside route by way of Strait of Juan de Fuca. From the entrance it is 48 miles to Seldovia, 59 miles to Homer, 110 miles to Nikishka, and 175 miles to Anchorage.

(944) **Prominent features.**–The shore on both sides of the inlet can be seen in clear weather, but it is sometimes difficult to determine a position because of the lack of marked features on the E shore. Conspicuous and useful marks are Augustine, Iliamna, and Redoubt Volcanoes in the lower inlet, and Mounts Susitna and Spurr in the upper inlet. Prominent in their respective localities are four parabolic antennas, lighted atop, along the E shore from Cape Starichkof to Kenai; the numerous peaks S of Kachemak Bay and N from Kamishak Bay; Anchor Point; the 1,900-foot hill 10 miles from the E shore between Capes Starichkof and Ninilchik; Chisik Island; Kalgin Island, East, West, and North Forelands; Point Possession; and Fire Island.

(945) **Anchorages.**–Port Graham, Seldovia Bay, Kasitsna and Coal Bays in Kachemak Bay, Iniskin Bay, Tuxedni Channel, and Knik Arm are the secure harbors in the inlet. Temporary anchorage in thick weather can be selected at most places in the inlet with the aid of the chart. The great range of the tides must always be kept in mind when anchoring.

(946) **Dangers.**–The shoals in Cook Inlet are generally strewn with boulders that are not marked by kelp. These boulders, on the otherwise flat bottom, are not normally found by echo sounder or lead lines unless directly over them. Most of those located by the survey were found by sighting them at low water. It was noted in places that the boulders rise as much as 30 feet above the general level of the bottom. The boulders may be moved during the ice breakup in spring and by the action of strong currents. As a measure of safety, it is considered advisable for vessels to avoid areas having depths no more than 30 feet greater than the draft. At low water, deep-draft vessels should avoid areas with charted depths of less than 10 fathoms.

(947) In general, the shoal banks fronting the marshy parts of the shores in the upper inlet are free from boulders but there are indications that boulders do exist in the deeper water outside these banks.

(948) With an average tidal current there are swirls throughout the inlet, but they do not necessarily indicate dangers as they show in depths of 15 fathoms if the bottom is uneven. Heavy swirls with slight overfalls should be avoided, and any disturbance which has a recognizable wake in the water should be considered as indicating a dangerous rock or shoal. A dangerous wave condition exists over the shoals in Cook Inlet when the current opposes winds over 12 knots.

(949) The waters of the inlet are much discolored by glacial silt. At low water the discoloration may extend to the mouth of the inlet, and at high water it may be comparatively clear to East and West Forelands or even farther N. Frequently with either a flood or ebb current the water above the Forelands appears as liquid mud. This water is very damaging to salt water pumps and shaft bearings.

(950) During winter months most buoys in Cook Inlet are removed from station. (See the Light List.)

(951) **Routes.**–For vessels approaching Cook Inlet, the chart is the best guide.

(952) Kennedy Entrance and Stevenson Entrance are the main deep-draft entrances to Cook Inlet from the E. (See chart 16606.) When entering Kennedy Entrance, between Perl and Amatuli Islands, caution is necessary to avoid the two off-lying dangers: the 4½-fathom rocky shoal, marked on its E side by a bell buoy about 16.4 miles E of East Amatuli Island Light, and Cowanesque Rock, covered 2½ fathoms, 7.3 miles SE of East Amatuli Island Light.

(953) Some vessels approaching from the E, pass N of East Chugach Island and enter the inlet via Chugach Passage, while others pass between Perl and East Chugach Islands to enter the passage. Local knowledge is desirable in using Chugach Passage. Vessels approaching from the S and passing between East Amatuli Island Light and the 2½-fathom shoal SE of it, should make due allowance for the set of the tidal current and, especially during periods of low visibility, keep a sharp lookout for the shoal. (See chart 16645.)

(954) Courses inside the inlet should be set as prudent navigation demands, with due allowance for weather conditions and set of the currents. See the section on the Port of Anchorage, later in this chapter, for more information on routes.

(955) **Tides and currents.**–The diurnal range of tide in Cook Inlet varies from 14.3 feet at Port Chatham to 29.0 feet at Anchorage.

(956) Tidal currents in Cook Inlet are strong and must be considered at all times. The small local steamers plan their trips so as to have favorable current and prefer to anchor rather than steam against the current of a large tide. A vessel with a speed of 8 knots, picking up the flood current of a large tide a little N of Anchor Point, can carry it to Fire Island.

(957) At the entrance to Cook Inlet the tidal currents have an estimated velocity of 2 to 3 knots, and in general increase up the inlet, with very large velocities in the vicinities of Harriet Point, East and West Forelands, and the entrances to Knik and Turnagain Arms. The current velocity measured by the survey ship McARTHUR was 5 knots at anchorage near East and West Forelands, Tyonek, and Point MacKenzie. These anchorages were out of the full strength of the current, and it is estimated that the velocity of the current during a large tide is as much as 8 knots between East and West Forelands and probably more between Harriet Point and the S end of Kalgin Island.

(958) In general, the direction of the current is approximately parallel to the trend of the nearest shore and, when flats are uncovered, parallel to their edges. Off the various bays a set may be expected, toward the bay on a flood current and from the bay on an ebb current.

(959) Information for several places in Cook Inlet is given in the Tidal Current Tables.

(960) The following statements give information not contained in the Tidal Current Tables. Current table information should be relied upon for all localities listed in those tables. The available current information for Cook Inlet is derived largely from observations near the shores. In the middle of the channel it is likely that velocities are larger and times of current somewhat later than near the shore.

(961) Dangerous Cape.–A current of nearly 3 knots sets at times across the broken ground around the cape, causing heavy rips and overfalls.

(962) Kachemak Bay.–From Dangerous Cape, a flood current sets up Kachemak Bay with a velocity of 1 to 2 knots in a NE direction, and the ebb flows in a SW to W direction. The currents at the mouth of the bay are uncertain, and may vary from place to place, making it difficult to make correct allowance for set in crossing from Anchor Point to Seldovia.

(963) Seldovia.–The currents have an estimated velocity of 1 to 2 knots.

(964) Knik Harbor.–The currents have moderate velocity at the anchorage near the shore, and are strong in midchannel.

(965) Turnagain Arm.–The currents are very strong and the flood frequently comes in as a bore, with large tides, under certain weather conditions. This bore is said to be 4 to 6 feet high at times, and is very dangerous for small craft. Boats should be beached well above the level of the flats, to avoid the bore when it comes in. The bore can be heard about one-half hour before it arrives, sounding like breakers on the beach; it travels slowly.

(966) Harriet Point.–The currents are very swift at Harriet Point, exceeding 5 knots on large tides, and with S breezes bad tide rips occur between Harriet Point and Kalgin Island, and extend some distance S.

(967) Kamishak Bay.–In the N part of the bay, the currents follow the coast, flooding NE and ebbing SW at a rate of about 1 knot at strength. The current is more noticeable near the shore. With a strong W wind, tide rips occur about 2 to 4 miles N of Chinitna Point.

(968) **Ice.**–The upper part of Cook Inlet is more or less obstructed during the winter by ice which forms on the flats and in the shallower waters.

(969) During a mild winter or after a period of several days of mild weather, vessels will probably have no difficulty in reaching the head of the inlet and lying at the docks long enough to discharge their cargoes.

(970) During a severe winter or after a considerable period of severe cold, full-powered vessels usually reach the head of the inlet but because of the heavy masses of ice floating in the strong currents, find it difficult to dock without the aid of an icebreaker.

(971) Ice does not generally interfere with navigation S of Anchor Point except on the W side of the inlet, where large fields of ice are sometimes carried by wind and tides as far as Augustine Island, closing Iliamna Bay for brief periods.

(972) (See Page T-21 for details on ice breakup and freezeup in Cook Inlet.)

(973) **Supplies.**–The principal settlements along Cook Inlet are Seldovia, Homer, Kenai, and Anchorage; supplies and water are available. Water also can be obtained from numerous streams along all the high shores but is sometimes accessible only at high tide; in the upper inlet the only known streams where vessels can approach the shore close enough to boat water in any quantity are on the N side of East Foreland, on the N side of Point Possession, and in Knik Arm.

(974) **Chart 16606.–Barren Islands,** a group of mountainous islands in the middle of the entrance to Cook Inlet between Chugach Islands and Shuyak Island, occupy an area about 13 miles long and 5 miles wide. East and West Amatuli Islands are bold and precipitous and devoid of trees. They are thickly covered with grass in the depressions and on the less precipitous slopes. In general, the anchorages around Ushagat Island are preferable to the others in the group.

(975) **Dangers.**–A pinnacle rock, covered 4½ fathoms and marked by a buoy, is in the approach to Cook Inlet 16.2 miles E from East Amatuli Island Light and 10.7 miles S of East Chugach Light. The top of the rock is of very small area and apparently is the high point of a larger shoal. It may or may not be marked by a current slick. Another shoal area, **Cowanesque Rock,** unmarked and with a least depth of

2½ fathoms, is 7.3 miles 124° from East Amatuli Light. Mariners are cautioned to give both of these shoals a wide berth.

(976) A rock awash at half tide is 1.2 miles N from the northernmost point of West Amatuli Island.

(977) A bare rock, 8 feet high, is about 0.8 mile W of the NW point of Ushagat Island. Two rocks awash at half tide are 220 yards NW and 0.5 mile ESE of the bare rock.

(978) Operators of small boats should take particular care to avoid being caught in the tide rips off the Barren Islands. With a moderate W sea, wind force 4 to 5, coaming seas in series of three to four high waves have been seen N of Nord Island with sufficient height and force to seriously endanger, if not swamp, the ordinary fishing launch. In moderate weather small boats should not leave these islands until the current sets with the sea.

(979) **Tidal currents** of considerable velocity are found in Kennedy Entrance and Stevenson Entrance, the flood current setting approximately NW and the ebb SE. Heavy tide rips occur with strong winds in the vicinity of the islands, and are frequently dangerous for small vessels. The wind among the Barren Islands is generally stronger than it is a few miles away.

(980) In the deep waters of Kennedy and Stevenson Entrances and their approaches, the current usually is regular and appears to have less force than along the sides of the passages. At the edges of the banks bordering the islands and on the detached 20- and 30-fathom banks, in fact wherever there is much change in depth, the current increases greatly in force. Such currents are usually, but not always, marked by ripples, eddies, or boils.

(981) Ebb currents set strongly to the E along the edge of the bank bordering the N side of the Barren Islands, to the S between Ushagat and Amatuli Islands, and to the E, N of Sugarloaf Island. The ebb currents are variable for a few miles S from the Barren Islands. Farther S, they set steadily SE.

(982) On the flood a narrow band of strong current will be felt a few miles N of the Barren Islands. Some lee from the flood current is afforded closer inshore, but even there a steady set to the W will generally be found.

(983) The current in general probably does not exceed 4 knots. Reports indicate that slack waters do not occur at the times of local high and low tides, and the navigator is cautioned against assuming such a relation to exist.

(984) **Kennedy Entrance,** one of the two main deep-draft entrances to Cook Inlet from the E, is between East Amatuli and Perl Islands. It has a clear width of about 7 miles, with general depths of 30 to 110 fathoms, though detached rocks and reefs extend 3 miles off Perl Island and 1.5 miles off East Amatuli Island.

(985) **Stevenson Entrance,** S of the Barren Islands, is the second main entrance to Cook Inlet from the E. It has a clear width of about 8 miles between the dangers that extend off the Barren Islands on the N and off Shuyak Island on the S, with general depths of 26 to 100 fathoms. The S shore of Stevenson Entrance is described in chapter 5.

(986) **East Amatuli Island,** at the E end of the group, has high peaks along its length, except 0.8 mile from the SW end where it drops to a valley having a level of less than 200 feet. A rocky islet, 118 feet high and 200 yards off the E end of the island, is marked by **East Amatuli Island Light** (58°54.9'N., 151°57.1'W.), 120 feet above the water, and shown from a skeleton tower with a diamond-shaped red and white daymark. A rock awash is 250 yards E of the light.

(987) **Puffin Peak,** with a conical top on East Amatuli Island, is the highest peak in the E group of the Barren Islands.

(988) **Amatuli Cove,** on the N side of East Amatuli Island and close to the W end, affords fair anchorage near its head for small craft, in 6 to 8 fathoms, sand and gravel bottom. With a heavy NE wind, considerable sea makes into the cove and the williwaws are heavy. Winds draw through the cove with great force, especially from the SE and S. The holding ground is not good. Kelp grows along the shores, and there is a small stream at the head of the cove.

(989) **West Amatuli Island** is mountainous. A cluster of rocks about 30 feet high is 0.5 mile E from the NE end of the island, with a reef between. A rock, 6 feet high, is 370 yards off the N point of the island. A rock awash at half tide, which does not always break, is 1 mile N of the 6-foot rock.

(990) **Sugarloaf Island** is 1.1 miles S from East Amatuli Island; deep water is between it and the other Barren Islands. A large grass-covered rock, 75 feet high, is 0.4 mile S of Sugarloaf Island, with foul ground between. A rock awash is 200 yards from the SW corner of the island and a 10-fathom bank, on which tide rips are common, is about 0.4 mile W.

(991) Sugarloaf Island is a Steller sea lion rookery site. There is a 3-mile vessel exclusionary buffer zone around the entire island. (See **50 CFR 227.12,** chapter 2, for limits and regulations.)

(992) **Nord Island** is 1.3 miles N from the E end of Ushagat Island with deep water between. Its S half is a dome 690 feet high, while its N half is lower and irregular.

(993) **Sud Island,** 1.1 miles off the SE side of Ushagat, is high near its SW end. Near its NE end is a knob 203 feet high. Islets, covered rocks, and rocks awash at low water, extend out 400 yards in many places around the island.

(994) A small rocky grass-topped island, 380 feet high, is 1.5 miles SSE from the SW point of Ushagat Island. Foul ground surrounds the island and extends almost to a bare rock 48 feet high, about 1 mile to the S. A low rock is between the island and the bare rock. Strong tide rips in this vicinity extend to the S of Ushagat Island. A barrier against the ebb current is formed by the island, rocks, and shoal area, which reduces the strength of the current along the SE shore of Ushagat Island.

(995) **Ushagat Island,** the westernmost and largest of the Barren Islands, is wide near its W end. Ushagat Island is grass covered except on the tops of peaks and where the cliffs are steep. The trees are spruce, ranging from about 50 feet high near the lake to 3 feet high near the W end. The island is practically inaccessible except at the low neck near the NE end, and at the beaches fronting the valley in the NW part. The summit of the island is the highest in the Barren Islands. **Table Mountain,** at the NE end, is separated from the other high land of the island by a low narrow neck. There are several brackish lakes which are probably fresh in the spring.

(996) Outlying rocks are to the N and W of the NW point of Ushagat Island. Outlying rocks and islets are to the S and W of the SW point of the island. The W side of the island is indented about 1 mile by a wide open bay with two bights. Good anchorage for all E winds can be had in the bight at the N end of the bay.

(997) Anchorage with shelter from S weather, and some protection from W weather, can be had off the N side of Ushagat Island near the head of the deep bight 2.5 miles from the NW promontory. Anchor in 12 to 15 fathoms, rock bottom, about 0.5 mile off the two small sand beaches. A small boat can get more shelter by anchoring close in.

(998) Good protection in N or W weather can be had in the bight on the S side of Ushagat Island, N of Sud Island. Williwaws are strong, but a small boat can avoid the worst of them by anchoring under the cliffs to the W of the head of the bight. A large vessel should anchor in 12 to 18 fathoms, rock bottom.

(999) **Charts 16645, 16646.–Chugach Islands** consist of mountainous East Chugach, Perl, and Elizabeth Islands near the coast of Kenai Peninsula at the entrance to Cook Inlet.

(1000) **East Chugach Island** has a low valley through the middle in a NE and SW direction. The S peak is 1,400 feet high, and the peak near the W end is higher. The SE point of the island is a cliff with a peak at its crest and slightly lower land between it and the mountains. The point is marked by **East Chugach Light** (59°06.4'N., 151°26.5'W.), 325 feet above the water, and shown from a skeleton tower with a diamond-shaped red and white daymark on the SE end of the island.

(1001) Considerable foul ground extends from the island into the passage to the N. A rock awash at low water is 0.5 mile off the NE point. A 4¼-fathom, kelp-marked shoal is 1.4 miles NE of the low-wooded spit at the NW end of the island. The passage is apparently clear between the 4¼-fathom shoal and the shoal area making off the points at the entrance to Chugach Bay.

(1002) The passage between East Chugach and Perl Island is clear, and is preferred by vessels passing inside of Perl and Elizabeth Islands, because it is considered safe and easy to navigate.

(1003) If the passage from Gore Point N of East Chugach Island is used, care should be taken to make proper allowance for the currents which set in and out of Port Dick and diagonally across the approach to East Chugach Island. This passage should not be attempted unless the weather is clear enough to use leading marks.

(1004) **Perl Island** is in the middle of the Chugach group. Its NW point is sandy on the W side and has a high cliff on the N side. Several cabins and a gravel airstrip are on the point. **Perl Island Light 1** (59°07.1'N., 151°38.3'W.), 80 feet above the water, is shown from a skeleton tower with a square green daymark on the extreme NE point of the island.

(1005) A pinnacle rock, covered 4½ fathoms, is about 0.5 mile off the SE side of the island.

(1006) **Perl Rock,** 87 feet high and marked by a light, is a large prominent detached rock about 0.5 mile S of Perl Island. A rock that uncovers is 185 yards W from Perl Rock.

(1007) **Nagahut Rocks,** about 50 feet high, are large prominent bare rocks, close together and about 1.5 miles W of the SW end of Perl Island. Rocks and foul ground are between them and the island. Safe passage between Nagahut Rocks and Perl Island is possible in depths greater than 20 fathoms, but extreme caution is advised.

(1008) **Dora Reef** is a small patch of covered rocks about 1 mile SW of Nagahut Rocks. The reef is steep-to and breaks at low water with moderate seas.

(1009) There is deep water in the passage between Elizabeth Island and Nagahut Rocks; however, a shoal of 6 to 9 fathoms is 0.4 to 1 mile E from the SE end of Elizabeth Island, and a shoal covered 4½ fathoms is 1 mile W from the W end of Perl Island.

(1010) **Chugach Passage** is between Perl and Elizabeth Islands and the rounded end of the mainland. A lighted buoy marks the NE side of the channel in the turn of the passage.

(1011) The end of the mainland is fringed with reefs, isolated rocks, and extensive kelp beds. In rounding it from the E, the outermost danger is a rock, bare at half tide, 0.4 mile off the S side of the rounding mainland shore.

(1012) Chugach Passage is commonly used by vessels entering Cook Inlet from E. Depths of 5½ to 10 fathoms were found in the shallowest part of the channel between the SE end of Elizabeth Island and the dangerous reefs that extend from the mainland. An abrupt rocky spot, covered 7 fathoms, is about 0.5 mile NW of the N end of Perl Island.

(1013) **Elizabeth Island** has two mountain masses, separated by a low valley that extends in a NW direction. The NE point is a sandspit marked at its outer extremity by a buoy. A depth of 1½ fathoms is 0.3 mile SE and a prominent large bare rock is 0.3 mile WSW, respectively, from the buoy. Cape Elizabeth is the W end of the island. **Cape Elizabeth Light** (59°08.8'N., 151°52.6'W.), 48 above the water, is shown from a square tower with a diamond-shaped red and white daymark near the S end of the cape. A submerged rock, dangerous to navigation, is 0.4 mile W of the cape.

(1014) **Currents, Chugach Passage.**–E of Elizabeth Island the flood sets N and the ebb S with velocities of 3.1 knots and 1.8 knots, respectively. Currents of about twice these velocities have been reported during heavy weather. (See the Tidal Current Tables for daily predictions.)

(1015) It is reported that the turn of the current in the main passage S of Elizabeth Island occurs earlier, possibly as much as 1 hour, than in Chugach Passage. In the area S of the Chugach Islands, tidal currents are much stronger near the islands than the deep water farther S.

(1016) Heavy tide rips occur from the NW end of Perl Island to the W end of the passage. The heaviest rips are in the vicinity of Perl Island with an ebb current and E wind. Heavy rips also occur off the SE point of East Chugach Island.

(1017) Detailed sailing directions for Chugach Passage are not considered necessary; the chart is the guide, having due regard for existing conditions of weather and set of current. Midchannel courses are clear in the approach to the passage N of East Chugach Island and between that island and Perl Island. Local knowledge is desirable.

(1018) **Port Chatham,** indenting the end of Kenai Peninsula N of Elizabeth Island, is a secure harbor for vessels of any size, and easily entered in the daytime with clear weather. During heavy gales some williwaws are felt at the anchorage, but they are not dangerous.

(1019) Below Chatham Island the shores on both sides of the entrance are foul, but above the island the main part of the harbor is clear. The dangers are marked by kelp with the water below half tide. The mountains on either side of the harbor rise abruptly from the water and are wooded about half way to the summits. The small cannery and wharf at Portlock on the S shore were in ruins in 1982.

(1020) **Claim Point,** on the W side of the entrance, is a wooded hill with a low wooded neck in back of it. Bare rocks and kelp extend about 250 yards off the SE side of the point.

(1021) **Chrome Bay** is on the N side of the entrance to Port Chatham.

(1022) **Kelp Point** is 0.5 mile NE from Claim Point. A bare rock is 250 yards S of Kelp Point, and a dangerous detached reef with rocks bare at low water is about 300 yards E of the bare rock. This reef is covered by kelp, but usually the kelp does not show at high water.

(1023) **Chatham Island,** small, low, rocky, and partly wooded, is in the middle of Port Chatham, about 1.2 miles inside the entrance. **Port Chatham Entrance Light** (59°12.6'N., 151°46.5'W.), 40 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the W point of the island.

(1024) The channel leads W and N of the island, and the only known danger is a rock covered 1¼ fathoms, 500 yards N of the light. The rock is marked on its W side by a buoy. There is deep water on either side of the rock. A depth of 5¼ fathoms was found 250 yards SW of the light.

(1025) The passage E of Chatham Island is foul and should not be attempted by strangers. A rock, covered 2¼ fathoms, is 0.4 mile from the E shore and 0.7 mile 165° from Chatham Island Light.

(1026) On the E side, 0.6 mile NE from Chatham Island, is a projecting rocky, wooded point, where the port changes direction. The opposite side, NE from this point, is a low grassy spit. A lumber camp is on the spit.

(1027) **Anchorages.**–The best anchorage is in the broad part of the harbor 0.3 mile SE of the spit, in 10 to 13 fathoms, soft bottom.

(1028) At the E end of the harbor are rocks showing but little above high water. On the S shore, 188° from these rocks, water can be obtained by boats which can be placed under a waterfall at the higher stages of the tide. Just N of the low spit is an excellent place for beaching a vessel.

(1029) **Routes.**–When entering Port Chatham from Cook Inlet it is well to keep at least 0.5 mile S of Claim Point and Kelp Point. When approaching from Chugach Passage, the white scar on the cliffs E of Kelp Point is a good mark. Keep midchannel between Chatham Island and the N shore, passing about 100 yards S of the buoy marking the 1¼-fathom rock N of the light. From there to the anchorage keep in midchannel.

(1030) **Tides and currents.**–The diurnal range of tide is 14.3 feet at Port Chatham. The tidal currents have little velocity in the entrance and harbor, but in the approach on either side of Elizabeth Island there are strong tidal currents, and at times tide rips.

(1031) The coastline between Port Chatham and Koyuktolik Bay is foul, and thick kelp extends as much as 0.5 mile offshore.

(1032) **Koyuktolik Bay** is about 5 miles WNW of Port Chatham. Its N shore consists of bare rocky cliffs, while the S shores are lower. The S entrance point is a low yellow bluff. Rocks and reefs extend 0.2 mile from the S entrance point. Temporary anchorage for a moderate-sized vessel, in 8 to 10 fathoms, hard bottom, can be found 0.5 mile from the head of the bay. In heavy weather a considerable swell may reach this anchorage. It is constricted by a sand and gravel shoal that extends from the S shore near the entrance to a lagoon and by rocks that uncover off the N shore. The lagoon is navigable by skiff at high water.

(1033) **Point Adam,** just W of Koyuktolik Bay, is low at the end, and rises in a steep grassy slope to mountains. **Magnet Rock** is 3.3 miles 345° from Point Adams and about 0.5 mile off **Point Bede.** The rock is 25 feet high, black, and prominent.

(1034) **Flat Island,** 1.4 miles N from Magnet Rock, is small, flat, and grass covered; it is composed of two closely connected islands joined by bare reefs. **Flat Island Light** (59°19.9'N., 151°59.7'W.), 70 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the NW point of the northernmost island. The island is surrounded by kelp. A group of rocks that uncover and marked by kelp are 0.2 mile off the W side of Flat Island. Heavy tide rips occur in the area between Point Bede, Magnet Rock, and Flat Island.

(1035) **Chart 16646.–Port Graham,** on the E side of Cook Inlet, 4 miles NE of Flat Island, is a secure harbor inside Passage Island, and with care is easily entered in the daytime. Its entrance between Russian Point on the S and Dangerous Cape on the N, has extensive outlying reefs, covered at various stages of the tide. The dangers are generally steep-to and marked by kelp.

(1036) **English Bay** is an open bight on the W side of **Russian Point** (59°21.6'N., 151°55.3'W.). **English Bay Reef,** bare at low water, is about 1 mile W of Russian Point. There is broken bottom and thick kelp between the reef and the foul ground that extends from Russian Point; strangers should not cross this area. Depths of 3¼ and 5 fathoms are about 0.5 mile SSW of English Bay Reef. **English Bay,** a small native settlement, is on the NE side of English Bay. A gravel airstrip is near the village.

(1037) **Dangerous Cape** (59°24.0'N., 151°54.3'W.) is on the N side of the entrance to Port Graham. **Dangerous Cape Reef** extends 0.5 mile W from the W side of the cape. **Bird Reef,** 250 yards long, is 0.6 mile S from Dangerous Cape. The highest rock at the N end of the reef is covered at extreme high tide. The shore reef inside of Bird Reef is composed of rocks which uncover and some bare rocks. A detached rock, covered 1¼ fathoms, is in the channel between Bird Reef and the shore reef. Midway between Bird Reef and Passage Island, and 0.5 mile from the N shore, is a small shoal with 2½ fathoms, marked by a buoy. Vessels should pass S of it, as another shoal makes out 650 yards from the shore.

(1038) **Passage Island,** 1 mile inside the entrance, is high and wooded. It is generally fringed with reefs to a distance of 150 yards, and a shelving spit, covered at high water, extends 350 yards E from its E end. The end of this spit is marked by a buoy. A reef, with numerous rocks bare and covered at various stages of the tide, extends 0.9 mile WSW from the W end of the island. **Port Graham Entrance Light** (59°22.3'N., 151°54.1'W.), 50 feet above the water, is shown from a small house with a red and white diamond-shaped daymark on the N end of the island.

(1039) Rocks, bare at low water and marked by a buoy, are 250 yards W of the point on the N shore E of Passage Island. This is the worst danger in the entrance. The channel has a width of 250 yards between the rock and the reef fringing Passage Island.

(1040) The only serious danger E of Passage Island is a narrow, submerged reef with kelp that extends halfway across Port Graham from the N shore 0.6 mile SE of Passage Island, and is marked at the S end by a buoy. There are small streams on the shores of the port and a large stream and valley are at its head.

(1041) **Port Graham** has a cannery and pier on the S side, 1.9 miles beyond Passage Island. The pier has a 100-foot face with 15 feet reported alongside. The cannery is owned by Port Graham Corporation and has not been in use since the Valdez Oil Spill of March 1989. A small store is in the village. A commercial air taxi makes runs to Homer and Seldovia, weather permitting.

(1042) About 900 yards NW of the wharf is a shoal that extends about 300 yards offshore and marked at its outer end by a buoy.

(1043) **Anchorages.**–Temporary anchorage for a small vessel can be selected in the middle of **Coal Cove,** inside Dangerous Cape, in 5 to 10 fathoms, rocky bottom; the shore of the cove is fringed with kelp to a distance of 350 yards. The cove should be approached with caution. A better anchorage with more room will be found in the bight on the N shore, N of Passage Island, in 7 to 10 fathoms. These anchorages are exposed to a heavy swell in S or W weather.

(1044) When inside Passage Island, anchorage in 10 to 17 fathoms can be had in any part of Port Graham except the

cable area about 0.9 mile ESE of the wharf. One of the best is N or NE of the wharf, in 10 to 13 fathoms, sticky bottom. The cove SE of the wharf is shoal.

(1045) **Routes.**–The safest time to enter Port Graham is at low water, and the better entrance is N of Passage Island. The channel S of Passage Island should not be used by strangers. The chart is the guide.

(1046) The entrance S of Passage Island is approached through a narrow unmarked channel with depths of 6 to 8 fathoms over a rocky bar N of Russian Point. The bar channel rounds a reef, bare at low water, that extends 600 yards N from Russian Point.

(1047) **Tides and currents.**–The diurnal range of tide is about 16.5 feet. Strong tidal currents, both ebb and flood, set across the mouth of the harbor, but there is little current at or inside of Passage Island. With opposing wind and current, heavy tide rips occur off and well N and S of the entrance to Port Graham.

(1048) **Point Pogibshi** (see also chart 16645) is a prominent flat-topped grassy point about 50 feet high, with rocky sides, on the E side of Cook Inlet 1.5 miles N of Dangerous Cape. At this point the coast changes direction NE for about 5 miles to Seldovia Bay. **Point Pogibshi Light** (59°25.5'N., 151°53.1'W.), 94 feet above the water, is shown from a skeleton tower with a diamond-shaped red and white daymark on the S side near the end of the point.

(1049) Kelp extends 0.5 mile off the bight 2.7 miles NE of Point Pogibshi.

(1050) **Seldovia Bay,** 7 miles NE of Port Graham, is a secure harbor in any weather. There are several shoals covered less than 3 fathoms in the entrance, and the inner part of the bay is very shoal.

(1051) **Point Naskowhak** (59°27.3'N., 151°44.4'W.), on the W side of the entrance to Seldovia Bay, is the N of two small high rocky wooded knobs which stand on a low grassy spit surrounding a lagoon. A reef with rocks awash extends about 0.1 mile N from the point, and kelp-marked broken ground extends almost 0.5 mile NE. Kelp-marked shoals with a least depth of 2 fathoms are 700 yards ENE from the point.

(1052) **Gray Cliff,** the E entrance point of Seldovia Bay, is a bare rock cliff 60 to 70 feet high. **Seldovia Bay Entrance Light** (59°27.1'N., 151°43.3'W.), 64 feet above the water, is shown from a small house with a red and white diamond-shaped daymark at the S end of the cliff.

(1053) **Seldovia Point,** 1 mile N of Gray Cliff, is a 200-foot-high cliff, wooded on top. A shoal with a least depth of 2¼ fathoms is about 0.4 mile N of the point. Kelp extends 0.6 mile from shore in the bight NE of the point.

(1054) **Red Bluff,** 0.2 mile S of Gray Cliff, is high and reddish in color. Foul ground extends from the bluff to about 0.2 mile W and 0.1 mile SW. Several groundings have been reported on the rocks in the vicinity of Seldovia Bay Lighted Buoy 1; caution is advised. A rock that uncovers 4 feet is about 300 yards W of the bluff. This rock is steep-to on its W side and the principal danger in the bay.

(1055) **Watch Point,** 0.6 mile S of Gray Cliff, is a small 30-foot-high grassy head with a few trees and a short low grassy neck behind it. A high pointed rock is near the E shore 300 yards N of the point.

(1056) **Seldovia Bay Light 3** (59°26.5'N., 151°43.3'W.), 45 feet above the water, is shown from a small house with a square green daymark off the end of Watch Point. Kelp-marked rocks with a least depth of ¾ fathom are between the light and the Seldovia waterfront to the S.

(1057) **Seldovia,** on the E side of Seldovia Bay just S of Watch Point, is a fishing and logging town. It has a cannery, some stores, hotel, hospital, and churches. A local magistrate is in the town.

(1058) **Channel.**–The channel to Seldovia is from 400 yards to 100 yards wide between the shoals and rocks that extend from either side of Seldovia Bay. These obstructions are marked by kelp at slack water in summer and fall, but the kelp tows under during the strength of the tidal currents. In August 1984, the buoyed channel had a controlling depth of 18 feet.

(1059) **Anchorages.**–The best anchorage is in the middle of Seldovia Bay,0.8 mile S of Seldovia Bay Light 3, in 9 to 10 fathoms, sticky bottom. A small vessel can anchor in the channel W of Seldovia with Red Bluff open W from Watch Point and the charted church cross bearing 068°.

(1060) **Tides and currents.**–The diurnal range of tide is 17.8 feet at Seldovia. (See the Tide Tables for daily predictions.) Additional information on the predicted hourly heights of the tide can be obtained from the publication "Supplemental Tidal Predictions - Anchorage, Nikiski, Seldovia, and Valdez, Alaska," published by the National Ocean Service. The tidal currents have an estimated velocity of 1 to 2 knots.

(1061) **Wharves.**–Seldovia has three piers and a small-boat harbor.

(1062) City Pier: an L-shaped pier 200 yards S of Watch Point; 210-foot face; 25 feet reported alongside; deck height, 27 feet; gasoline, diesel fuel, electricity, and water are available year-round; ¾-ton hoist; receipt of petroleum products and general cargo; Alaska Marine Highway Ferry Terminal; owned by the City of Seldovia.

(1063) Pacific Pearl Seafood Pier: an L-shaped pier just behind and N of the City Pier; 87-foot face; 14 feet reported alongside; one ¾-ton and one 1½-ton hoists; receipt of king crab for the cannery; owned and operated by Pacific Pearl Seafood Co.

(1064) **Seldovia Small-Boat Harbor,** about 0.2 mile S of City Pier, is protected by breakwaters. A light marks the end of the N breakwater. In July 1991, the controlling depth was 12 feet in the entrance channel and basin except for shoaling to 10 feet near the SE corner of the basin. A local extension at the SE end of the basin had depths of about 6 to 10 feet. The harbor provides moorage for 140 vessels; some transient spaces are available. The **harbormaster** assigns berths. The harbormaster's office, at the N end of the small-boat harbor parking lot, monitors VHF-FM channel 16 and can be contacted by calling 907-234-7886. Water and electricity are available at the floats and fuel is available. A 102-foot and a 106-foot grid are in the basin. The basin is owned by the State and operated by the city.

(1065) **Supplies** and **repairs** are limited.

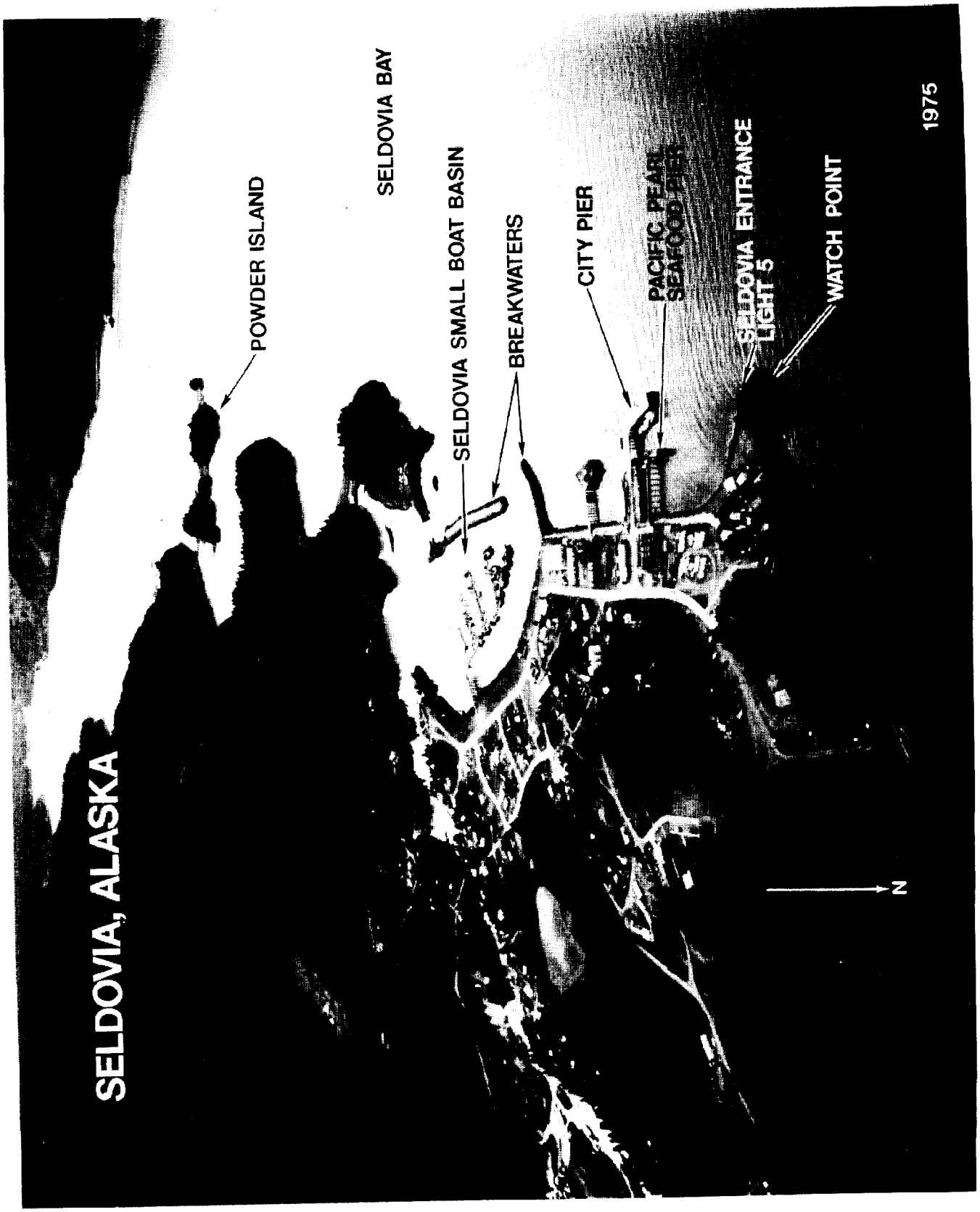
(1066) **Communications.**–The Alaska Marine Highway System has scheduled ferry service from Seldovia to Homer and Kodiak. Small commercial ferries make daily runs in the summer to Homer. A commercial air taxi makes runs to Homer and Port Graham, weather permitting. A gravel road leads to Jakolof Bay.

(1067) Landline telephone, radiotelephone, and radiotelegraph communications are maintained.

(1068) **Seldovia Slough,** just S of the small-boat harbor, leads E and N to **Seldovia Lagoon.** It is dry at low water and only navigated by skiffs.

(1069) The remainder of the cove is nearly dry at extreme low water. A grassy head with a few trees forms the SW side of the cove that is joined to the main shore by a low narrow neck.

(1070) **Chart 16645.–Kachemak Bay** is a large bay on the E side of Cook Inlet. The entrance is between Seldovia Point (59°28.3'N., 151°42.0'W.) on the S and Anchor Point


SELDOVIA, ALASKA
POWDER ISLAND
SELDOVIA BAY
SELDOVIA SMALL BOAT BASIN
BREAKWATERS
CITY PIER
PACIFIC PEARL SEAFOOD PIER
SELDOVIA ENTRANCE LIGHT 5
WATCH POINT
N
1975

(59°46.8'N., 151°52.0'W.) on the N. It affords excellent anchorage for vessels of all classes and sizes.

(1071) **Weather.**–Winds in the Kachemak Bay area are predominantly from the NE from late fall to early spring. During the rest of the year, SW winds are the most frequent. Winds are strongest during the late summer and early fall.

(1072) **Fogs** are common to the area. Ground fogs occur most frequently in winter with the heaviest fogs reported to be in January. Homer and Seldovia occasionally report fog conditions. The more frequent occurrence is in the summer when it may last for days at a time. It is reported that fog banks frequently hang over the open water after harbors have been cleared.

(1073) The annual mean temperature of the area is reported to be about 35°F. July and August are usually the warmest months. The temperature can range from a high of nearly 90°F in the summer to well below zero in the winter.

(1074) **Ice** forms in the freshwater streams and within areas of relatively little water movement. The boat harbor at Homer will pack with slush and pan ice during the colder periods, but rarely halts small-boat traffic completely. The headwaters of Jakolof Bay reportedly will form ice, but it is not considered a problem to navigation.

(1075) **Caution.**–Heavy concentrations of fishing vessels, crabpots, and fixed fishing gear are in Kachemak Bay. Marker buoys on some of the fixed gear may be submerged at half tide and invisible at higher tides. Vessels transiting to and from Homer not more than 2 miles seaward of the 10-fathom curve from Anchor Point to Bluff Point should clear the fixed gear.

(1076) **Nubble Point,** 4.2 miles NE of Seldovia Point, is a long sandspit, terminating in a rocky knoll, which may be mistaken for Point Naskowhak if not sure of the position. The E part of the point is wooded.

(1077) **Kasitsna Bay,** between Nubble Point and **Herring Islands,** has anchorage in 12 to 15 fathoms, good holding ground. The water shoals abruptly to the shore and to the flat which fills the cove formed by Nubble Point; the flat in the cove will be avoided by keeping the E end of the point bearing W of 014°.

(1078) Two rocks close together and marked by a buoy on the NE side are 0.5 mile NE of the N end of Nubble Point. The W rock is covered 2 fathoms and the E rock bares at extreme low water. The buoy marks the entrance between the rocks and Hesketh Island. A shoal with a least depth of 5½ fathoms is 500 yards SE of the rocks. A least depth of 12 fathoms was found between the rocks and Nubble Point by giving the N end of the point a berth of over 200 yards. A private mooring buoy is 1.3 miles SSW of the buoyed rocks.

(1079) In 1981, the NOAA Ship RAINIER found numerous uncharted rocks and shoals while surveying in the vicinity of the Herring Islands; caution is advised.

(1080) **Jakolof Bay** is entered at the SE corner of Kasitsna Bay. Private ferries make occasional runs between Jakolof Bay and Homer in the summer months. An overhead power cable with a clearance of 51 feet crosses the entrance of the bay.

(1081) Jakolof Bay is a long, narrow finger of water about 1.7 miles long and 0.25 mile wide, lying in a general NNW and SSE direction. The entrance to the bay is about 0.125 mile wide and unmarked. A small island which connects to the W shoreline at lower stages of tide is located near the center of the entrance. However, a rock ledge extends outward from the island an estimated 250 feet or more, reducing the clear channel to about 250 feet or less. In 1981, the NOAA Ship RANIER reported a clear depth of about 20 feet at zero tide in the easternmost 250 feet of the channel. The E shoreline drops away to maximum depth very rapidly. A rock, covered 10 feet, is about 140 yards SSE of the island at the entrance. A shoal, covered 15 feet, is about 270 yards inside the entrance and about 85 yards off the E shore. A shoal, covered 5 feet, is about 700 yards SE of the entrance, and a rock, covered 4 feet, is about 300 yards SE of the shoal. Navigation above this point is not recommended as the bottom shoals rapidly toward the S shore.

(1082) A small floating pier, maintained by the State, is on the W shore about 0.2 mile inside the entrance to the bay. Berthing is available at the pier for about 15 to 20 small boats. Depths of about 25 feet were reported in the center of the bay to the E of the floating pier.

(1083) Both ebb and flood currents reportedly run fair with the E shoreline of the bay. Small eddies formed by the current have been observed near and in the entrance during a period of approximately half floodtide. The reported maximum velocity of the ebb and flood currents is about 3 knots. The average is reported to be 1.5 knots.

(1084) **Hesketh Island, Yukon Island,** and **Cohen Island** are high and wooded. An islet is on the reef that extends 0.5 mile NW from Hesketh Island. **Cohen Island Rock Light** (59°33.0'N., 151°27.9'W.), 79 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on **Sixty-foot Rock** at the N end of a reef that extends 0.3 mile N from Cohen Island. The light shows a higher intensity beam toward Cook Inlet. There is a prominent yellow cliff on the W end of Cohen Island. The passage between Yukon Island and Hesketh Island has a 2-fathom shoal in midchannel at both ends. **Eldred Passage,** E of the islands, is deep near the middle, except at the N end where there is a bar on which the least depths found were 8 to 12 fathoms.

(1085) **Tutka Bay** has no desirable anchorages for large vessels. Broken ground, on which some pinnacle rocks have been found, extends across the entrance. There is an abandoned salmon cannery on the shore just E of the southernmost island in Tutka Bay, 3 miles inside the entrance. It is a difficult place for large vessels. Just NW of this island is a half-tide rock that closes the channel behind the island to all but small boats. An overhead power cable with a clearance of 78 feet crosses the narrow part of the bay. Mariners are warned that numerous submerged rocks and rocks awash, some in relatively deep water, have been found in the various coves and in Tutka Bay; caution is advised.

(1086) **Tutka Bay Lagoon** is about 4 miles inside the mouth of Tutka Bay on the SW side. The Lagoon, well protected, has depths to 27 feet. The entrance, a small narrow channel, is a stream except at high water. The sill which holds the lagoon is at the head of this channel and is about 10 feet above low water. Boats up to 30 feet in length can enter the lagoon at high water. The entrance to the channel is protected by a rock awash and a 1-fathom submerged delta plain that extends about 0.25 mile offshore.

(1087) **Sadie Cove,** the inlet in the E side of Eldred Passage, is not completely surveyed W of the bend but is apparently clear near midchannel. Foul ground extends about 0.2 mile off the N and S entrance points. An overhead power cable with a clearance of 170 feet crosses the mouth of the cove. Anchorage for large vessels can be found at midchannel where the cove bends S, in 13 to 15 fathoms.

(1088) **Lancashire Rocks,** 1.8 miles NE from Cohen Island, are awash. They are 0.5 mile offshore with foul ground inshore from them.

(1089) **Gull Island,** 93 feet high, marked by a light, 5 miles NE from Cohen Island, is among a group of prominent bare rocks that are visible about 10 miles. **China Poot Bay,** S of Gull Island, is nearly dry at low water. An overhead power

cable with a clearance of 152 feet crosses near the head of the bay. A narrow channel is along the NE side of the bay. It terminates at a small lagoon at the head of the bay. A well protected anchorage can be found in the lagoon in 3 to 5 fathoms; the bottom is mud. Transiting the channel at low water, in a boat larger than a skiff, should not be attempted without local knowledge. **Peterson Bay,** 1.5 miles N of China Poot Bay, provides good protection from E-W winds. A foul area exists around the small islands near the head of the bay. A 5 to 7 fathom channel on the W side of the foul area runs to the head of the bay. A submerged rock covered 8 feet is in the center of the channel abeam of the largest island. Depths at the head of the bay are 6 to 14 fathoms.

(1090) **Charts 16645, 16646.-Homer Spit,** on the N side of Kachemak Bay, is a low gravel and shingle spit, partly covered with grass. It is 4.5 miles long and from 100 to 500 yards wide. It is described as the longest inhabited spit in the world.

(1091) **Coal Point,** the outer end of Homer Spit, is marked by **Homer Spit Light** (59°36.0'N., 151°24.6'W.), 34 feet above the water and shown from a tower on top of a hotel roof. A private flashing light, visible from seaward and shown from a 35-foot brown tower, is about 0.4 mile **284°** from Homer Spit Light. Care must be taken not to confuse this light with the breakwater light, which is not visible over the spit.

(1092) **Coal Bay,** the bight NE of Homer Spit, is shoal but there are no outlying dangers.

(1093) **Homer,** at the base of of Homer Spit, is a fishing and tourist town with several stores, hotels, and a small hospital. From Homer it is about 143 miles to Anchorage, 158 miles to Seward, and 1,313 miles to Seattle.

(1094) **Prominent features.**–Homer Airport, at the base of Homer Spit, has an aerolight and approach lights that are aligned with the runway. When lighted, the approach lights are highly visible, however, they are lighted only when needed by aircraft.

(1095) **Anchorage.**–Excellent anchorage can be had 0.8 mile or more N of Homer Spit Light, in 10 to 15 fathoms, soft bottom.

(1096) **Weather.**–The climate of Homer is marine but with precipitation amounts modified by the Kenai Mountains. The annual precipitation is reduced when air being lifted over the mountains leaves most of its moisture on the windward side. For this reason the usual Gulf Coast amount of near 60 inches is reduced to less than half that amount. The relatively low annual snowfall is a reflection of the midwinter temperatures. Often precipitation will begin as snow but turn to rain shortly afterwards. The occurrence of the heaviest monthly amounts during the fall and winter months is the result of the increased frequency of storms into the Western Gulf of Alaska during those months.

(1097) Temperatures experienced at Homer are more nearly representative of marine climate than is precipitation. Winters are mild, seldom getting colder than 0°F and summers are cool with the maximum temperature seldom going above 70°F. The range between average maximum and minimum temperatures does not exceed 16 degrees during any of the 12 months. The freeze-free period on the average begins in late May and ends in mid-September.

(1098) Surface winds at the station are seldom strong even in winter. However, a short distance to the SE, over Kachemak Bay, and to the W over Cook Inlet, wind speeds requiring warnings to small craft are fairly common in winter and summer.

(1099) The occurrence of a thunderstorm is rare. Heavy fog is infrequent and of short duration, but patchy ground fog is common in spring and fall.

(1100) **Tides.**–The diurnal range of tide is 18.1 feet at Homer.

(1101) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(1102) Vessels en route Cook Inlet ports, Homer, Kenai, Anchorage, etc., meet the pilot boat about 1 mile S of Homer Spit Light (59°36.1'N., 151°24.5'W.) in Kachemak Bay, off Homer.

(1103) The pilot boat can be contacted by calling "MARY DELE" on VHF-FM channels 10 and 16, or through the Southwest Alaska Pilots office at Homer, call sign, KCE-203, on the same frequencies. The pilot boat is a 42-foot trawler with a green hull, and a white deckhouse with the word "Pilot" shown on the forward side on the house. Vessels picking up a pilot should maintain a speed of about 6 knots and have the pilot ladder 3 feet above the water. The pilot boat displays the appropriate day and night signals when on duty.

(1104) **Caution.**–Ships entering Kachemak Bay to pick up a pilot off Coal Point before continuing into Cook Inlet have been reported coming dangerously close to the **Archimandritof Shoals,** which extend W from Homer Spit and are marked on the SE side by a lighted buoy. These instances occur with foreign ships or strangers to the area who are piloting on small-scale British Admiralty Charts, which do not show these shoals. The strangers tend to steer for the lights of Homer. Mariners are advised to use the largest scale chart available for this area and to give these shoals a wide berth.

(1105) **Customs** and **Immigration** are handled by Anchorage officials on advanced notice.

(1106) **Quarantine.**–A U.S. Public Health Service Contract Physician is located at the hospital in Homer. (See appendix for additional information.)

(1107) Two **Coast Guard** Cutters are stationed in Homer.

(1108) **Harbor regulations.**–The waterfront facilities are operated by the City of Homer. The City Pier and Fish Pier (in the small-boat harbor) are administered by a Port Director (telephone, 907-235-2964); his office is 300 yards WSW of City Pier. The Port Director's office monitors VHF-FM channel 16. The small-boat harbor is administered by a harbormaster (telephone, 907-235-3160); his office is on the SW side of the small-boat harbor.

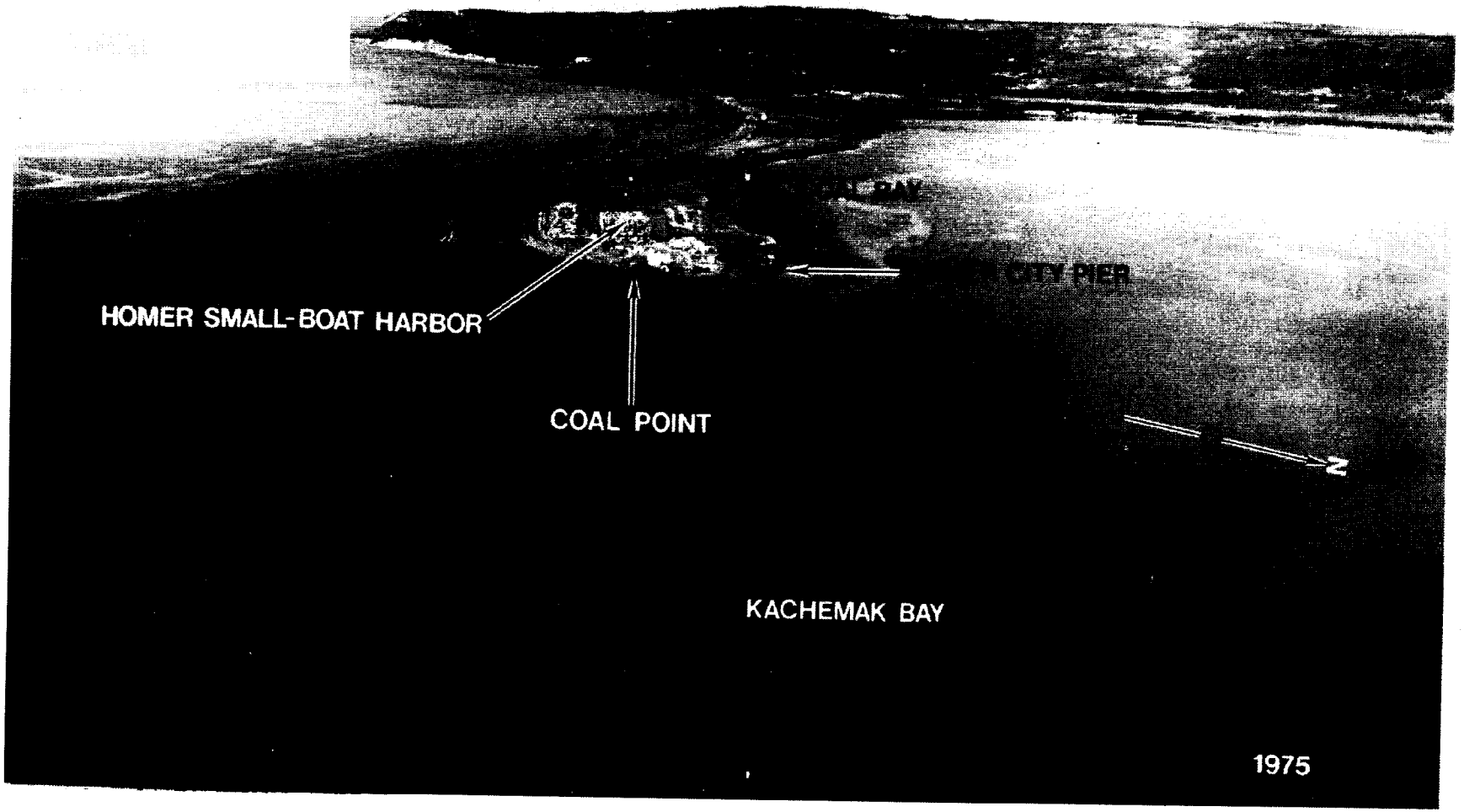
(1109) **Wharves.**–Homer has 2 deep-draft piers and a small-boat harbor.

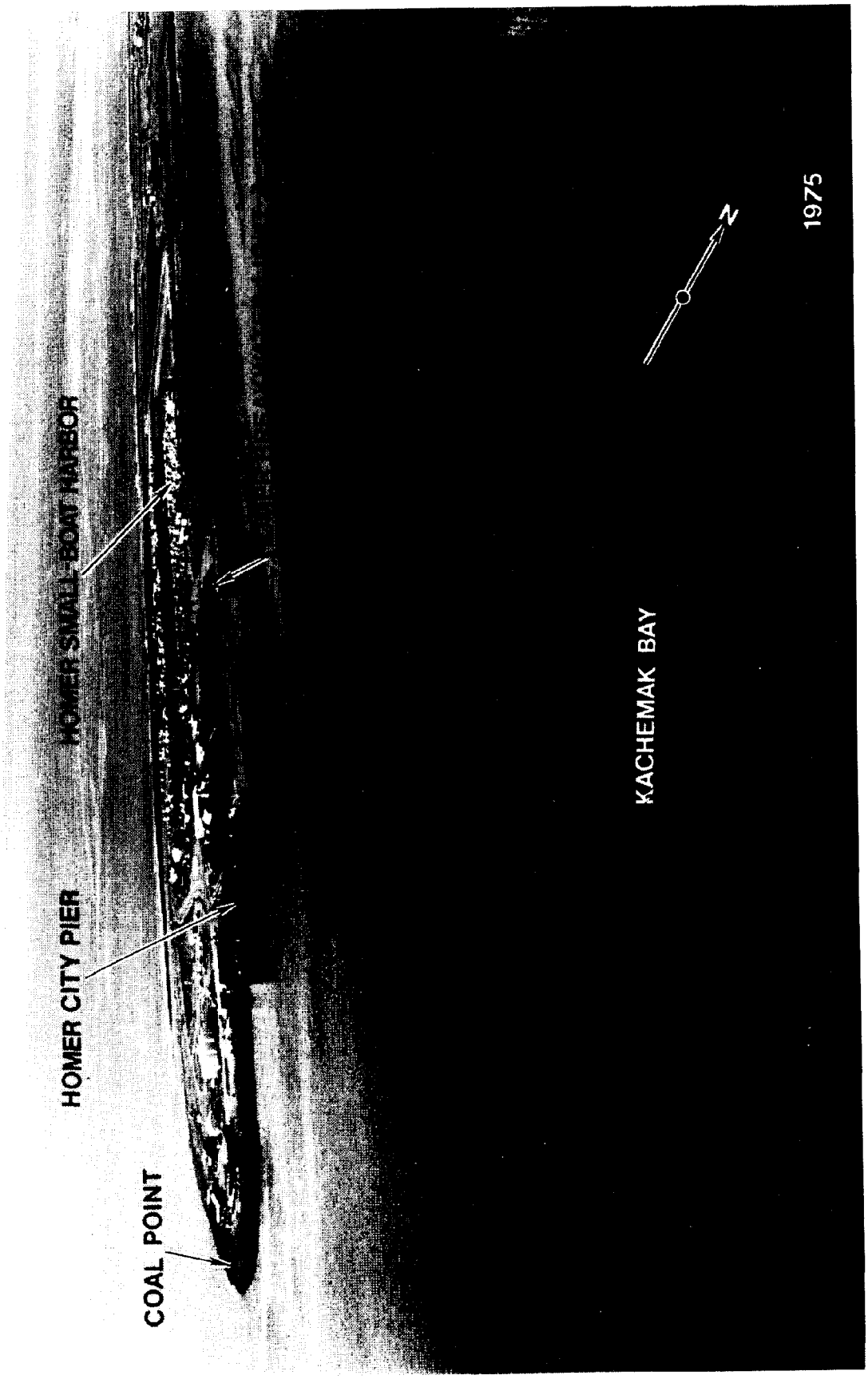
(1110) **Homer City Pier:** on the N side of Coal Point; 410-foot offshore wharf with about 30 feet alongside, 62-foot SE face with 12 feet reported alongside, and 144-foot NW face, used for mooring a Coast Guard cutter, with about 20 feet reported alongside in August 1989; Alaska Marine Highway System Terminal; receipt and shipment of general cargo and petroleum products; pipelines extend from the wharf to storage tanks in rear, total capacity 732,250 barrels; water is at the pier; ice is supplied at the pier seasonally by the city and year round by Seward Fisheries; owned by the city of Homer and operated by city of Homer, Chevron, U.S.A., Inc., U.S. Coast Guard, and the State. Shoaling to about 10 feet exists 100 yards NW of the NW pier face.

(1111) Pilings of an old pier may exist just SE of Homer City Pier.

(1112) **Homer Spit Deep Water Pier:** just NNW of Homer Breakwater Light 2 and marked by private lights, extends 527 feet offshore; 324-foot E face with 40 feet reported alongside, additional 200 feet with mooring dolphin; 240-foot W face with 30 feet reported alongside; 110 x 116-foot staging area on main pier. A 150-ton mobile crane, 40-ton

HOMER SPIT, ALASKA




HOMER SPIT, ALASKA
COAL POINT
HOMER CITY PIER
HOMER SMALL BOAT HARBOR
KACHEMAK BAY
N
1975

forklift, and pumpout station are available; owned and operated by the city of Homer.

(1113) From January to March, ice floes interfere with operations of Homer City Pier. During heavy ice floes, cargo barges use a wharf in the small-boat harbor.

(1114) **City of Homer Fish Dock:** on the E side of small-boat harbor; 383-foot face with 20 feet alongside; deck height, 31 feet; receipt of fish and handling of fish equipment; owned by city of Homer and operated by Seward Fisheries, division of Icicle Seafood Inc.

(1115) **Homer Small-Boat Harbor,** protected by a breakwater, is just NW of the City Pier. A light on the outer end of the breakwater marks the entrance. In August 1992, the controlling depths were 18 feet in the entrance channel, thence in 1989, 14 to 20 feet in the SE part of the basin and in November 1989, 10 to 15 feet in the NW part with lesser depths toward the SW edge.

(1116) The harbor has moorage for about 740 vessels with some transient spaces; the **harbormaster** assigns berths. The harbormaster's office monitors VHF-FM channel 16; channels 10 and 68 are used as working frequencies. During the summer this basin is very crowded. Electricity is available on the floats, and gasoline, diesel fuel, and water are available at a floating fuel pier at the SE end of the basin. A 100-foot grid, a 168-foot grid, and a launching ramp are also available. The basin is owned by the State and operated by the city.

(1117) From January to March, ice floes clog the entrance channel and cause the NW part of the basin to freeze, limiting the use of the basin to the first three finger piers.

(1118) **Supplies and Repairs.**–Provisions, water, ice, gasoline, diesel fuel, and some marine supplies are available. A machine shop is in town.

(1119) **Communications.**–Landline telephone, radiotelephone, and radiotelegraph service are available in Homer. Scheduled air service is available to Anchorage, and air taxies run to Seldovia and Port Graham. The Alaska Marine Highway System makes scheduled runs to Seldovia and Kodiak, and private ferries make runs to local communities during the summer. Homer is connected with the Alaska Highway System.

(1120) **Halibut Cove,** on the S shore about 6 miles E of Homer Spit, affords excellent anchorage in 23 fathoms with good holding bottom. **Halibut Cove Light 2** (59°36.0′N., 151°12.9′W.), 70 feet above the water, is shown from a small white house with a red triangular daymark on the NE point of **Ismailof Island** on the S side of the cove. A daybeacon, 0.3 mile S of the light, marks a rock awash. Shoals of 4 and 5 fathoms are near the middle of the cove due E of the light. The village of Halibut Cove has a school. The community of Halibut Cove operates a small-craft float facility at the community center, providing about 1,000 feet of berthing space.

(1121) **Halibut Cove Lagoon,** at the head of Halibut Cove, has depths to 38 fathoms. The lagoon is isolated at low water by a gravel bar which reduces the entrance to a swift, shallow stream. At high water, the navigable channel on the NW side of the entrance is not well defined; local knowledge is advised.

(1122) **Bear Cove,** on the S side of Kachemak Bay near the head, offers good anchorage in 12 fathoms, although the williwaws are violent and the swinging room is constricted. A pinnacle rock which covers at high water is near the middle of the entrance to the cove.

(1123) The head of Kachemak Bay consists of extensive mudflats. The N side is bordered with mudflats and the 10-fathom curve is about 2 miles offshore. From this curve the water shoals abruptly toward shore.

(1124) From Homer Spit to **Anchor Point** the coast is a line of bluffs, with the greatest height of 750 feet at **Bluff Point.** In front of the bluff is a narrow rock and shingle beach. Numerous hazardous rocks are offshore between Homer and Anchor Point. The depths inside the 10-fathom curve are irregular, and there is a possibility of detached boulders not found by the survey. **Anchor Point Light** (59°46.1′N., 151°52.0′W.), 41 feet above the water, is shown from a skeleton tower with a diamond-shaped red and white daymark on the point.

(1125) **Charts 16640, 16661.**–The main bluff line recedes about 0.4 mile from the shore at Anchor Point (59°46.3′N., 151°52.0′W.) and approaches the coast again about 1 mile to the N, then continues close to the shore up to Cape Starichkof. The bluff attains an elevation of 270 feet 2.8 miles N of Anchor Point, then gradually descends to the N.

(1126) At **Cape Starichkof** about 7 miles NNE of Anchor Point, the bluff recedes again, is less steep, and is covered with vegetation. N of the cape the bluff follows the shore, varies from 100 to 240 feet in elevation, and continues nearly to **Cape Ninilchik** about 15.5 miles NNE of Anchor Point.

(1127) From N of Anchor Point to Cape Ninilchik, the coast is free from dangers so far as known, and anchorage can be selected in sand bottom. The survey vessel used an anchorage close inshore just N of Cape Starichkof, in 6 to 7 fathoms. The holding ground is fair, and there is some shelter from S weather.

(1128) The 1,900-foot peak 10 miles back of Cape Starichkof is sharp with a high saddle between it and a slightly lower peak just S. It is the only prominent and distinctive highland feature between Anchor Point and Forelands. A lighted parabolic antenna is on Cape Starichkof.

(1129) **Deep Creek,** 2 miles SW of Ninilchik, is recognized from seaward by a break in the bluff 0.4 mile wide. A gravel road leads from Sterling Highway to the beach and a State camping ground.

(1130) **Ninilchik,** a fishing settlement at the mouth of Ninilchik River, has a small-boat basin and cannery. A Russian Orthodox Church on the bluff above the village is prominent from offshore.

(1131) **Ninilchik Small-Boat Harbor,** 400 feet above the mouth of the Ninilchik River, is 400 feet long by 125 feet wide and used by fishing boats.

(1132) **Ninilchik Channel Entrance Light** (60°03.3′N., 151°39.9′W.), 15 feet above the water, is shown from a spindle with a red and white diamond-shaped daymark on the seaward end of the north jetty; the light marks the entrance to a small-boat basin inside the mouth of the Ninilchik River. The approach to Ninilchik is through scattered offlying rocks to the entrance channel, which should be used only with local knowledge. A submerged rock sill about 9 feet above MLLW, extends across the entrance channel about 50 yards above the entrance light. A daybeacon on a pole, just inside the seaward end of the S jetty, warns of the approach to the sill, and another daybeacon on a pole marks the NE end of the sill. In May 1993, the entrance channel was 9½ feet above MLLW with greater heights along the edges and the basin was 3½ feet above MLLW. The channel is narrow and difficult and, in the absence of local knowledge, should be used only in daylight and during relatively calm weather. The boat basin has one floating pier, which is removed in wintertime. No supplies or repair services are available.

(1133) The basin has no local governing body and is used on a first-come basis. It was designed to safely moor 32 vessels; however, as many as 100 boats have crowded into the basin at one time.

(1134) Landline telephone service is available, and Ninilchik is connected to the Alaska Highway System.
(1135) N of Cape Ninilchik the coast is very foul, being characterized by immense boulders not marked by kelp. The boulders apparently rest on comparatively flat bottom, so that soundings give no indications of them. It is probable that many more exist than were found by the survey.
(1136) **Clam Gulch,** 14 miles NE of Ninilchik, has a gravel road leading from Sterling Highway to the beach. A state camping ground is along the road.

(1137) **Charts 16640, 16648.**–On the W shore of Cook Inlet, from Cape Douglas (58°51.0'N., 153°15.0'W.) to Chisik Island about 80 miles to the NNE, the mountains generally rise abruptly from the water, and Iliamna and Redoubt Volcanoes tower well above the surrounding peaks, affording excellent marks from all parts of the lower inlet.
(1138) **Sukoi Bay,** on the N side of Cape Douglas, is shoal, and can be used only by small craft with local knowledge. Rocks bare at low water in the middle of the entrance, and a ledge bares at low water between the rocks and the S shore.
(1139) In 1972, the NOAA Ship RAINIER anchored outside of Sukoi Bay 0.5 mile N of Cape Douglas in 13 fathoms. The ship experienced dragging during 20-knot winds.
(1140) The two bluff points 5 and 8 miles NW of Cape Douglas are the ends of two sharp, rocky ridges that extend from the highland of Mount Douglas. Anchorage can be had in the bight between the points in 6 to 10 fathoms, sandy bottom, with shelter from S and W winds, but the williwaws are bad during W gales. Vessels navigating between Cape Douglas and Shaw Island are cautioned to avoid a rocky area with a least depth of 2½ fathoms about 3.5 miles SE of Shaw Island and a rocky area with a least depth of 3¼ fathoms 2.7 miles SSE of Shaw Island. At the head of the bight is a short valley with a glacier. Just clear of the bluff point on the SE side of the bight is a pinnacle rock as high as the bluff. The bight between this point and the N point of Sukoi Bay appears shoal.
(1141) **Shaw Island,** flat and grass covered, is 10 miles NW from Cape Douglas and 1.8 miles from shore. A depth of 12 fathoms was found midway between it and the shore. Ledges extend N from the island for 0.8 mile.
(1142) **Kamishak Bay,** about 20 miles NW of Cape Douglas, has numerous reefs rising to within a few feet of the surface scattered throughout the area. Because of these hazards, vessels should proceed with caution in the bay.
(1143) The shores of Kamishak Bay are mountainous with bare-faced headlands and palisades of stratified rock. The lower hills are covered with grass and alder brush. There is no timber except for sparsely wooded areas near the mouth of the Kamishak River and N of Iniskin Bay. The shoreline along the S and W sides of the bay is characterized by a low flat bluff, 50 feet above mean high water. The islands in the bay appear to be detached parts of this bluff. The shore throughout the bay is bordered by dangerous reefs, most of which uncover at low water.
(1144) A safe passage to the S shore has not been found. It is possible, however, to approach the W shore through a break in the reefs. In the waters N of Amakdedori, this should only be attempted during a rising tide and with local knowledge of the ledges and reefs along the shore.
(1145) The approach is from the S side of Augustine Island, which is passed from 1.5 to 2.5 miles offshore, on a course of **257°.** Head for Chenik Head, a low flat cape S of the former village of **Chenik. Chenik Mountain** (Three Peaks), a high mountain group 3 miles NW of Chenik, show slightly on the starboard hand. Avoid **Juma Reef,** it bares at low water and extends NNE from Nordyke Island for at least 1.2 miles. N of this reef is a channel about 1 mile wide and with a least depth of 6 fathoms. As soon as the line of the reefs is passed change course to **215°.** The W part of **McNeil Head** should be dead ahead and the outer tangent of Step Mountain should be dead astern. Anchor 1,100 yards W of Nordyke Island in 5 fathoms, sticky mud bottom. The currents at this anchorage set SSW on the flood and NNE on the ebb.
(1146) High tide in this area occurs ten minutes later than at Seldovia and the height is 2.4 feet lower than at Seldovia. Low tide occurs 15 minutes later and is 0.1 foot lower than at Seldovia.
(1147) **Nordyke Island** is flat and grass topped. Two smaller flat grass-topped islands are SW of Nordyke Island. Rock ledges that bare at low water make off from these islets for about 0.5 mile to the S. A series of reefs that bare at low water are like huge stepping stones between Nordyke Island and McNeil Head.
(1148) **Tide.**–The diurnal range of tide at Nordyke Island is 15.2 feet.
(1149) The S shore of Kamishak Bay is foul with extensive reefs and ledges and adjoining mudflats. **Amakdedulia Cove, Akjemguiga Cove, Pinkidulia Cove, Horseshoe Cove,** and **Akumwarvik Bay** are strewn with boulders and reefs surrounded by mudflats which uncover at low tide.
(1150) **McNeil Cove** is shoal and filled with sandflats. The S side of the cove is marked by a prominent headland called **McNeil Head.** Bands of conglomerate rock cross the faces of McNeil Head. **McNeil Islet,** mushroom shaped and about 45 feet high, is located off this headland. A lagoon in the SW part of McNeil Cove is used as a refuge in stormy weather by small fishing craft, which lie in the mud during low water. **Kamishak,** located on this lagoon, consists of one abandoned cabin. A wagon road 12 miles long leads from Kamishak to the site of a copper claim.
(1151) S of Amakdedulia Cove are hills and cliffs having a green and yellow tinge. Three flat-topped islets about 30 feet high are off these cliffs. Fingers of reefs spread out from the islets for about 1 mile.
(1152) **Chenik Head** is a low flat cape about 50 feet high on the N side of Amakdedulia Cove. A rock ledge bare at low water makes off this point for a distance of about 0.5 mile. An isolated rock, 7 feet high, is on this ledge about 0.1 mile offshore. N of Chenik Head are two small islets that serve as markers for vessels crossing the line of reefs.
(1153) **Amakdedori,** a village 4.3 miles N of Chenik Head, has a long stretch of sand beach covered with drift of all kinds. Rocky outcroppings border this beach just offshore, and several large reefs are farther offshore. A safe landing can be made on the beach N of **Amakdedori Creek.**
(1154) N of Amakdedori is an extensive stretch of conspicuous palisades. Above these and near the W end is a dome-shaped peak about 2,000 feet high.
(1155) **Contact Point** is a round-topped headland about 400 feet high surrounded by precipitous bluffs. It is conspicuous from the vicinity of Augustine Island. A tall pinnacle rock close to the headland identifies it when viewed from the SE. A submerged ledge extends 0.5 mile offshore from Contact Point.
(1156) The entrance to **Bruin Bay** is N of Contact Point. The bay is separated into an inner and an outer portion by a finger of land running N from a point 1 mile W of Contact Point. Two cabins and a rain catch basin are on the N end of this finger. The outer part of Bruin Bay has adequate water for small vessels, but is bordered by submerged ledges. Several unsurveyed reefs exist in the outer bay. A pinnacle rock 1.1 miles 343° from Contact Point uncovers 3 feet. A safe passage for small craft wishing to enter the outer bay is parallel to and 1 mile N of the S shore of the outside bay; this

passage should only be attempted on a high tide and with local knowledge of the reefs in the area. The unnamed cove on the N side of the outer bay uncovers at low water and is strewn with boulders and reefs. The inner bay is reached by passing between the numerous rocks and reefs lying N of the finger of land dividing the bay. The passage is hazardous because of very strong currents. The inside bay is virtually a tidal flat strewn with large boulders. Local fishing vessels transit the passage into the inner bay at slack water. Bruin Bay is known for its strong winds out of the W and NE.

(1157) The shoreline NE of Bruin Bay is rugged. A waterfall 3.3 miles NE of Contact Point is conspicuous. **Fortification Bluff** is a line of bold, angular-edged palisades with faces of stratified rock. **Step Mountain** is the headland on the S side of Rocky Cove. Two flat areas below the peak form steps on the side of the mountain. **Rocky Cove** is obstructed by reefs, bare at lowest tides, that extend 2 miles offshore. **Ursus Cove** is exposed to a heavy swell in E weather. The bottom is very broken.

(1158) **Augustine Island** is a 4,304-foot-high volcanic, conical peak from which steam frequently discharges. The upper slopes are barren, but the lower parts of the island are covered with grass, brush, and alder. There are also a few groups of spruce trees. The shore is low, with bluffs in places, and is generally strewn with boulders. A boulder reef extends about 0.8 mile off the NW shore of the island. The N end of the island, terminating in **Burr Point,** consists of numerous small mounds of boulders with sloughs between. The University of Alaska maintains a summer field camp in this area at a small protected cove on the E side of Burr Point. This facility consists of two metal buildings for housing seismic research crews during the summer months. The cove can be reached via a small, unmarked channel at any water above mean lower low water and could afford protection from any weather for small boats, but its use is not recommended without local knowledge. The W end of the island is detached from the main part by a lagoon, the entrances to which are partly blocked by boulders. A second lagoon, inland from the cove on the SW side of the island, is also partly blocked at the entrance but has been used as a loading basin by a power scow, which entered at high water.

(1159) The SW cove is much used by fishing craft as an anchorage. It has an even bottom of coarse sand, green mud, shell and gravel. The depth is from 3 to 5 fathoms. Anchor off the sandspit on the E side of the cove; the W side should be avoided because of reported boulders on the bottom. Huge boulders can be seen near the entrances to the two lagoons. A bank having depths of 2 to 3 fathoms extends over 3 miles W of Augustine Island. A second bank having depths of 2 to 4 fathoms extends for 2.2 miles off the SW point of the island.

(1160) **Augustine Rocks** are 8.3 miles S from the peak of Augustine Island. They are two flat rocks, with a smaller one between, all covered at high water. Their position is reported to be generally marked by kelp or breakers.

(1161) **Iliamna Bay** is on the N side of Kamishak Bay 13 miles N from Augustine Island. Its W arm is called **Cottonwood Bay.** The greater part of the bay is filled by a flat but there is good anchorage just inside the entrance. The shores are mountainous and there are no trees except the cottonwoods on the flats at the heads of the bay.

(1162) **A.C. Point,** on the E shore of the bay about 2 miles NW from North Head, has been used as a landing place.

(1163) **Williamsport,** in a cove on the W shore of Iliamna Bay 1 mile from the N end of the bay, is the E terminus of a 15.5-mile, State-maintained, gravel road between Williamsport and Pile Bay. The road is open from June to October.

(1164) Vessels less than 12 feet wide, 32 feet long, and 9½ feet high are hauled, by truck, between Williamsport and Pile Bay. From Pile Bay the vessels transit Lake Iliamna (chart 16013) to the Kvichak River and down the river to Bristol Bay. The controlling depth in the river was reported to be 3 feet in 1973. This depth may be more or less, depending on the runoff.

(1165) A trail leads from the road between Williamsport and Pile Bay to the abandoned village of **Old Iliamna** on the Iliamna River (chart 16640).

(1166) Williamsport consists of a house, boat ramp, and wharf. The base of the wharf and boat ramp dry before low water. The wharf has a 50-foot face and dries 12 feet. The operator of the hauling service monitors radiotelephone 3201 from 0800 to 0930 and 1800 to 1930 when the road is open. Because of working limitations and tides, boats sometime have to wait to be hauled out.

(1167) **Tides and currents.**–The diurnal range of tide is 14.5 feet in lower Iliamna Bay. The currents just inside the entrance have an estimated strength of 1 to 2 knots.

(1168) **Local magnetic disturbance.**–Differences of as much as 3° from normal variation have been reported in Iliamna Bay.

(1169) **White Gull Island** (59°37.1'N., 153°34.3'W.), grass covered and about 70 feet high, is conspicuous near the middle of Iliamna Bay just inside the entrance. The bay shoals gradually from 6 fathoms in the entrance N of White Gull Island to 1 fathom in the entrance to Cottonwood Bay. Anchorage in 3 to 4 fathoms, soft bottom, can be had 0.8 mile inside the entrance to Iliamna Bay with the N side of White Gull Island in range with the S point at the entrance, and the N point at the entrance bearing 106°. The anchorage is exposed to E and SE winds and there are heavy williwaws with W winds, but it is regarded as secure during the summer.

(1170) It is reported that Iliamna Bay does not freeze but that drift ice in large quantities sets in at times from the upper inlet. Water can be obtained from streams on the NE side about 1 mile inside the entrance. N gales prevail in winter and heavy williwaws are reported to come from the mountains on the NE shore. The prevailing summer winds are down the bay and are frequently fresh, especially on bright days.

(1171) In the approach to Iliamna Bay the depths are 6 to 8 fathoms several miles from shore, and these depths extend close to Turtle and Black Reefs. Enter the bay between North Head and White Gull Island. When in the bay care must be taken to avoid a reef, partly bare at low water and with 2½ to 3 fathoms close-to, that extends 0.4 mile E from the S point at the entrance to Cottonwood Bay.

(1172) **Turtle Reef** extends over 0.4 mile E from South Head at the entrance of Iliamna Bay. The reef is largely bare at low water, and is about 15 feet high at its highest point.

(1173) **Black Reef** is 0.5 mile from shore and 1.1 miles E from **North Head.** The highest points of the reef are two rocks, 5 to 10 feet high. Lying 0.5 mile NE of Black Reef is another reef which covers at half tide; its S end is 0.5 mile from shore.

(1174) **Iniskin Bay,** on the N side of Kamishak Bay E of Iliamna Bay, is a secure harbor in any weather, although subject to some williwaws from the high sharp bare peaks on the W shore.

(1175) The E shore is generally low and alder covered. The W and upper parts of the bay are filled with boulder-strewn flats, bare at low water, and the E part is shoal and fringed by a reef. The channel is nearly 0.8 mile wide at the entrance and tapers to a narrow slough at the head.

(1176) **Local magnetic disturbance.**–Differences of as much as 3° from normal variations have been observed in Iniskin Bay.

(1177) Three small islands with outlying reefs are on the E side of the entrance of Iniskin Bay. The N and largest is **Scott Island,** about 40 feet high and partly wooded, and from it a reef with rocks about 15 feet high extends 0.5 mile NW. The middle island is about 35 feet high, and from it a reef extends 0.8 mile SW, terminating in **Iniskin Rock.**

(1178) **Iniskin Island,** outermost of the three mentioned above, is 50 feet high on the N side, and from it a reef partly bare at low water extends 0.5 mile SW; lying 1 to 1.3 miles SW from the islet is **Iniskin Shoal,** a submerged reef with little depth, which does not break in heavy weather. These reefs rise abruptly from depths of 5 to 8 fathoms.

(1179) **Iniskin River,** at the head of Iniskin Bay, is navigable for boats of not more than 3-foot draft for a distance of about 2 miles above the entrance.

(1180) To enter Iniskin Bay, avoid the reefs which rise abruptly from deep water and extend about 1 mile from the shore E of the bay. Pass more than 1 mile S of the outer islands off the entrance. When two prominent headlands (59°40.4'N., 153°28.5'W., and 59°41.6'N., 153°27.8'W.) on the W side of Iniskin Bay are in line, steer this range until near the W shore, avoiding a reef which extends about 0.7 mile S from **Knoll Head.** Follow this shore a distance of 0.3 mile until **Range Peak,** on the N side of **Right Arm,** is in line with Iliamna Volcano, and then steer this range; the chart is the guide. Anchor on the range, from 1.5 to 2.5 miles above Scott Island, in 5 to 6 fathoms, clay bottom, where the width of the channel between the 5-fathom curves is about 700 yards.

(1181) Water can be obtained from the streams in Iniskin Bay, the most convenient to the anchorage being on the W side about 2 miles above the entrance. The tidal current averages 1 knot in Iniskin Bay.

(1182) From Iniskin Bay to Oil Bay, the coast is fringed by a reef that extends about 1 mile from shore and rises abruptly. Many of the rocks show at low water. **Pomeroy Island,** 2.2 miles SE of Scott Island, is small and rocky and has a few trees on its W end. **Big Rock,** 9 feet high, is 1 mile E of Pomeroy Island. From Iniskin Bay to Oil Bay there is a comparatively smooth passage for launches inside the reefs.

(1183) From Oil Bay to Chinitna Point reefs extend about 1 mile from shore in places and rise abruptly from deep water. Rocks show at low water close to shore only. With N winds, small boats can get some shelter in Oil Bay, Dry Bay, and the small bight under Chinitna Point.

(1184) **Oil Bay** is shallow and open with a sand beach at its head which bares for 0.8 mile from shore. The bottom is rocky and foul for about 1 mile offshore on the W side of the entrance. Abandoned oil wells are located in the valley of **Bowser Creek** about 2 miles from the head of the bay. From Oil Bay a valley leads through to Chinitna Bay, and a good trail to Iniskin Bay extends along the N side of **Mount Pomeroy.**

(1185) **Dry Bay** is a rocky shoal bight between Oil Bay and Chinitna Point. The bay has a sand beach at its head.

(1186) A 6-fathom shoal, about 2 miles NE of Chinitna Point and about 1.5 miles offshore, is usually marked by turbulence that can be hazardous to small craft. Because of the irregular bottom and swift tidal currents, seas two or three times as high as the seas in adjacent areas may be in the vicinity of the shoal.

(1187) **Chart 16640.–Chinitna Bay** is shoal, and an anchorage in 4 to 5 fathoms in the entrance is exposed to all E winds. The bottom is muddy and good holding ground, and anchorage can be selected anywhere in the bay where there is sufficient depth to remain afloat at low water. There are strong williwaws with W winds. The bay is filled with ice during the winter. Tidal currents average 1 knot in Chinitna Bay.

(1188) **Gull Island,** 100 feet high, rocky and grass covered, is on the S side of the entrance to Chinitna Bay. Reefs extend 0.6 mile NE and SE from the island. A deep channel, 0.3 mile wide, leads into Chinitna Bay between Gull Island and the mainland to the SW.

(1189) From Chinitna Bay to the prominent waterfall 5 miles S of Chisik Island, the coast is low and wooded, with lagoons and marshes in places, and some quicksand. Along Tuxedni Channel the coast comprises rocky bluffs and rises abruptly to high land.

(1190) An extensive shoal, with rocky, very irregular bottom extends 6 miles from the W shore between Chinitna Bay and Tuxedni Channel. The least depth is about 3½ fathoms, but there is probably less. Tide rips mark the shoal except at slack water, and are dangerous to small craft in heavy weather; the heaviest rips are near the extremity of the shoal, about 6 miles offshore. Numerous boulders, some awash, are just N of the entrance to Chinitna Bay and extend as far as 1.2 miles offshore. Small craft without local knowledge should avoid this area. Deep-draft vessels should avoid areas with depths of less than 10 fathoms.

(1191) Floating debris, including large logs, often forms long windrows parallel to shore about 4 miles off the coast in the vicinity of Chinitna Bay. Although logs are common throughout Cook Inlet, they seem to gather here more frequently than at other places.

(1192) **Red Glacier,** 7 miles N of Chinitna Bay, is a prominent landmark which derives its name from the red soil covering the seaward edge.

(1193) **Iliamna Volcano** is an important landmark. Steam generally issues from fissures just below the summit and from one of the lower peaks on the SE slope.

(1194) **Chisik Island** has a narrow ridge, comparatively smooth on top, that slopes gradually upward from the SE end of the island to its NW end where it terminates in a conspicuous cliff. **Chisik Island Light** (60°05.8'N., 152°33.7'W.), 215 feet above the water, is shown from a square frame with a diamond-shaped red and white daymark on the S end of the island; a reef extends 0.3 mile S.

(1195) **Tuxedni Channel,** on the SW side of Chisik Island, is a secure anchorage. Heavy williwaws occur with gales from any direction, and raise a choppy sea dangerous to open boats. The channel is reported to be blocked with ice from December to March.

(1196) **Snug Harbor** is generally accepted as including all the waters of Tuxedni Channel from Chisik Island Light to about 1 mile inside the entrance. These waters are quite well protected from all winds except williwaws blowing from the N end of Tuxedni Channel. The holding ground is good throughout the entire area and safe anchorage can be found on either side of the channel except when floe ice is present to varying degrees between November and May, depending on the severity and the stage of the tides when the ice leaves the lagoons and streams at breakup time.

(1197) A former cannery on the E side of Snug Harbor serves as a seasonal supply and maintenance facility for a small fishing fleet. A T-head pier at the facility has about 10 feet reported alongside.

(1198) **Tides and currents.**–The diurnal range of tide is 16.6 feet in Tuxedni Channel. The current floods NW at a velocity of 1.1 knots and ebbs SSE at a velocity of 1.9 knots.

(1199) **Tuxedni Bay** consists largely of shoals and reefs. A narrow channel extends from Tuxedni Channel nearly to

the head of the bay. This channel shoals rapidly after leaving Chisik Island. The passage N of Chisik Island should be avoided, even by small craft.

(1200) To enter Tuxedni Channel give the S end of Chisik Island a berth of over 0.5 mile, keep in midchannel until about 2 miles inside the entrance, and then follow the Chisik Island shore at a distance of 0.5 mile. The anchorage is about 3.5 miles above the light, in 13 to 14 fathoms, mud and sand bottom, and has a clear width of 0.7 mile. On the island side, the shore is bold but a shoal makes out 0.6 to 1 mile from the main shore abreast the anchorage; the shoaling is abrupt on the sides of the channel and there are boulders in places on the shoals.

(1201) In 1978, the NOAA Ship FAIRWEATHER reported the shifting of rocks and the possibility of uncharted rocks in Tuxedni Bay W of longitude 152°40'W. Caution is advised in this area.

(1202) **Charts 16661, 16662, 16663, 16665, 16660.**–From Tuxedni Bay to Harriet Point, the W shore of Cook Inlet is a gravel bluff with trees on top and a few boulders in the water. **Redoubt Point** (60°17.3'N., 152°25.0'W.), 7 miles NE of Tuxedni Bay, is an alder-covered bluff from 200 to 300 feet high, with a number of bare slides. There are boulders in places on the shoals which fringe this shore, and vessels should proceed with caution when inside the 10-fathom curve.

(1203) **Redoubt Volcano** is an important mark 15 miles inland from Harriet Point. There is a notch on its SE slope just below the summit.

(1204) **Double Peak** (see chart 16013), 15 miles N of Redoubt Volcano, has two knobs on top, and is easily identified from the inlet.

(1205) **Harriet Point** is a clay bluff about 100 feet high, with boulders at the water. A boulder reef, bare at low water, extends 0.8 mile E from Harriet Point. The point should not be approached closer than 1.5 miles on the line of the reef. In 1975, the NOAA Ship DAVIDSON observed a dangerously steep, short, and choppy sea condition between Harriet Point and the S part of Kalgin Island. This sea condition resulted from strong currents and opposing winds, and the steep waves were of short duration. **Harriet Point Light** (60°23.8'N., 152°14.2'W.), 95 feet above the water, is shown from a square frame structure with a diamond-shaped red and white daymark on the end of the point.

(1206) Fair anchorage is available in moderate weather on the N side of Harriet Point, which so far as known is safe during the summer except for S, SE, and NE gales. Very small vessels can anchor in about 5 fathoms about 0.5 mile from shore, with the point bearing 177°. At the anchorage the ebb current has a velocity of 2 to 3 knots, while the flood current is weak and of short duration.

(1207) From Harriet Point to West Foreland, two shallow bights form **Redoubt Bay.** The shore in the bay is generally low and backed by patches of woods which appear continuous, and is subject to overflow at extreme high tides. It is fronted by a flat that extends off a greatest distance of 2.5 miles. The edge of the flat is generally steep-to, but no boulders were seen on those parts lying in front of the marshy shore. **Drift River** is shallow, rapid, and obstructed by rocks and snags.

(1208) About 10 miles N of Harriet Point and S of Drift River, is the **Drift River Marine Terminal,** a privately owned offshore loading platform in 60 feet of water; a helicopter deck and living quarters are on the platform. Breasting and mooring dolphins, connected by walkways, are adjacent and on the sides of the loading platform. Privately maintained lights on mooring dolphins mark the extremities of the terminal facilities; a fog signal is at the S light. Two 30-inch oil lines lead from a crude oil tank farm on shore to the platform. The platform headings are 035°-215°. Tankers can be loaded at a rate of 50,000 barrels per hour. A small airfield is maintained ashore by the pipeline company.

(1209) The platform is a good radar target.

(1210) The U.S. Coast Guard Captain of the Port, Western Alaska, has issued the following order to impose vessel traffic movement control in the vicinity of the offshore loading platform (Christy Lee) at the Drift River Marine Terminal:

(1211) No vessel shall maneuver, anchor or moor in such a manner as to endanger itself, any other vessel or facility in order to prevent any vessel from mooring or departing the Drift River Marine Terminal.

(1212) From early December to mid-March, large pieces of ice have been reported to approach the platform during flood tides. Caution is advised.

(1213) A prominent wooded butte is 4 miles inland and 14 miles W of West Foreland.

(1214) **Kalgin Island,** wooded and fringed with boulders, is higher at its N and S ends. **Kalgin Island Light** (60°29.0'N., 151°50.6'W.), 140 feet above the water, is shown from a square frame structure with a diamond-shaped red and white daymark on the NE point of the island. **Kalgin Island South Light** (60°20.7'N., 152°05.1'W.), 65 feet above the water, is shown from a square frame structure with a diamond-shaped red and white daymark on the S point of the island.

(1215) A shoal, marked at its S end by a seasonal lighted bell buoy, extends 16 miles S from Kalgin Island. (See chart 16640.) There are spots bare at low water for nearly 8 miles from the island, and thence S the least depth found is 2 fathoms. The bottom is very broken. No boulders show at low water, however, except near the island.

(1216) A passage with general depths of 12 to 15 feet, which is used by cannery tenders, leads across the shoal from 1 to 2.5 miles S of Kalgin Island. A range should be picked up in the opening N of Chisik Island to insure making the course good, as the currents on either side of the island have a velocity of 3 to 4 knots at times, and are nearly slack in the lee of the island. There are boulders near Kalgin Island and possibly in the passage.

(1217) A sand ridge, which nearly uncovers, is about 2.5 to 3.5 miles W of Kalgin Island. A lighted seasonal bell buoy is off the W side of the shoal. During the summer months, floating debris and logs may be encountered in the channel W of the buoy.

(1218) A boulder-strewn shoal with depths of 7 fathoms or less extends 8 miles N from the NE point of Kalgin Island. The outer boulders which uncover are 2.5 miles from the island in depths of 22 feet. It is advisable to proceed with caution where the depths are no more than 30 feet greater than the draft.

(1219) Small vessels can select anchorage off the middle of the N end of Kalgin Island, with good shelter from S gales drawing up the inlet. Fair holding ground is from the middle of the N shore W. The currents are as weak as will be found at any of the exposed anchorages. Caution must be observed, however, at low water when crossing the broken boulder-strewn area where depths of less than 5 fathoms make off from the N end of the island.

(1220) The highest parts of the shoal between Kalgin Island and West Foreland uncover between 3 and 4 feet. The shoal has been shifting S and is 5.5 miles from the N end of Kalgin Island. Although the shoal is rocky in places, no boulders show at lowest tides. There are boulders in places on the bottom between the shoal and West Foreland.

(1221) **West Foreland** is a flat headland with a bluff at the water. The shore at West Foreland and for a distance of 4 or 5 miles N is fringed with boulders which extend below low water.

(1222) **Kustatan River** has its entrance 3.5 miles W of West Foreland. It connects inland with McArthur River, which enters the inlet 12 miles N of West Foreland.

(1223) For a distance of 8 miles N from West Foreland the bluff is at the water, and numerous boulders are on the beach. The bluff then trends inland to a conspicuous wooded ridge, 5 miles long and 300 feet high, which is 2.5 miles inland at its N end.

(1224) For a distance of 15 miles N from the end of the bluff, the shore of **Trading Bay** is flat, grass covered, and subject to overflow, and has several sloughs. This part of the bay is fronted by a flat that extends off a greatest distance of 2.1 miles at the mouth of McArthur River. This river is about 1 mile wide at its entrance at high water, but because of a bar across its mouth it cannot be entered at low water.

(1225) **Nikolai Creek** is a narrow slough 19 miles N of West Foreland. A depth of 1 to 2 feet at low water is in the channel across the flat. A depth of about 15 feet can be taken into the river at high water. The water in the river is fresh nearly to its mouth except for a short time at high water.

(1226) About 3 miles E of Nikolai Creek is a prominent gulch with a small stream in it. The bluffs come to the shore at the gulch and continue around North Foreland. Anchorage 1 mile off the gulch is in 3½ fathoms, hard bottom.

(1227) **Granite Point** is a prominent gray bluff 1 mile E of the gulch. Between the point and North Foreland, 5.5 miles to the ENE, is **Beshta Bay,** a shallow bight with anchorage in 7 to 10 fathoms, mud and gravel bottom. The anchorage is good during moderate weather or with offshore winds. Care should be taken to avoid the rocky shoal that bares at low water and extends 1 mile from shore 1.5 miles E of Granite Point. The flood current has a velocity of 4 to 5 knots and the ebb 2 to 3 knots. **North Foreland,** on the NW side of Cook Inlet 25 miles above West Foreland, is a bluff about 150 feet high at the shore end of a hilly wooded ridge; thence N the bluff is lower. A large T-head pier, marked by private lights at the outer ends, extends about 0.25 mile SE from North Foreland.

(1228) **Tyonek** is a native village near the mouth of **Indian Creek,** 1.5 miles NE of North Foreland. The village has a Bureau of Indian Affairs school. Vessels call at Tyonek, and a landing strip just N of the village is suitable for light planes. Mail is received once a week from Anchorage.

(1229) **Chuitna River,** 3 miles N of North Foreland, is marked by a low break in the bluff. A depth of about 8 feet can be taken into the mouth of the river at high water, and the tides are felt about 1 mile upriver. In 1966, a pipe covered about 2 feet at mean higher high water was reported E of the entrance to the river in about 61°06.2'N., 150°55.0'W.

(1230) A prominent bluff 150 feet high is on the S side of **Threemile Creek.** Bluffs continue N for 2.5 miles from this creek, and then the tree line is from 2 to 3 miles inland from the ordinary high-water mark, the strip between being subject to overflow at extreme high tides. This feature continues to within 2 miles of Point MacKenzie.

(1231) Beginning at Threemile Creek, the shore is fronted by a broad mudflat. Its low-water edge is about 2 miles off the mouth of Beluga River, 5.5 miles off the mouth of Susitna River, 3.5 miles off the shore E nearly to Little Susitna River, and then meets the shore at Point MacKenzie.

(1232) **Beluga River** is 11.5 miles N of North Foreland. The channel through the flats at the mouth of the river has a depth of about 2 feet or less at low water, and is said to shift in the winter and spring from the action of ice.

(1233) The effect of the tide is felt in Beluga River 6 to 8 miles above the mouth, and it is said that boats can navigate as far as Beluga Lake, about 20 miles from the mouth.

(1234) **Theodore River** is 3.5 miles NE of Beluga River. Three or 4 miles up, the two rivers are within 1 mile of each other and there is an easy portage between them.

(1235) **Susitna River** is on the N side of Cook Inlet 22 miles NE of North Foreland. **Mount Susitna,** a prominent landmark along the upper part of the inlet, is about 6 miles W of the river at a point 13 miles above the mouth.

(1236) The channels across the flats at the mouth of Susitna River have depths of 2 feet or less at low water and change during the winter and spring because of ice and freshet action. The channels above the mouth are said to change frequently in the spring and early summer. Vessels navigating the deep channels of Cook Inlet should keep well away from the flats because their outer limits have been known to change drastically.

(1237) Launches navigate Susitna River to **Yentna River,** about 20 miles above Cook Inlet, thence run occasionally up the Yentna to the forks about 65 miles from the Susitna. The tides are not felt more than 7 miles from the inlet, and above this the current is swift. Overhead power cables with a least clearance of 37 feet cross the Susitna River about 5 miles above its mouth.

(1238) **Alexander** is a small settlement on the W side of Susitna River 10 miles above the mouth. Susitna is on the E side 18 miles above the mouth and just below the mouth of the Yentna; launches, occasionally towing scows, run to and from Anchorage. Mail is delivered to both settlements twice monthly by airplane from Anchorage.

(1239) **Ice.**–(See page T-21 for dates of ice breakup and freezeup for Susitna River.)

(1240) **Talkeetna** is 65 miles above the mouth of Susitna River.

(1241) **Little Susitna River,** 9 miles W of Point MacKenzie, is said to be navigable for launches at high water for about 8 miles.

(1242) **Cape Kasilof** (60°22.0'N., 151°22.0'W.) is on the E side of Cook Inlet opposite Kalgin Island. The high bluffs characteristic of much of the E shore are absent between the cape and Kenai to the N.

(1243) Five miles SW from Cape Kasilof and 2.3 miles from shore are **The Sisters,** three prominent rocks, the highest of which is 5 feet. The foul ground back of The Sisters extends about 10 miles S from the cape and is strewn with boulders 15 to 50 feet high.

(1244) Temporary anchorage is possible in 4 fathoms 1 mile from shore a little S of Cape Kasilof. The area is exposed except in NE weather.

(1245) **Kasilof River** empties into the E side of Cook Inlet 2.5 miles NE of Cape Kasilof. The narrow winding channel that leads through the inner shallows to the river mouth is not navigable at low water. The entrance channel is marked by a light and buoys. A lighted buoy, about 2.5 miles W of the light, marks the approach to the entrance channel; the light, entrance buoys, and approach buoy are maintained seasonally. Entrance should not be attempted without local knowledge of conditions.

(1246) A dock with a 78-foot face and a launching ramp are on the N side of the entrance. A 200-foot detached float is moored in the entrance just off the dock.

(1247) **Kasilof** is a small agricultural settlement on the N side of Kasilof River, about 5 miles above the mouth. **Cohoe,** another small settlement on the S side of the river

mouth, has a store. Both villages are connected by the Sterling Highway with Anchorage, Homer, and other points along the W side of Kenai Peninsula.

(1248) Kasilof River is narrow and has a strong current. Boats drawing up to 6 feet can find good shelter in the river and remain afloat at low water. Vessels drawing as much as 10 feet enter the river and go as far as 6 miles upstream.

(1249) **Ice.**–(See page T-21 for dates of ice breakup and freezeup for Kasilof River.)

(1250) **Karluk Reef,** 4 miles N of Cape Kasilof and 3.5 miles from the E shore, is partly bare at low water. There are other shoals and submerged rocks between the reef and the shore.

(1251) **Salmo Rock,** 9.5 miles N of Cape Kasilof and 2 miles from shore, is one of the outer boulders off Kenai River and shows well at low water.

(1252) **Kenai,** 11 miles N of Cape Kasilof and on the N side of the Kenai River mouth, is a fishing town and a support base for offshore drilling operations in Cook Inlet.

(1253) **Prominent features.**–Three towers with red flashing lights are prominent at night S and E of town.

(1254) The entrance channel to the **Kenai River** is marked by a lighted 049° range and a seasonal lighted buoy. The area surrounding the mouth of Kenai River, for about a radius of 2 to 4 miles, is strewn with rocks, boulders, shoals, wrecks, and other obstructions. The bars at the entrance to the river are nearly dry at low water, but there are depths of 8 to 10 feet in places in the river. Because of the shifting bars at the river entrance, the range may not mark the best water. Mariners are advised not to enter Kenai River without local knowledge.

(1255) It is reported that small craft navigate the river to **Soldotna,** about 14.5 miles above the mouth.

(1256) A fixed highway bridge with a clearance of 15 feet crosses the river about 4.5 miles above the mouth.

(1257) (See **162.245,** chapter 2, for navigation regulations for the Kenai River.)

(1258) **Tides and currents.**–The diurnal range of tide is 20.7 feet at the Kenai River entrance. The currents in the river mouth attain velocities of 5 knots or more.

(1259) **Weather.**–Prevailing winds in the summer are from the SE and SW; NE winds prevail in the winter. Fog occurs from December to February, with some fog in the early spring.

(1260) **Ice.**–(See page T-21 for dates of ice breakup and freezeup for Kenai River.)

(1261) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, and Pilotage, Homer, for details.)

(1262) **Customs.**–Kenai is a **customs station.**

(1263) **Quarantine.**–A U.S. Public Health Service Contract Physician is located at the hospital in Kenai. (See appendix for additional information.)

(1264) **Wharves.**–Five wharves for barges and fishing vessels are along the Kenai River.

(1265) **Kenai Packers Wharf:** N side of Kenai River, 1 mile above the mouth; 720-foot face; dries at other than high tide; deck height, 25 feet; cranes to 10 tons; receipt of fish; owned and operated by Kenai Packers, Inc.

(1266) From June to October, private mooring buoys are placed on the S side of the river channel from about 300 yards W of Kenai Packers Wharf to 400 yards E of the wharf.

(1267) **Kenai City Dock** (Army Dock): a marginal wharf 460 yards upstream (ESE) from Kenai Packers Wharf; 300-foot face; 7 feet to bare; deck height, 28 feet; receipt of fish; owned by the City of Kenai and operated by Salamatof Seafoods Inc.

(1268) **Port of Kenai Wharf:** 550 yards SE of Kenai City Dock; 365-foot face; 18 feet to bare alongside; deck height, 20 feet; receipt of construction materials, general cargo by barge, fish, offshore oil well supplies, and bunkering vessels, 18 acres of open storage and 30,000 square feet of covered, heated, storage; owned by Cherrier and King, Inc. and operated by Cherrier and King, Inc. and Dragnet Fisheries, Inc.

(1269) A small-boat launching ramp and a 240-foot sectional mooring float are just S of the Port of Kenai Wharf. The mooring float is removed during the winter. It is owned by the State and operated by the city.

(1270) **Fishermans Packing, Inc. Piers:** lower and upper piers with 50- and 40-foot faces, respectively; 3 feet alongside; deck heights, 27 feet; receipt of fish and bunkering vessels; owned and operated by Fishermans Packing, Inc.

(1271) **Columbia Wards Wharf:** 540 yards S of Fishermans Packing, Inc. Piers; 100-foot face; 415 feet of berthing space with dolphins; 2 to 3 feet alongside; deck height, 27 feet; pipeline on wharf extends to storage tanks in rear; receipt of fish and bunkering vessels; owned and operated by Columbia Wards Fisheries.

(1272) **Supplies and repairs.**–Gasoline, diesel fuel, berths, water, ice, a lift, and a launching ramp are available. Most supplies are available in Kenai. Repair service is available and machine shops are in town.

(1273) **Communications.**–Kenai is connected with the Alaska Highway System and scheduled air service to Anchorage is available daily. Landline telephone, radiotelephone and radiotelegraph communications are available.

(1274) **Nikiski,** 8.5 miles NNW of Kenai, is the site of three deep-draft piers and a shallow-draft wharf. For a complete description of the port facilities refer to Port Series No. 38, published and sold by the U.S. Army Corps of Engineers. (See appendix for address.) All facilities are used in connection with the petroleum industry. Oil tanks on shore are conspicuous; three brown tanks above the Kenai LNG Dock are the most prominent.

(1275) Union Chemcial Wharf: a T-head pier 3 miles S of East Foreland Light; 228-foot face, 1,135 feet of berthing space with dolphins; 40 feet alongside; deck height, 38 feet; bulk urea loading tower with a telescopic loading spout with loading rate of 1,000 tons per hour; storage buildings in rear, total capacity 125,000 tons; shipment of anhydrous ammonia and dry bulk urea, and receipt of sulfuric acid, caustic soda and petroleum products; private lights mark each end of the pier; owned and operated by Union Chemical division of Union Oil Co. of California.

(1276) Kenai LNG Dock: a T-head pier just N of the Union Chemical Wharf; 100-foot face, 1,050 feet of berthing space with dolphins; 40 feet alongside; deck height, 40 feet; shipment of liquefied natural gas and petroleum products; receipt of crude oil; private lights mark each end of the pier; owned by Kenai LNG Corp., and operated by Phillips Petroleum Co. and Tesoro-Alaskan Petroleum Co.

(1277) Kenai Pipeline Co. Wharf: a T-head pier just N of Kenai LNG Dock; 348-foot face, 1,310 feet of berthing space with dolphins; 42 feet alongside; deck height, 35 feet; receipt of crude oil, and shipment of petroleum products; private lights mark each end of the pier; owned by Kenai Pipeline Co. and operated by Kenai Pipeline Co., Chevron U.S.A., Inc., and Tesoro-Alaskan Petroleum Co.

(1278) Rig Tenders Dock (Port Nikiski Dock), a wharf just N of Kenai Pipeline Co. Wharf; 600-foot face; depths alongside 10-14 feet, except for a 6-foot shoal at the S end, in

1974; deck height, 32 feet; 7-acre terminal servicing the offshore oil-drilling industry, and shipment of petroleum products; five fuel and water stations capable of transferring 1,000 gallons per minute; three crawler-type cranes up to 150-ton capacity; pipelines lead from wharf to storage tanks in rear, total capacity 510,000 barrels; heliport adjacent to terminal; owned and operated by Crowley Maritime Corp. and Tesoro-Alaskan Petroleum Corp.

(1279) Phillips Petroleum Co. monitors VHF-FM channels 10 and 16 continuously. Kenai Pipeline Co. Wharf and Rig Tenders Dock monitor VHF-FM channel 10 (156.50 MHz) continuously.

(1280) The T-head piers are reported to be good radar targets.

(1281) A shoal area, about 5 miles long with depths of 2¼ to 5½ fathoms, marked by a seasonal buoy, is about 2 miles off the piers at Nikiski. Deeper water is between it and the piers.

(1282) **Tides and currents.**–The diurnal range of tide at Nikiski is 20.4 feet. (See Tide Tables for daily predictions.) Additional information on the predicted hourly heights of the tide can be obtained from the publication "Supplemental Tidal Predictions-Anchorage, Nikiski, Seldovia, and Valdez, Alaska," published by the National Ocean Service. Tidal currents at Nikiski attain a velocity of about 3.8 knots on the flood and about 2.6 knots on the ebb. (See Tidal Current Tables for daily predictions.)

(1283) Ice floes are a severe problem at Nikiski during January and February; more so on the flood than the ebb. Ships usually keep their engines running on or standby while moored in case they are needed to help resist the force of these ice floes.

(1284) **East Foreland,** 60 miles N of Anchor Point and about 56 miles from Anchorage, is a nearly level wooded headland with a 276-foot bluff at the water's edge. **East Foreland Light** (60°43.2'N., 151°24.3'W.), 294 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the highest part of the bluff. A shoal, marked near its W edge by a seasonal buoy, and with a least depth of 3½ fathoms, extends 2 to 3.5 miles W and SW of the light.

(1285) **Nikiski No. 2** (Nikiski), 2.5 miles NE of East Foreland, is the site of a commercial facility (**Arness Landing**) that was inactive in 1976. It consists of three grounded liberty-type ships and a gravel surfaced wharf. The grounded vessels provide about 3,000 feet of berthing space alongside. The majority of the facility is dry at low water. It is owned by Dillingham Corp.

(1286) A coastal radio station is at Nikishka No. 2.

(1287) **Nikiski Bay** is the bight between Nikishka No. 2 and Boulder Point, 3 miles to the NE. Boulders, bare in places at low water, fill the bight. The bight provides anchorage in depths of 1 to 5 fathoms. The smooth sloping bottom provides good holding ground. The anchorage is sheltered from E and S winds, but is open to N and NE blows which generally prevail except during the summer. Currents reach 3 to 6 knots on both the ebb and flood and increase greatly with the distance from shore. Mariners should avoid a strong current area around the small, 3-fathom shoal lying 0.25 mile offshore between Arness Landing and East Foreland.

(1288) **Middle Ground Shoal,** which uncovers 6 feet for 3.5 miles of its length, is a long ridge of hard sand with rocky bottom in places, in the middle of the inlet 9 miles N of East Foreland.

(1289) **Oil Well Structures.**–Extensive oil drilling operations are being conducted in Cook Inlet extending as far N as Anchorage. The heaviest concentration of these operations is in the vicinity of Middle Ground Shoal.

(1290) Obstructions in these waters consist of submerged wells and oil well structures (platforms), including appurtenances thereto, such as mooring piles, anchor and mooring buoys, pipes, and stakes.

(1291) In general, the oil well structures (platforms), depending on their size, depth of water in which located, proximity of vessel routes, nature and amount of vessel traffic, and the effect of background lighting, may be marked in one of the following ways:

(1292) Quick flashing white light(s) visible at least 5 miles; fog signal sounded when visibility is less than 5 miles.

(1293) Quick flashing white light(s) visible at least 3 miles; fog signal when visibility is less than 3 miles.

(1294) Quick flashing white or red lights visible at least 1 mile; may or may not be equipped with fog signal.

(1295) Structures on or adjacent to the edges of navigable channels and fairways, regardless of location, may be required to display lights and fog signals for the safety of navigation.

(1296) Associated structures within 100 yards of the main structure, regardless of location, are not normally lighted, but are marked with red or white retro-reflective material. Mariners are cautioned that uncharted submerged pipelines and cables may exist in the vicinity of these structures, or between such structures and the shore.

(1297) During construction of a well or during drilling operations and until such time as the platform is capable of supporting the required aids, fixed white lights on the attending vessel or drilling rig may be shown in lieu of the required quick flashing lights on the structure. The attending vessel's foghorn may also be used as a substitute.

(1298) Submerged wells may or may not be marked depending on their location and depth of water over them.

(1299) All obstruction lights and fog signals used to mark the various structures are operated as privately maintained aids to navigation. (see **67.01 through 67.10,** chapter 2, for regulations.)

(1300) Information concerning the establishment, change, or discontinuance of offshore oil well structures and their appurtenances are published in Notice to Mariners. These structures and aids are subject to heavy damage and/or destruction from ice in winter; unlocated debris and remains may exist. Mariners are advised to navigate with caution in the vicinity of these structures and in those waters where oil exploration is in progress, and to use the latest and largest scale chart of the area.

(1301) During the continuing program of establishing, changing, and discontinuing oil well structures, special caution should be exercised when navigating the inshore and offshore waters of the affected areas in order to avoid collision with any of the structures.

(1302) Information concerning seismographic operations is not published in Notice to Mariners unless such operations create a menace to navigation in waters used by general navigation. Where seismographic operations are being conducted, obstructions such as casings (pipes), buoys, stakes, and detectors are installed. Casings are marked with flags by day and fixed red lights by night; buoys have colored international orange and white horizontal bands, and stakes are marked with flags.

(1303) From **Boulder Point,** a prominent boulder reef with few breaks in it, extends for 20 miles along the shore to Moose Point. For the greater part of this distance the boulders, some very large, show at low water to a distance of 2 miles from shore, and there are occasional ones which show above high water.

(1304) A prominent yellowish bluff is 4 miles E of Boulder Point. **Gray Cliff,** 10 miles NE of Boulder Point, is a good

mark. There is a break in the boulder reef off Gray Cliff where a small vessel can approach the shore as close as 0.8 mile and find anchorage in about 5 fathoms, mud bottom, sheltered from easterly and southeasterly weather.

(1305) Rocks awash are about 4.2 miles W and 4 miles NNW, respectively, from Gray Cliff. Because of the size of the boulders along this shore, it is not safe to skirt it with less than about 5 fathoms beneath the keel.

(1306) **Moose Point,** low and wooded with a grassy flat at its end, is not prominent; it is marked by a light equipped with a racon. Between it and Point Possession, a distance of 10 miles, there are few boulders so far as known but the bottom is generally rocky and irregular. **Moose Point Shoal,** 5 miles long and partly bare at low water, begins opposite Moose Point and is 1.8 to 2.2 miles from shore.

(1307) A 2¼-fathom spot, 6.5 miles 293° from Moose Point Light, is marked by a lighted seasonal buoy; shoaling may have taken place between it and the SE shore. **Beluga Shoal,** covered 4⅓ fathoms, is in the middle of Cook Inlet about midway between North Foreland and Fire Island and about 8.5 miles N of Moose Point.

(1308) About 6 miles NE of Moose Point is a prominent reddish bluff, on the N side of which is a small stream in a deep canyon, the latter showing from SW.

(1309) **Point Possession,** 36 miles NE of East Foreland, is on the S side of Cook Inlet and on the SW side of the entrance to Turnagain Arm. The point, marked by a light, is a low, rounding, heavily wooded headland with a bluff at the water's edge. **Possession,** a small native village occupied only during the summer, is on the W side of the point where the bluff is low and a valley leads inland. About 1 mile S of the village the bluff is 140 feet high, and 1.5 miles inside Turnagain Arm, it rises to 284 feet.

(1310) A reef extends about 1 mile off the NW side of Point Possession. There are depths of 1¼ fathoms on its NE edge; the N edge drops off abruptly to depths of 12 to 20 fathoms about 1 mile offshore. Care should be taken when rounding the point at low water not to open this range until well clear of the reef. A current line generally indicates the edge of the reef when the tidal current is strong in either direction.

(1311) Temporary anchorage for a small vessel can be had 0.8 mile from shore and 2 miles SW of Possession in 4 fathoms, sandy bottom. It is sheltered from easterly and southeasterly winds, but considerable sea makes around Point Possession at times from the violent northeasterly winds that blow at intervals out of Turnagain Arm.

(1312) Shoals with least depths of 2 to 2¼ fathoms are between Point Possession and Fire Island, in the entrance to Turnagain Arm.

(1313) On the N side of Point Possession temporary anchorage for a small vessel can be had in 4 fathoms, hard bottom, 0.3 mile off a gulch 1 mile NE of Possession. The anchorage is out of the strong tidal currents that set in and out of Turnagain Arm. Water can be secured by boats at high tide from the gulch, but in the late summer the flow is small and the water discolored from flowing over the clay bluff.

(1314) Fire Island Shoal, marked by a seasonal lighted bell buoy, is about 6 miles N of Point Possession; a description of the shoal is given later in this chapter, under Shelter Bay.

(1315) **Turnagain Arm** is only partially surveyed. Most of it is a large mudflat, bare at low water and intersected by winding sloughs. Navigation is safe only for small craft drawing 6 feet or less. Local knowledge is necessary since the channels wind from side to side and are subject to change, and strong currents and tide rips increase the difficulties of navigation. It is reported that sediment from the rivers is causing further general shoaling in the arm. The flood comes in at spring tides as a bore, sometimes attaining a height of 6 feet. Its rate of advance is about 6 knots but the velocity of the current may exceed 6 knots in places.

(1316) A submarine pipeline extends from the mainland shore close E of Burnt Island in a 024°30′ direction across the arm to the opposite shore.

(1317) Launches can be beached on the gradually sloping, smooth sand in the bight on the W side of **Gull Rock,** 4 miles E of Burnt Island, or in the bight 2 miles W of Gull Rock.

(1318) Small craft generally use the anchorage on the W side of Fire Island until conditions are favorable for proceeding up Turnagain Arm.

(1319) **Hope** is on the S side of Turnagain Arm 23 miles above Point Possession. **Girdwood** is on the N side 14 miles farther up. Formerly mining towns of some importance, both have stores and can be reached by small boats at high water. Girdwood is on the Alaska Railroad and the Anchorage-Seward highway which follow the N shore of Turnagain Arm. **Portage** is at the head of Turnagain Arm, 8 miles above Girdwood, and at the mouth of Placer River.

(1320) Turnagain Arm is noted for the violent winds which blow out of it whenever the wind is easterly, and is locally referred to as the **Cannon,** which expresses the opinion held of it. With light to moderate easterly winds in other parts of the inlet, a moderate gale will frequently blow out of the arm and a heavy sea and tide rips will be raised from its mouth across to North Foreland on the W shore of Cook Inlet.

(1321) **Charts 16665, 16663, 16660.–Fire Island** is about 6 miles NNE of Point Possession. The channel in Cook Inlet W of Fire Island is marked by a **058°** lighted range at the NW end of Fire Island.

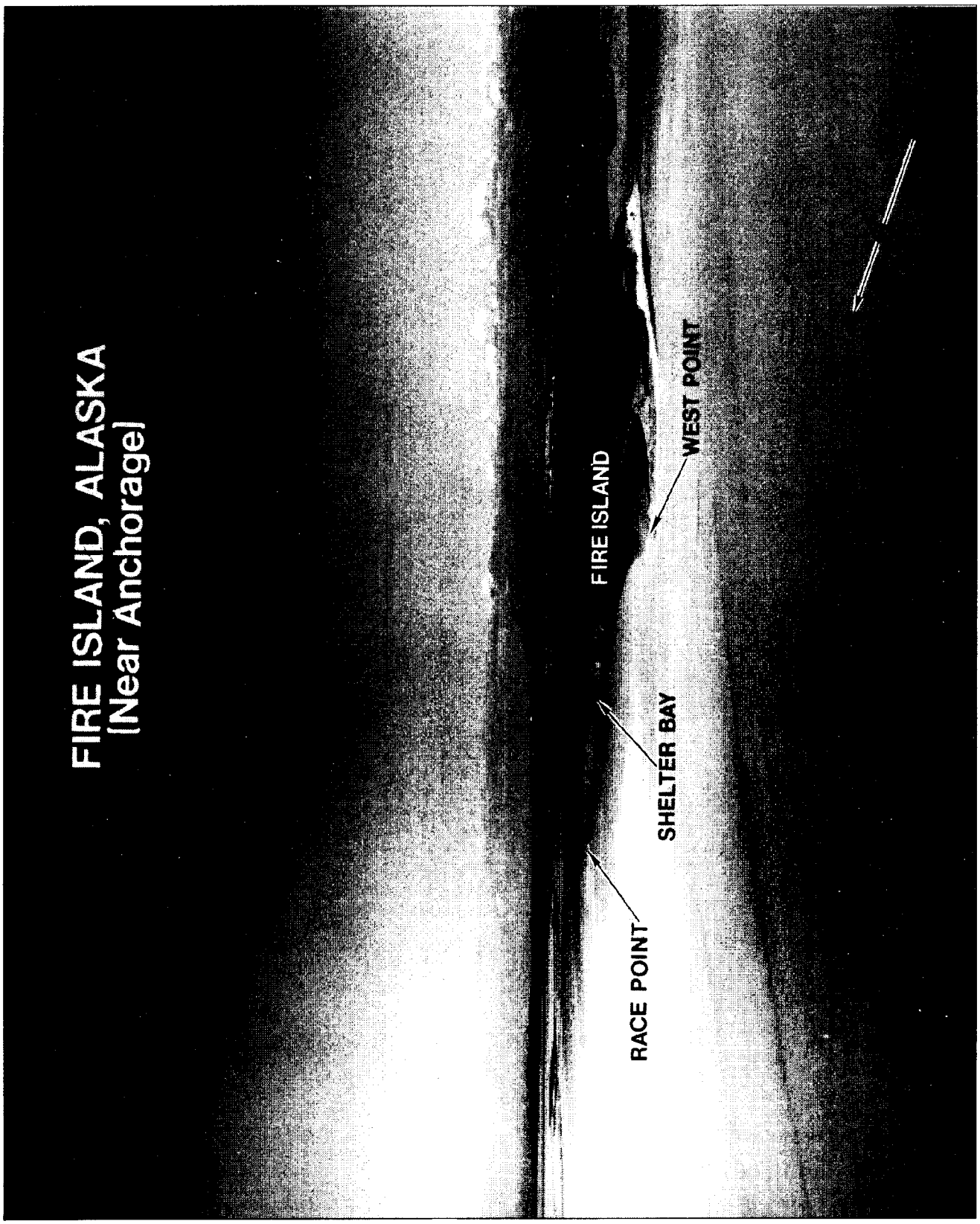
(1322) **Note:** Due to the narrow width of the channel between Fire Island and Fire Island Shoal, the Coast Guard recommends that all inbound and outbound traffic broadcast a voice security call on VHF-FM channel 16 (156.80 MHz), and establish voice communications with opposing traffic on VHF-FM channel 13 (156.65 MHz), prior to transiting the **058°** Race Point range.

(1323) **West Point,** the SW extremity of Fire Island, is marked by **Fire Island Light 6** (61°07.6′N., 150°16.9′W.), 30 feet above the water, shown from a skeleton tower with a red triangular daymark, and equipped with a racon. Race Point, the NW extremity of Fire Island, is marked by **Race Point Light** (61°10.1′N., 150°13.5′W.), 170 feet above the water and shown from a skeleton tower with a red and white diamond-shaped daymark.

(1324) Fire Island is wooded and has elevations of more than 250 feet in its central part. Near the SW end are high sandhills, with bare summits, and a small lake. Another lake is in the NE central part of the island. The shores are mostly high bluffs except at West Point and **North Point,** the NE extremity.

(1325) **Shelter Bay,** on the W side of Fire Island between West Point and Race Point, is mostly mudflats, bare at low water. Anchorage for small vessels has been recommended in 4 to 5 fathoms off the N part of the bay, 0.5 mile from shore. The current is strong throughout the flood, but the ebb is weak and after the first 2 hours is nearly slack. With fresh southwesterly, northwesterly or northerly winds, the anchorage has rough seas and tide rips.

(1326) **Fire Island Shoal,** which bares at low water, is about 2 miles NW of West Point. The shoal, about 3.5 miles long and 0.9 mile wide and marked on the S edge by a seasonal lighted bell buoy, is rapidly shifting ESE. In July 1990, the shoal was encroaching the Race Point rangeline; caution is advised.


FIRE ISLAND, ALASKA
(Near Anchorage)
FIRE ISLAND
WEST POINT
SHELTER BAY
RACE POINT

(1327) **Point Campbell,** on the NE side of the entrance to Turnagain Arm, is 2.5 miles E of Fire Island. The area between is a mudflat that bares at low water.

(1328) **Point Woronzof,** 3.5 miles NE of Point Campbell, is on the S side of the entrance to **Knik Arm.** A **242°** lighted range NE of Race Point Light, a **081°06′** lighted range on Point Woronzof, and a **061°** lighted range on Point MacKenzie mark the channel in Cook Inlet from Fire Island to Point Woronzof. **Point MacKenzie** is on the N side of the entrance to Knik Arm about 2.3 miles NNE of Point Woronzof. **Point McKenzie Light 11** (61°14.3′N., 149°59.2′W.), 80 feet above the water, is shown from a square frame structure with a green square daymark on the point. It is reported that the range on Point MacKenzie is sometimes difficult to see when the sun is directly behind the range markers.

(1329) **Anchorage,** on the SE side of Knik Arm, 175 miles from the entrance to Cook Inlet, and 1,428 miles from Seattle, is Alaska's major seaport and largest city. The main industries are government, tourism, and transportation.

(1330) **Prominent features.**–When approaching Anchorage, the lights on Fire Island and Point MacKenzie, the gantry cranes on the city wharf, the control tower and aerobeacon at the International Airport, a number of radio and television towers, and water tanks in the vicinity of Ship Creek are among the conspicuous landmarks. The N tank near Ship Creek is painted in red and white checkers.

(1331) **Channels.**–The main channel leads between Fire Island and the shoals to the N and W of the island. The channel is marked by lighted ranges and seasonal buoys at critical locations. The chart is the best guide. (See Routes.)

(1332) **Anchorages.**–The best anchorage for deep-draft vessels is W of Anchorage in depths of 10 to 12 fathoms, silt bottom. The usual anchorage for small vessels is nearer Anchorage in depths of 8 to 10 fathoms. Holding bottom is good and there is little chance of dragging if the chain scope is 5 to 7 times the depth, but the anchor probably will foul in a blow if it remains down through two tides. It is dangerous to remain at anchor in this area when the ice breaks in the spring.

(1333) **Dangers.**–In addition to the dangers in Cook Inlet previously described, **North Point Shoal,** about 2 miles N of North Point on Fire Island, changes radically from year to year and bares several feet at low water. The shoal is shifting ESE onto the Point Mackenzie Range. **Knik Arm Shoal,** with a least depth of 18 feet and marked by two seasonal buoys, is in about the center of the channel, about 2 miles W of Point Woronzof. **Woronzof Shoal,** a long shoal that bares about 1.2 miles W of Point Woronzof. **North Point Shoal,** 1.2 miles NW of Knik Arm Shoal, has a least depth of 16 feet. **Woronzof Shoal,** a long shoal that bares about 1.2 miles W of Point Woronzof, rocks close NW of the point, and the flats off Anchorage, should be avoided. Two submerged dolphins are off the Anchorage waterfront in about 61°13′45″N., 149°54′25″W., and 61°13′59″N., 149°53′54″W.

(1334) In November 1983, a partially submerged barge was reported about 0.5 mile WNW of the Anchorage cargo terminals in about 61°14′42″N., 149°54′06″W.

(1335) In 1992, three submerged obstructions were reported in the vicinity of General Cargo Terminals 1, 2, and 3 in the following approximate positions:

(1336) 61°14′47.4″N., 149°53′14.7″W.

(1337) 61°14′35.4″N., 149°53′12.4″W.

(1338) 61°14′35.8″N., 149°53′14.3″W.

(1339) **Tides and currents.**–The diurnal range of tide at Anchorage is 29 feet and the observed extreme low water is 6.5 feet below mean lower low water. (See Tide Tables for daily predictions.) Additional information on the predicted hourly heights of the tide can be obtained from the publication "Supplemental Tidal Predictions—Anchorage, Nikiski, Seldovia, and Valdez, Alaska," published by the National Ocean Survey. Close off the town, the current floods NE at a velocity of 1.5 knots and ebbs SW at a velocity of 2.5 knots. One mile off the town, the current averages 2.9 knots. Strong currents and swirls in the area make navigation difficult. It is reported that the flood following the higher of the low waters is unpredictable, especially during the last 3 hours, in the vicinity of the Port of Anchorage wharves. An eddy flows up Knik Arm during the ebb. Vessels anchored close in avoid the stronger currents, which attain velocities of 6 knots or more, at times, in midchannel.

(1340) **Weather.**–The Alaska Mountain Range lies in a long arc from SW, through NW, to NE, approximately 100 miles distant from Anchorage. During the winter, this range is an effective barrier to the influx of very cold air from the N side of the range. Extreme cold winter weather, associated with a high pressure system over interior Alaska, may lead to a succession of clear days in Anchorage, with temperatures dropping to –15°F to –25°F, as contrasted to the –50°F and even –60°F readings in the interior. There are some factors, however, which tend to offset the sheltering effect of this mountain barrier. Chief among these is cold air entrapment in various suburban areas during periods of light winds. This results occasionally in temperatures on the outskirts of Anchorage as much as 15°F to 20°F colder than observed at the official observation sites.

(1341) The four seasons are well marked in the Anchorage area, but in length, and in some major characteristics, they differ considerably from the usually accepted standards in middle latitudes.

(1342) Winter is considered to be the period during which the ponds, streams, and lakes are frozen; this normally extends from mid-October to mid-April. The shortest day of the year has 5 hours and 28 minutes of possible sunshine. Periods of clear, cold weather normally alternate with cloudy, mild weather during the Anchorage winter. The clear, cold weather is frequently accompanied by significant fog because of the important low-level moisture source provided by the arms of Cook Inlet which surround the area on three sides; while considerable floating ice is prevalent, the high tides maintain some open water throughout the winter. Visibilities of 0.5 mile, or less, occur about 5 percent of the time during December and January, and most of these low visibilities are associated with fog. Snow visibilities generally range from 1 to 3 miles though heavier snowfalls will, of course, restrict visibilities to less than 1 mile on a few occasions. The first measurable snow occurs, on the average, on October 15, but has been as early as September 20; latest measurable snow in the spring averages April 14, but has been as late as May 6. Snow occurs on 20 to 25 percent of the midwinter days, and most of the snow falls in relatively small daily amounts, with only 2 percent of the midwinter days having more than 4 inches. The heavier snows occur in conjunction with vigorous storm centers moving N across south-central Alaska. Normally, the depth of snowfall on the ground does not exceed 15 inches. Strong, gusty, N winds which occur, on the average, once or twice during the winter will, under favorable snow conditions, cause drifting and packing of snow cover. Although normally an area of light winds, strong "Northers" at Anchorage occasionally result from the rapid deepening of storms in the nearby Gulf of Alaska at a time when the interior is covered by an extensive mass of quite cold air.

(1343) Spring is the period immediately following the famed Alaska "Break-up." This season is characterized by warm,

pleasant days and chilly nights; the mean temperature rises rapidly; precipitation amounts are exceedingly small.

(1344) Summer comprises the period from June through early September, and is, in reality, two seasons of about equal length, the first of which is dry, the second wet. At the time of the summer solstice, possible sunshine in Anchorage amounts to almost 19½ hours, and the sound of singing birds and pounding hammers is nearly as common at midnight as at noon. About the middle of July average cloudiness increases markedly, and the remainder of the summer usually accounts for about 40 percent of the annual precipitation.

(1345) Autumn is brief in Anchorage, beginning shortly before mid-September and lasting until mid-October. The frequency of cloudy days and precipitation drops sharply in early October. Measurable amounts of snow are rare in September, but substantial snowfalls sometimes reaching 10 to 12 inches occasionally occur in mid-October. Some of the stronger southerly winds, a few with damaging effects, occur in the late summer or fall; these are post-frontal winds following the movement of a storm from the southern Bering Sea or Bristol Bay, northeastward across the Alaskan interior. Somewhat less frequent, but more damaging, are the southeasterly "Chugach" winds which are funneled down the creek canyons on the NW slopes of the Chugach mountains E of the city; gusts estimated at 80 to 100 m.p.h. have caused considerable damage to roofs, powerlines and trailers on a few occasions.

(1346) The growing season in Anchorage averages 124 days, with the mean Daily temperature above freezing from April 8 to October 23. May 15 is the average date for the occurrence of a temperature as low as 32°F, while September 16 is the average first date with 32°F in the fall. The latest date with 32°F in spring has been June 6, and the earliest with 32°F in the fall August 16.

(1347) (See page T-4 for **Anchorage climatological table.**)

(1348) **Ice.**–Upper Cook Inlet rarely, if ever, freezes solid because of the enormous tidal range. Vessels can navigate Cook Inlet in the winter, but reinforced hulls are recommended; screws can sustain serious damage unless properly protected. The inlet is ice free from about May to November. The ice floes move with the tide, and patches of open water are occasionally visible.

(1349) **Routes.**–From the entrance point to Cook Inlet, 3 miles S of East Chugach Island Light, set courses to pass 6.5 miles S of the W end of Cape Elizabeth Island, 4.5 miles 208° from Flat Island Light, 6 miles W of Anchor Point Light, 5 miles E of Kalgin Island Light, 5 miles 302° from East Foreland Light; from this position continue on a course to intersect Race Point Range. Follow Race Point Range to a point 1.15 miles 331° from Fire Island Light, then set a course to intersect Point MacKenzie Range at 0.4 mile 319° from Race Point Light. Follow Point MacKenzie Range to the intersection with Point Woronzof Range, thence **081°** to the intersection with Fire Island Range (back range), thence **062°** along Fire Island Range to a point 1.05 miles 304° from Point Woronzof Rear Range Light, thence **070°** to the city of Anchorage facilities.

(1350) **Mariners are cautioned that the Point MacKenzie Range should not be used S of Race Point and that the use of Point Woronzof Range should be limited to higher tide stages.**

(1351) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, and Pilotage, Homer, for details.)

(1352) **Towage.**–Tugs are usually available at Anchorage, but they must lay on the mud at low water, and previous arrangements for their use must be made.

(1353) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(1354) **Quarantine.**–A U.S. Public Health Service Contract Physician is located at the hospital in Anchorage. (See appendix for additional information.)

(1355) **Customs.**–Anchorage is a **customs port of entry.**

(1356) **Coast Guard.**–A **Marine Safety Office** is in Anchorage. (See appendix for address.)

(1357) **Harbor regulations.**–The Port Commission of the city of Anchorage establishes rates and regulations for the port facilities under their control. The Port Director enforces harbor regulations and assigns berthing at all municipal piers, wharves, and bulkheads.

(1358) **Wharves.**–Anchorage has one deep-draft wharf with berthage for three vessels, a petroleum terminal dock, many commercial barge wharves, and a small-boat marina. For a complete description of the port facilities refer to Port Series No. 38, published and sold by the U.S. Army Corps of Engineers. (See appendix for address.)

(1359) Port of Anchorage, General Cargo Terminals No. 1, No. 2, and No. 3: (61°14'23"N., 149°53'13"W.); 2,108-foot face; dredged annually to 35 feet alongside; deck height, varies from 37 to 40 feet; four level-luffing gantry cranes to 40 tons and two 27½-ton container cranes; 35,000 square feet of heated, covered storage, and 26 acres of open storage; water, electricity, and telephone service are available; receipt of general cargo, mostly containerized; owned by Municipality of Anchorage and operated by Sealand Service, Inc., Totem Ocean Trailer Express, and Port of Anchorage.

(1360) In 1992, three submerged obstructions were reported in the vicinity of the terminal in the following approximate positions:

(1361) 61°14'47.4"N., 149°53'14.7"W.

(1362) 61°14'35.4"N., 149°53'12.4"W.

(1363) 61°14'35.8"N., 149°53'14.3"W.

(1364) Port of Anchorage Petroleum Terminal: offshore wharf just S of General Cargo Terminal No. 1; 605 feet of berthing space with dolphins; dredged annually to 35 feet alongside; deck height, 40 feet; receipt of petroleum products, bunkering vessels, occasional receipt and shipment of general cargo; owned by Municipality of Anchorage and operated by Port of Anchorage.

(1365) Kaiser Cement Corp. Anchorage Terminal Dock has a grounded 250-foot LST 0.3 mile S of the Port of Anchorage facilities. Depth alongside, 18 feet to bare; receipt of cement by barge; owned by Kaiser Cement Corp. and The Alaska Railroad and operated by Kaiser Cement Corp.

(1366) Pickworth & Associates Marine Division Dock: a wharf 100 yards S of Kaiser Cement Corp. Anchorage Terminal Dock; 290 feet of berthing space; depth alongside, 16 feet to bare; cranes to 53 tons, and three forklifts are available; 5 acres of open storage; owned by The Alaska Railroad and operated by Pickworth & Associates.

(1367) Anderson Terminal: 400 yards S of Pickworth & Associates Marine Division Dock; 100-foot outer face, 557-foot N side, and 217-foot S side, outer face 11 feet to bare alongside; cranes to 150 tons are available; 10,000 square feet of covered storage, and 7 acres of open storage; receipt and shipment of general cargo and heavy lift equipment by barge; owned and operated by North Star Terminal and Stevedore Co.

(1368) An abandoned fish-processor pier is 50 yards S of Anderson Terminal.

(1369) Pacific Western Lines Cement Dock: 100 yards S of Anderson Terminal and on the N side of Ship Creek; 100-foot wharf with 18 feet to bare alongside, and a 350-foot grounded Liberty ship used as a wharf and storage for cement and barite; cranes up to 40 tons are available; receipt of bulk cement and general cargo by barge; owned and operated by Alaska Aggregate Corp., doing business as Pacific Western Lines.

(1370) Whitney Fidalgo Anchorage Dock: N side of Ship Creek, 300 yards above the mouth; 212 feet of docking space; depth alongside, 3 feet to bare; receipt of fish and seafood; owned and operated by Whitney Fidalgo Seafoods, Inc.

(1371) Anderson Pier (61°17'31"N., 149°54'58"W.), on the W shore of Knik Arm, is accessible only at high water.

(1372) **Supplies.**–Bunker C, gasoline, diesel fuel, and water are available at the Port of Anchorage Petroleum Terminal. Some marine supplies can be obtained in town.

(1373) **Repairs.**–Repair facilities for large ships are limited to machinery. Limited engine and hull repairs are available for small boats.

(1374) **Communications.**–Anchorage isserved by coastwise and ocean freight; truck lines serve the port via the Alaska Highway System. The city is the railroad, highway, and aerial center for western Alaska. It is the headquarters of the Alaska Railroad, the State-owned and operated line which connects with Seward, Whittier, and Fairbanks.

(1375) Highways connect with places on the Kenai Peninsula, Fairbanks, Valdez, and other places in Alaska. The Alaska Highway also provides a land route through Canada to the conterminous United States.

(1376) The International Airport, 4 miles SW of Anchorage, is the hub of trans-Pacific air service; flights are offered to all parts of the world.

(1377) Radiotelegraph, radiotelephone, and cable communications are available. The Port of Anchorage guards 2182 kHz and VHF-FM channel 16 (156.80 MHz); call letters are KBT-42 and WHJ-82, respectively.

(1378) **Small-craft facilities.**–Anchorage Marina, 200 yards S of Whitney Fidalgo Seafoods, Inc. on Ship Creek, has moorage for 40 craft on three floating finger piers from May to November. The floating piers go dry at low water and have about 10 feet alongside at high water. A launching ramp is available. Moorage is free, but is limited to 72 hours. The marina is owned by the State and operated by the city.

(1379) A small-craft float is at the N end of the Port of Anchorage General Cargo Terminal No. 3. A small-craft ramp and float are approximately 300 feet S of the mouth of Ship Creek.

(1380) **Ship Creek,** on the NE side of the Anchorage waterfront, bares at low water and there is no range for entering. Boats rest on the bottom at low water, and local knowledge is recommended.

(1381) From about 7 miles above the entrance to Knik Arm to the head are extensive mudflats that bare soon after high water. The flats are cut by numerous channels and sloughs. The main channel is close to the W shore of Knik Arm, then winds E and N; it is narrow and intricate, navigable only on the tide, and then only with knowledge of conditions.

(1382) **Knik** is a village on the NW side of Knik Arm, about 15 miles above the entrance. Small craft go to Knik at high water and lie on the bottom at the ends of the landings between tides. The channel to Knik is close along the W shore. **Eklutna** is on the S bank at the entrance to Knik River.

5. KODIAK ISLAND

(1) This chapter describes Afognak and Kodiak Islands and the numerous smaller off-lying islands which surround their shores. Also described are the various passes and straits leading between these islands, the port of Kodiak, and the numerous other fishing villages.

(2) **Chart 16580.–Kodiak Island** and Afognak Island, close together and separated from the mainland SW of Cook Inlet by Shelikof Strait, are large and have numerous small islands along their shores. The group is about 54 by 155 miles in extent, with its greatest length in a SW direction. The land is rugged and mountainous, with elevations of 2,000 to 3,000 feet along the shores and more than 4,500 feet in the interior. The rocky shores are indented by deep, narrow inlets.

(3) The 1912 eruption of Katmai Volcano, on the mainland 90 miles W of Kodiak, covered this group with a thick deposit of volcanic ash. The effects of the eruption have gradually disappeared and large ash deposits are seen only in a few places.

(4) Kodiak, on Kodiak Island, is the principal business center in the area. Afognak Island, mostly timbered, is a Government forest reserve. Some cattle and sheep are raised, and a few mineral prospects have been located. Salmon canneries operate during the fishing season. The crab, halibut, and herring fisheries also are important; the halibut fleet operates on Albatross and Portlock Banks. The periods of good weather are longer on these islands than on the adjacent mainland, and considerable success has been attained in growing vegetables.

(5) Afognak Island is separated from Kodiak Island by Marmot Bay, Kupreanof Strait, and the passages on either side of Whale Island. These waters provide a direct route from Kodiak Harbor to Shelikof Strait. Kodiak, on the NE coast of Kodiak Island, lies behind the islands in the NW part of Chiniak Bay; one approach is from the N, and the other is from the SE through Chiniak Bay.

(6) **Weather.**–On Afognak Island the prevailing winds are NE except in spring and again in late summer when they shift to SW and W directions. At Kodiak, the winds, usually NW in late fall, winter, and spring, shift to NE in early summer and then to SE until the end of September. The average wind speed is 20 knots at Kodiak, and the area is subject to violent williwaws.

(7) Annual precipitation averages 67 inches on Kodiak Island, and 53 inches on Afognak Island. Annual snowfall averages 47 inches at Kodiak, and measurable snow has been recorded in every month of the year except July and August.

(8) Mean annual temperature is 41°F at Kodiak. Extreme temperatures noted were 85°F in August and –2°F in January. Water temperatures are about 1°F lower than air temperatures in summer, and 1° and 2°F higher in late fall, winter, and early spring. Womens Bay, on the NE coast of Kodiak Island, is frequently blocked by ice in midwinter.

(9) Fogs are common over the area and are most frequent at Kodiak in June and July. Cloudiness is considerable.

(10) **Chart 16604.–Shuyak Island** appears as part of the N end of Afognak Island, but is separated from it by Shuyak Strait. The S portion is densely wooded, with the higher hills showing bare rocky outcrops. Proceeding N the trees gradually disappear and the N part is entirely grass covered.

(11) **Stevenson Entrance,** the passage between the Barren Islands and Shuyak Island (see chapter 4), is navigable in clear weather. **Kennedy Entrance,** the passage N of the Barren Islands, is generally used if bound for Shelikof Strait from the E.

(12) **Latax Rocks,** the northernmost feature of the Kodiak-Afognak-Shuyak group, are three rocky islets lying in line of the trend of the W coast of Shuyak Island. They are 32, 27, and 20 feet high, respectively, the outer one being the lowest and the most ragged. A rock, which uncovers 7 feet, is about 0.5 mile N of the outermost rock, and a reef, which uncovers 6 feet, is about 0.4 mile W of the outermost rock. Several detached shoals are in the vicinity of Latax Rocks. Ships using Stevenson Entrance should pass N of Latax Rocks. **Latax Rocks Light** (58°41.4'N., 152°28.9'W.), 40 feet above the water, is shown from a pile with a red and white diamond-shaped daymark on the N end of the northernmost rock.

(13) **Current.**–In the vicinity of Latax Rocks it has been noted that the current flows in a W direction on a rising tide and E on a falling tide with velocities reaching about 3 to 4 knots. The current appears to be less in the deeper water in the passage N of Latax Rocks. (See chapter 4.)

(14) **Tide rips** in the vicinity of Latax Rocks are particularly heavy and should be avoided by small vessels. (See caution as to tide rips in the locality of the Barren Islands, chapter 4.)

(15) **Party Cape** is the NW end of Shuyak Island. It is 178 feet high and grass covered for 1 mile or more back.

(16) **Dark Island,** between Party Cape and Latax Rocks, is about 0.8 mile in diameter, 115 feet high, and grass covered. Several large black rocks are off the SW end of Dark Island. **Starr Rocks,** which uncover 6 feet, are between Dark Island and the E part of Party Cape.

(17) Currents observed during one-half day in June on the SW side of Dark Island set W on the flood with a velocity of 1.3 knots. The ebb velocity was 1 knot.

(18) The passage between Latax Rocks and Dark Island has a 5¼-fathom shoal near the middle where the currents and tide rips may appear heavier than elsewhere in the passage. The passage can be used by well-powered vessels by keeping 0.45 mile N of Dark Island on a due E or W course, with careful attention to the set from the strong currents.

(19) **Dark Passage,** between Starr Rocks and Party Cape, may be navigated by keeping 0.4 mile off the cape and passing N of a rock 3 feet high lying 0.9 mile WNW of Party Cape. Because of the strong currents and heavy tide rips, the passage should be avoided.

(20) Shag Island and the W coast of Shuyak Island are described later in this chapter.

(21) The N coast of Shuyak Island from Party Cape to Point Banks is very irregular and fringed with numerous rocks and islets. Heavy currents and tide rips are found along this coast. **Carry Inlet** and **Shangin Bay,** the main indentations, are narrow and tortuous. They may be used only by small craft with local knowledge. Carry Inlet has its entrance channel about 2 miles SE of Party Cape. The narrowest part of Shangin Bay, 1.2 miles from its entrance, has a midchannel rock which is awash at minus tides.

(22) **Perevalnie Islands,** 95 feet high and grass covered, are close to the N shore of Shuyak Island and 0.5 mile W of

Point Banks. **Perevalnie Passage,** between the islands and the mainland, may be used as a boat passage with a depth of about 5 feet.

(23) Temporary anchorage during S weather appears feasible 1 mile WSW of the W end of Perevalnie Islands.

(24) **Point Banks,** an island about 0.4 mile long, and 130 feet high, is entirely grass covered. The narrow passage between it and the NE end of Shuyak Island has several rocks and is choked with kelp.

(25) **Sentinel Island,** a rock 33 feet high 0.9 mile NW of Point Banks, is a good landmark from the E or W. Its sides are nearly vertical.

(26) Fronting the E coast of Shuyak Island, 1.5 to 3.5 miles offshore, are a series of reefs and rocks separated by broken bottom areas and extending 7 miles in an approximately true S direction from a 2½-fathom reef, 1.4 miles SE of Point Banks, to the vicinity of a bare rock 52 feet high. A similar series crosses the former in the latitude of Sea Otter Island.

(27) **Routes.**–Vessels using the passage along the E coast of Shuyak Island, inside the series of reefs and rocks, should proceed with caution. The bottom in this passage is extremely broken. It is considered that only a wire-drag survey would prove the absence of all dangers. The known dangers may be avoided by rounding the SE end of Point Banks Island by 0.5 mile until the E end of the island bears true N. Then proceed 5.8 miles on course **175°** until the prominent group of rocks, highest 15 feet, are a little less than 0.8 mile to the W, then steer **205°** into Perenosa Bay. Tidal currents are very strong.

(28) The main approach from seaward to Andreon Bay, Shuyak Strait, and Perenosa Bay, is S of the rocks SE of Sea Otter Island and between the 52-foot bare rock and Seal Islands, but its use by large vessels cannot be recommended. Indications of shoals along the approach are numerous, but they have not been examined with the wire drag. There are evidently pinnacle formations in this region. To avoid the known areas of extreme broken bottom, steer course **282°** from seaward, pass 3.2 miles N of Tolstoi Point, then 1.9 miles S of the large rock, 52 feet high, lying SW of Sea Otter Island, and then pass 1.5 miles N of the sharp black rocks N of Posliedni Cape.

(29) **Sea Otter Island,** 7.5 miles SE from Point Banks, is grass covered, 0.4 mile long, and 105 feet high. Bare rocks and breakers extend to the E and SE for 2.3 miles.

(30) **Little Fort Island,** 85 feet high, off the E coast of Shuyak Island and 8 miles S of Point Banks, is grass covered and marks the entrance to Andreon Bay. **Big Fort Island** forms the S side of the bay. **Big Fort Channel** separates the island from the mainland. This channel bares at half tide. Anchorage for small boats may be had in **Andreon Bay** near the entrance to Big Fort Channel in 12 fathoms, muddy bottom. The axis of the entrance channel is a little less than one-third the way from the NE end of Big Fort Island to Little Fort Island, it then follows the rounded N end of Big Fort Island about 350 to 400 yards offshore.

(31) Shuyak Strait has a navigable entrance at its W end and is described later in this chapter.

(32) **Perenosa Bay,** on the N side of **Afognak Island,** is between the E entrance to Shuyak Strait and **Posliedni Point.** The NW part of the bay is foul. Anchorages may be found in several arms of Perenosa Bay, but the approach to the bay from seaward is characterized by a very broken bottom, as described above.

(33) **Delphin Bay** is the W one of the S arms of Perenosa Bay. The channel W of tree-covered **Delphin Island** is foul. Rocks are in the center of the passage E of the island, and the best water is 270 yards off the E points of Delphin Island. Boats can anchor in 16 fathoms, hard bottom, in the center of the head of the arm, after passing the island. A heavy swell comes into Delphin Bay in N weather.

(34) **Discoverer Bay,** the SE arm of Perenosa Bay, has excellent anchorage in 15 fathoms, muddy bottom, E of **Discoverer Island,** which is tree covered and northernmost in the bay. A 3¾-fathom shoal is about 0.5 mile NW from the E entrance point, and a 1-fathom spot is between the shoal and the point. Small boats can enter the channel on the W side of the island and go to the head of the arm. Two mooring buoys are in the SE part of Discoverer Bay.

(35) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(36) The Kodiak Island area is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(37) Vessels using Southwest Alaska Pilots Association pilots and en route to Discover Bay can meet the pilot boat about 2 miles N of Posliedni Point (58°26.0'N., 152°20.0'W.).

(38) The pilot boat can be contacted by calling "DISCOVERER BAY PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(39) **Phoenix Bay,** the arm of Perenosa Bay just W of Posliedni Point, is a good anchorage for all weather except NW; anchor in 10 to 17 fathoms, muddy bottom, 1.2 miles from the entrance. **Shields Point** forms the W entrance of the bay.

(40) **Seal Bay,** in general, extends from Posliedni Point to **Tolstoi Point.** From a point 1.1 miles N from Posliedni Point a series of rocky islands and reefs extend in an ESE direction across Seal Bay. Navigation in this area should not be attempted without local information.

(41) **Tonki Bay,** on the W side of Tonki Cape, has two arms separated by a headland. A 106-foot rocky islet is 0.5 mile N of the headland. Three rocks awash are about 0.3 mile from the E shore and 2 miles S of Tonki Cape. Anchorage is about 0.3 mile from the head of the E arm in 10 fathoms, soft bottom, but it is not secure with N winds. Small boats may anchor in the small cove on the E side of the head of the E arm in 8 fathoms, muddy bottom, in any weather.

(42) The W arm of Tonki Bay extends 6.5 miles S of the headland separating the two arms. Anchorage may be had in 18 fathoms, muddy bottom, about 0.3 mile from head of the arm.

(43) On the E part of Afognak Island is a series of mountain ridges with low depressions between them running through the island from N to S. From a distance Marmot Island appears as the easternmost of these ridges. The lower parts of Afognak Island are wooded, except its E coast, and its SW end S of Paramanof Bay.

(44) **Caution.**–In making Tonki Cape or Marmot Strait from the N, a very irregular set to the W has been experienced. In foggy weather a vessel is liable to be too close to the breakers off Sea Otter Island unless precautions are taken. Likewise in running to this locality from Seward, abnormal set has been experienced. From the experience of a survey vessel making these runs and in lying-to offshore, there seems to be two factors for which allowance should be made. First, if the run is made during the time of a flood spring tide, extra allowance should be made for set to the W. Second, if the course of the vessel passes over a bank or even a locality where the water is shoaled, extra allowance for a stronger current should be made.

(45) **Tonki Cape,** the NE end of Afognak Island, is a narrow grass-covered point 87 feet high near its N extremity. A

low-lying gap connects it with the ridge separating Tonki Bay and Marmot Strait. A short reef extends N from the cape 0.3 mile, terminating in a rock awash at high water. It is recommended that vessels clear the N end of the cape by at least 1.5 miles. **Tonki Cape Light** (58°21.1'N., 151°59.2'W.), 75 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark.

(46) **Sealion Rocks** are two bare rocks close together, the larger about 35 feet high, about 5.5 miles E from Tonki Cape and 4 miles N from Marmot Island. A reef that uncovers 7 feet is 0.6 mile NE from these rocks. Sealion Rocks have been used as a bombing target.

(47) **Marmot Island,** about 6.5 miles long, parallels the E side of Afognak Island. Marmot Island is wooded to a height of about 500 feet. The N end is low and rises gradually to the highland. The E side and S end of the island are bluffs over 1,000 feet high in places. The W shore is also steep but lower. Three high rocks are close to **Marmot Cape,** the S end of the island, and two more are close to its SE side.

(48) The SE shore of Marmot Island is a Steller sea lion rookery site. There is a 3-mile vessel exclusionary buffer zone around all but the NW shore of the island. (See **50 CFR 227.12,** chapter 2, for limits and regulations.)

(49) Shoal areas adjacent to the NW shore of Marmot Island extend N toward Sealion Rocks and border the N approach to Marmot Strait. A 4-fathom spot in this area is 2 miles off the N end of Marmot Island.

(50) The point on the NW shore of Marmot Island, 1.5 miles from the N end, is marked by a rock, 12 feet high, 600 yards offshore.

(51) Two covered rocks, on which the sea generally breaks, are about 1 mile apart and 2.5 miles E of **Cape St. Hermogenes,** the E end of Marmot Island. The N rock lies in the bearing 288° to the N end of the island. The S rock lies in the bearing 225° to the SE end of the island. Two pinnacle rocks close to the SE side of Marmot Island bear 232° when in range, the range passes SE of both breakers. A vessel should pass over 2 miles outside the breakers to avoid broken bottom.

(52) **Marmot Strait,** between Afognak and Marmot Islands, is 2.5 miles wide at its narrowest part. The strait is apparently free from dangers except along the shores. A shoal of 1¼ fathoms is 650 yards off the W shore of Marmot Strait, 6 miles from Tonki Cape. A midchannel course through the strait is recommended. Tidal currents have an estimated velocity of 1 to 3 knots, the flood setting N through the strait.

(53) **King Cove,** 6 miles W of Marmot Cape, is an open bight 1.5 miles long, indenting the coast 1.8 miles. It may be used as a temporary anchorage in 7 to 12 fathoms, sand bottom. It is exposed to E and S weather.

(54) The W coast of Marmot Strait for about 5 miles S from Tonki Cape is broken and rocky, with reefs extending offshore. Along this stretch is a low bluff with a grass- and muskeg-covered plain, extending 0.3 mile inland to the main ridge which rises abruptly. S to King Cove the bluffs increase in height with the shores steep-to. From King Cove to Pillar Cape the shoreline is a steep, bare bluff from 500 to 1,000 feet high.

(55) **Charts 16594, 16576.–Marmot Bay** extends W between Afognak and Kodiak Islands to Whale Island. In the center of the bay, near the entrance and N of The Triplets, in places the bottom rises abruptly from deep water to 14 to 17 fathoms. These areas should be avoided because there may be less water than indicated.

(56) The route from Marmot Strait to Kodiak is E of the broken bottom in the center of Marmot Bay entrance. However, shoal spots exist along this route E of Spruce Island and in the vicinity of Spruce Cape.

(57) The route in Marmot Bay from the vicinity of Marmot Strait to the passes at Whale Island lies between the general broken ground in the center of the bay and the N shore. Pillar Cape may be rounded at 1.5 miles in depths of 20 fathoms or more. Similar depths exist 0.8 mile off Cape Izhut. In the W end of Marmot Bay danger will be avoided by keeping well E of a line between the E end of Cape Kostromitinof and Stripe Rock, and E of this line extended S until Hog Island is open from the NW side of Whale Island.

(58) The route along the S side of Marmot Bay through Narrow Strait and Whale Passage is generally used by vessels from Kodiak bound for Shelikof Strait. Passage at the time of maximum current in Whale Passage should be avoided. Current predictions for Whale Passage may be obtained from the Tidal Current Tables.

(59) **Pillar Cape,** the outer end of the N shore of Marmot Bay, is a bluff over 500 feet high, similar to the SE side of Marmot Island. A high pinnacle rock is at the foot of the bluff, 0.5 mile E of the S end of the cape. About 1.5 miles W of the cape is an open bight from which lowland extends through to the W arm of Tonki Bay.

(60) **Izhut Bay,** a N arm of Marmot Bay, is about 5 miles wide between Pillar Cape and Peril Cape and extends about 7.5 miles in a NW direction. The only dangers are along the shores and in the arms of the bay. The bay proper is exposed to S weather, but some of the arms afford protected anchorages.

(61) The most important of these anchorages is **Kitoi Bay,** an arm on the W side. Its head is a landlocked basin about 0.5 mile in diameter. The swinging radius from the center of the basin is about 300 yards. To enter Kitoi Bay pass the N entrance point of this arm slightly less than 0.5 mile off on a course **305°,** picking up the range defined by the prominent point on the N side about 1.8 miles in and the stream at the head of the small bight at the head of the arm. Continue on course or range until 0.3 mile from **Midarm Island,** a small prominent midbay island, 50 feet high. This position is between another islet 600 yards to starboard and a 3-fathom spot 125 yards to port. The islet on the starboard beam is 100 yards from the N shore. The 3-fathom spot is marked by only a few streamers of kelp which are difficult to see. Then change course to pass S of the islet and steer midchannel course to the center of the basin which is clear to within a few yards from shore. A low-water spit extends a few yards off the N entrance point of the basin. Anchor in 20 to 22 fathoms, good holding ground. Small vessels may anchor in a small bight SW of the basin in 11 to 12 fathoms.

(62) Two fingerlike arms in the NE part of Izhut Bay extend N about 5 miles. **Saposa Bay,** the E arm, has an island about 0.5 mile from its entrance. A rock, covered ½ fathom, is about 125 yards S of the island. The passage is W of the island. The controlling depth is 2 fathoms. Small vessels may anchor above the island in 7 to 10 fathoms, sand bottom. The W arm is not recommended as an anchorage.

(63) **Peril Cape,** the outer end of the W shore of Izhut Bay, is a prominent precipitous headland about 600 feet high with a high pinnacle rock close to its S side.

(64) **Cape Izhut,** 2.5 miles SW of Peril Cape, is a projecting, long, wooded, hilly point from 250 to 500 feet high. There is deep water around the cape as close as 0.3 mile.

(65) **Duck Bay** is about 6 miles long from Cape Izhut to Cape Kostromitinof. At the E end of the bay temporary anchorage, with a swinging radius of about 300 yards, may be had in the middle of the cove 1.5 miles NW of Cape

Izhut, in 6 to 7 fathoms. The anchorage is E of an islet, 16 feet high, 0.3 mile from the N shore and should not be approached closely. **Selezen Point** forms the W side of the cove.

(66) A round, rocky island, 168 feet high and grass covered on top, is 2.5 miles W from Cape Izhut and 0.6 mile from shore. Kelp extends nearly 0.3 mile W and N of the island, and numerous bare rocks extend 0.5 mile E of the island and to the shore NE of it. On **Selezen Bay,** the cove N of the island, is the small native settlement of **Little Afognak.** Temporary anchorage may be had in the middle of the cove in 10 to 12 fathoms. Enter the cove W of the island between the island and a large rock awash at high water, which lies 0.3 mile S from the W point of the cove.

(67) **Mary Anderson Cove,** the next cove W, with its entrance 1 mile NW of the 168-foot island, is 1 mile long and 0.7 mile wide. The bottom is rocky and kelp extends some distance from shore in places. Small craft entering with care can anchor in 5 to 8 feet at the head.

(68) **Cape Kostromitinof,** on the N shore of Marmot Bay, is a projecting, long, level, wooded point, about 200 feet high, with bluffs in places at the water. N from the cape the land rises gradually in a distance of 5.5 miles to **Duck Mountain,** a prominent peak, 2,048 feet high.

(69) **Kazakof Bay,** referred to as **Danger Bay** by local fishermen, extends 6 miles in a N direction from the NW part of Marmot Bay. Anchorage for small vessels is found at the head of the bay. (See Routes, Kazakof Bay.)

(70) The cove on the E side, 3.5 miles above the entrance to Kazakof Bay, affords shelter for a small vessel anchored in 12 to 14 fathoms. Small craft can anchor in the SE end of the cove in about 5 fathoms. A reef extends about 100 yards off the S side of the entrance. The small bight in the E shore is shoal. In 1981, a logging camp was operating on the E side of the cove.

(71) **Parrot Island,** round, rocky, and 70 feet high, is in the entrance to Kazakof Bay. Channels for entering are on either side of the broken ground on which Parrot Island and other rocky islets and rocks awash are grouped. A submerged ledge with some kelp and a depth of 3½ fathoms is about 0.8 to 1.5 mile SE of Parrot Island; its N end is 0.5 mile off Cape Kostromitinof.

(72) **Stripe Rock,** 2.8 miles S of Parrot Island, is marked by a prominent white streak which extends along the entire height of the rock. It is composed of two pinnacles close together, about 35 feet high; the white streak is on the higher of the two pinnacles. A large bare ledge, 30 feet high, is between Stripe Rock and Parrot Island.

(73) W of Stripe Rock and the large bare ledge, the area extending to the shore is mostly foul and should be avoided by vessels.

(74) **Routes, Kazakof Bay.**–From E, shape the course for a position about 0.5 mile S of Cape Kostromitinof. Head for Parrot Island on a **305°** course until the SW end of the cape is a little forward of the beam. Change to **330°** and pass 0.25 mile off the SW end of the cape and the same distance NE of Parrot Island.

(75) Then steer **359°,** with Parrot Island astern, to the head of the bay. Above Parrot Island, give the shores a wide berth and avoid the low bare rock about 0.4 mile from the E shore and about 0.6 mile from the head of the bay. The anchorage is about 0.4 mile W of this rock in about 18 fathoms, mud and gravel bottom. The head of Kazakof Bay separates into two arms. Small vessels can anchor in 8 to 10 fathoms, either in the broadest part of the W arm 0.3 mile from its head, or in the entrance to the E arm.

(76) From SW, keep Hog Island open from the NW side of Whale Island until Stripe Rock is in range with the E side of Cape Kostromitinof. Then steer **041°** for 2.3 miles to a position 0.25 mile E of Stripe Rock. Then steer **006°** for 1.1 miles to a position 0.25 mile E of a bare ledge about 15 feet high. Then steer **333°** for 0.9 mile. Then steer **358°** for 0.8 mile, keeping Stripe Rock open W of the bare ledge astern until Parrot Island is 0.5 mile on the starboard beam. From this position a **005°** course will lead to the head of the bay.

(77) **Afognak Bay,** the W tributary to Marmot Bay, makes into Afognak Island about 3.5 miles. There is secure anchorage off an abandoned cannery at **Rivermouth Point,** near the head. (See Routes, Afognak Bay.) **Litnik** is an abandoned village on **Afognak River** at the head of the bay. The approach from Marmot Bay is through **Eastern Passage,** between Hog Island and Big Rock, which are off Afognak Bay. This approach is endangered by a rock awash, marked by a buoy, 0.6 mile SE of Big Rock. Foul ground marked by kelp extends about 350 yards from Hog Island into Eastern Passage, and shoal water extends about 0.3 mile SSW of Big Rock.

(78) A straight channel, bordered by dangers, leads from Eastern Passage to the central part of Afognak Bay. On the NE side of the channel are the Skipwith Reefs, with shoal water projecting channelward. On the SW side are **Danger Reef,** which uncovers about 5 feet. An unmarked 3¼-fathom shoal is 0.9 mile SE of the reef. A rock, covered 2¼ fathoms, is 0.6 mile NW of Danger Reef.

(79) **Hog Island** is the prominent mark for approaching Afognak Bay and also Afognak Strait. It is 0.4 mile long and has two wooded knolls with a saddle in between.

(80) **Hog Island Light** (58°00.2′N., 152°41.2′W.), 40 feet above the water, is shown from a square frame with a red and white diamond-shaped daymark on the S side of Hog Island.

(81) **Big Rock,** 1 mile from Hog Island with Eastern Passage between, is comparatively narrow, irregular, and 100 yards long in a N and S direction.

(82) **Skipwith Reefs,** a chain of bare rocks and reefs, extend about 2.5 miles NW from the rock awash in Eastern Passage to Lamb Island. The SW side of the rocks should be given a berth of over 0.4 mile.

(83) **Lamb Island,** 0.5 mile long and wooded, is near the point which marks the outer end of the E shore of Afognak Bay. The area between the point that marks the outer end of the E shore of the bay and Lamb Island is foul and should be avoided.

(84) **Alexander Island,** 0.8 mile E of Lamb Island, is grass covered and has a knob about 80 feet high at its N end. Foul ground surrounds the island and extends 1.2 miles toward Stripe Rock.

(85) **Dot Island,** small and wooded, is the westernmost of three small islands close to **Posliedni Point,** where Afognak Bay narrows to 0.5 mile. On the W shore opposite Dot Island is a cascade where water can be obtained by boat.

(86) **Graveyard Point** marks the outer end of the W shore of Afognak Bay; **Lipsett Point** is the next point inside the bay. **Aleut Village** is on the shore of the bight between these points.

(87) **Village Reefs,** partly bare at low water and covered with kelp, extend over 1 mile E from the shore around Graveyard Point toward Hog Island. The point of the reefs is midway between Graveyard Point and Hog Island. SE from the point of the reefs is a detached shoal with a least found depth of 3½ fathoms. Between this shoal and the reef extending 650 yards W from Hog Island is a channel 0.5 mile wide. The channel is sometimes used by vessels, with local knowledge, to enter Afognak Bay from Afognak Strait.

(88) **Head Point** is 1.4 miles S of Graveyard Point, and between these points is the former village of **Afognak,** whose

inhabitants moved to Settler Cove in 1965. The white church with green roof, 0.3 mile S of Graveyard Point, is the best mark in the village.

(89) Small vessels can anchor in 5 fathoms near the kelp on Village Reefs, with the church in Afognak bearing 344° and Head Point in line with Deranof Rock. Little current will be felt here, but there is exposure to E winds.

(90) **Routes, Afognak Bay.**–From NE, keep Hog Island open from the NW side of Whale Island, bearing anything W of **250°**; this range will lead about 0.3 mile SE of the rock awash 0.6 mile SE of Big Rock. After Big Rock appears in range with the E end of Lamb Island, turn to pass midway between Big Rock and Hog Island, and steer **315°** for the old cannery building at Rivermouth Point, showing midway between Dot Island and Posliedni Point. Keep this range for about 2 miles until the W end of Lamb Island is abeam. Then steer **308°** for 1.8 miles and pass 400 to 500 yards S of Dot Island. Keep this course for about 0.3 mile past Dot Island until 0.25 mile off the cascade on the W shore. Then steer **353°** for 0.8 mile, favoring slightly the W shore. Anchor near midchannel off the old cannery at Rivermouth Point in 8 to 10 fathoms. The anchorage is clear if **Winter Island,** in the W arm, is given a clearance of 300 yards and **Last Point,** on the N shore, 400 yards.

(91) From S steer **359°,** with Big Rock and the SW end of Alexander Island on range ahead, to pass E of Hog Island. When the N end of Hog Island is abeam, turn from the range to pass midway between Big Rock and Hog Island.

(92) **Whale Island,** at the W end of Marmot Bay, is about 4 miles in diameter. Its S half is a grass-covered mountain, 2,028 feet high, with a narrow light streak down its E slope. The N side of the island is low, and the lower parts of the island are generally wooded. **Treeless Islet,** rocky and grass covered, is 0.4 mile off the E side of the N end of the island. Whale Passage and Afognak Strait are S and N of Whale Island, respectively.

(93) **Afognak Strait,** between Whale and Afognak Islands, is used mostly by small vessels.

(94) The currents in the strait are only half as strong as in Whale Passage. The dangers are marked by kelp, which grows in depths up to about 6 fathoms and shows at slack water.

(95) If precaution is taken, navigation is not difficult on a clear day when the marks for the strait can be seen, and when the summit of Kupreanof Mountain is not hidden. The range formed by this mountain peak and Deranof Rock, off Deranof Island, effectively marks the channel through Afognak Strait, except in the central part of the strait and just inside the W entrance. In the central part of the strait the range passes close to the edge of foul ground making out from the N shore; here a vessel should guard against going anything N of the range. Just outside the W entrance, a 2½-fathom depth on a rock lying 600 yards from the Whale Island shore is on or a very little N of the range. The channel is just S of the rock, and here it is necessary to deviate a little S of the range to avoid the rock; the channel is only 300 yards wide between the 2½-fathom rock and the reef making out from Chiachi Point; the general depth is 24 feet.

(96) A reef awash is 0.4 mile NNW from Chiachi Point or 400 yards N of Kupreanof Mountain-Deranof Rock range.

(97) Most of the N half of Afognak Strait is foul. SW of Head Point the foul ground extends 0.3 mile offshore and its S edge is near the Kupreanof Mountain-Deranof Rock range.

(98) **Dolphin Point** is the NE end of Whale Island. A reef, partly bare at low water, extends 600 yards from Whale Island at a point 0.3 mile W of Dolphin Point.

(99) **Fox Bay,** the bight in Whale Island 1 mile W of Dolphin Point, has in its entrance a reef which uncovers at low water. A small vessel can anchor in the bay inside the reef in 4 to 5 fathoms, but the S shore must be given a berth of 300 yards.

(100) W of Fox Bay the shore of Whale Island is clear to **Chiachi Point,** the NW end of the island, from which a shelving reef makes out about 350 yards in a NW direction.

(101) Temporary anchorage may be had in the channel of Afognak Strait between Fox Bay and former Afognak village, in 7 to 8 fathoms, but exposed to the full strength of the currents and to E and N winds.

(102) A good anchorage in Afognak Strait, but exposed to E weather, can be had in 5 to 7 fathoms about 400 yards off a gravel beach on the SE end of Little Raspberry Island. The bottom is sand and gravel and the anchorage is suitable for large or small vessels. To make this anchorage from the E, hold a **270°** course with the S end of Little Raspberry Island ahead. The end of this island can be recognized as the N side of the passage N of Deranof Island. Remain on the bearing **270°** on the S end of Little Raspberry Island in order to avoid foul ground off Shoal Point and to avoid a rock S of this course which uncovers 1 foot. This rock is marked by kelp which tows under at most stages of the tide. If this course is used coming into this anchorage, or for small vessels in The Narrows, it is possible to select a good range for this course, with the S tip of Little Raspberry Island against the slope of a mountain on Raspberry Island near Last Timber Point.

(103) With E winds, small vessels can anchor in about 4 fathoms about 0.3 mile W of **Afognak Point,** on the N side of Afognak Strait; caution is required. When rounding into the anchorage, pass NE of a reef, bare at low water, 0.4 mile SW of the point; give the point a berth of over 300 yards.

(104) **Deranof Island,** 0.5 mile long, low and wooded, is the southernmost and largest of the islands at the W end of Afognak Strait.

(105) **Deranof Rock,** about 15 feet high, is nearly 200 yards S of the island. Broken ground with a least depth of 2½ fathoms is 0.4 mile E of the island and 074° from Deranof Rock.

(106) **Tides, Afognak Strait.**–High and low water occur about ½ hour later than at Kodiak. The diurnal range of tide is about 10 feet.

(107) The **tidal currents** in Afognak Strait set W on the flood and E on the ebb. The estimated velocity is 2 to 5 knots at strength, depending on the range of the tide. During the flood there is a strong set into Raspberry Strait; this should be kept in mind when in the W end of Afognak Strait.

(108) **Routes, Afognak Strait.**–From E in Marmot Bay, keep Hog Island open from the NW side of Whale Island, bearing anything W of **250°**; and pass 0.25 mile or more S of Hog Island and 0.5 mile N of Dolphin Point.

(109) Passing 0.5 mile NW of Dolphin Point, steer for Deranof Rock in range with the summit of Kupreanof Mountain; or if the mountain is obscured, steer for Deranof Rock with the S end of Hog Island astern,course **253°.** Off Head Point and for 0.8 mile to the W, go nothing N of the range. When approaching the W end of the strait, keep a little S of the range to avoid the rock with 2½ fathoms over it; but give the shore of Whale Island a berth of over 300 yards; on the flood, guard against a N set toward Raspberry Strait.

(110) When the E one of the two highest peaks on the S side of Whale Passage opens W of Whale Island, bearing 184°, steer **238°** and pass 0.25 mile SE of Deranof Rock. Continue the course 0.8 mile past the rock, and then steer **286°** with the summit of Whale Island astern. This course made good will lead through Kupreanof Strait, passing 0.4

to 0.5 mile S of Gori Point, 0.9 mile N of Outlet Cape, and 0.5 mile S of Malina Point.

(111) Raspberry Strait is described later in this chapter.

(112) **Raspberry Island,** extending from Shelikof Strait to Afognak Strait, is about 15 miles long in a NW and SE direction, and averages about 5 miles wide. On the NE side it is separated from Afognak Island by Raspberry Strait, and Kupreanof Strait borders its SW side. This island is rugged and mountainous with elevations up to 2,350 feet. Most of the shores are bold and precipitous except where numerous valleys meet the shore. The island is grass-covered except along the Shelikof Strait side, where it is for the most part bare sheer cliffs, and along the SE half of Raspberry Strait where the island is heavily covered with spruce.

(113) The description of features along the various shores of this island is given in connection with the information pertaining to Kupreanof, Raspberry, and Shelikof Straits.

(114) **Whale Passage,** S of Whale Island, joins **Kupreanof Strait** to form a part of the main route between Kodiak and Shelikof Strait. Strong tidal currents occur in Whale Passage. Eddies may cause vessels to veer toward danger. The S shore of Whale Passage is foul with rocks and kelp; the N shore is generally clear of obstructions. The islands bordering both sides of Kupreanof Strait are grass covered and mountainous, especially the N shore which rises abruptly. The timber extends W along the shore to Last Timber Point and Dry Spruce Island, where it terminates except for scattered clumps. Navigation in the daytime is not difficult when the current is not too strong; however, careful attention to steering is required under any condition.

(115) **Ilkognak Rock Light 1** (57°54.8'N., 152°47.0'W.), 18 feet above the water, is shown from a skeleton tower, with a square green daymark in the middle of the E entrance to Whale Passage. Broken ground, covered 3½ fathoms, is 0.3 mile E of the light, and a rock, covered 2¾ fathoms, is 0.1 mile W of the light. Broken ground, covered 3½ fathoms, is 0.2 mile NE of the light. A strong ebb current, heavy swirls, and upwelling occur in the wake of this broken ground, and dangerous tide rips prevail at such times with NE gales. A rock, awash at high water, is near Whale Island, 0.4 mile N of the light. A rock, covered 2 fathoms, is 0.3 mile off Whale Island and 0.9 mile NW of the light; heavy swirls and eddies occur in this area.

(116) **Shag Rocks,** 0.4 mile SW of Ilkognak Rock Light 1, uncovers about 5 feet.

(117) **Koniuji Island,** marked by a light, 0.3 mile from the S side of Whale Passage and 2 miles NW of Ilkognak Rock Light 1, is 40 feet high and grass covered. Kelp extends 0.2 mile W from the island. Koniuji Island should be given a good berth on the N side as the current sets toward it at times.

(118) **Kupreanof Strait,** 1.8 to 3 miles wide, is clear in midchannel but several shoal spots must be avoided.

(119) **Chernof Point,** on the S shore of Kupreanof Strait, 5.3 miles W of Ilkognak Rock Light 1, is low and wooded but prominent. A ledge of rock about 150 feet long and 50 feet wide, 0.5 mile W of the point and 0.2 mile offshore, uncovers about 5 feet; it is marked by heavy kelp. **Ostrovka Point,** 2 miles W of Chernof Point, is low and wooded; a high grassy islet is close-to.

(120) Broken ground, covered 4½ to 10 fathoms, extends 4.5 miles NW from Chernof Point up to 0.8 mile off Ostrovka Point and Dry Spruce Island.

(121) **Last Timber Point Light 6** (57°58.7'N., 152°58.8'W.), 35 feet above the water, is shown from a small house with a triangular red daymark on the point on the N side of Kupreanof Strait, 7.4 miles NW of Ilkognak Rock Light 1. **Thomas Rock,** 1.5 miles SE of Last Timber Point Light 6, is awash at low water; a patch, covered 6 fathoms, is 0.3 mile SW of the rock.

(122) **Gori Point,** 2.5 miles W of Last Timber Point Light 6, is the base of an abrupt sloping ridge with its summits close to the shore.

(123) **Kupreanof Mountain,** on Kupreanof Peninsula 10 miles W of Ilkognak Rock Light 1, is 2,440 feet high and consists of prominent broken gray rock.

(124) **Dry Spruce Island,** on the S side of Kupreanof Strait 8.5 miles W of Ilkognak Rock Light 1, is 225 feet high and wooded. **Dry Spruce Island Rock Light 7** (57°57.9'N., 153°04.2'W.), 30 feet above the water, is shown from a post with a square green daymark off the NW end of the island on a ledge which uncovers about 6 feet. Two grassy islets and a pinnacle rock are off the N side of the W end of the island.

(125) A small wooded island and shoals, dry at low water, are between Dry Spruce Island and **Drying Point,** the end of the mainland on the N side of Dry Spruce Bay.

(126) **Bare Island,** just W of Dry Spruce Island, is partly wooded on its E half. **Dry Spruce Bay Entrance Light** (57°57.3'N., 153°06.2'W.), 76 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on a small grassy island 0.4 mile W of Bare Island.

(127) **Anchorages.**–Temporary anchorage can be had in the bight on the N side of Whale Passage if stopped by too strong a flood current in the passage E. There is an eddy current in the bight, and care should be taken to get in far enough to ride to the eddy alone. A good place is in 8 fathoms, 300 yards from Whale Island, with Koniuji Island bearing about 238°.

(128) A better anchorage can be had 0.3 to 0.4 mile off the W side of Whale Island, in 8 to 10 fathoms. This is convenient to either Whale Passage or Afognak Strait, and is well out of the current; the anchorage is exposed to W winds.

(129) Anchorage may be had in places near the shore of Kupreanof Peninsula, but the only secure harbor is Dry Spruce Bay.

(130) **Tides and currents.**–Passage through Whale Passage at times of maximum current should be avoided. Floating aids to navigation may be dragged under or off station during these periods; mariners are urged to exercise particular caution. The tidal currents in Whale Passage set NW on the flood and SE on the ebb. During large tides, the currents are very strong with boils and swirls. The current velocity is about 4.5 knots. (See the Tidal Current Tables for predictions.) In summer 1981, slack water was observed to occur from 1 to 2 hours later than predicted.

(131) The tidal currents at Kupreanof Strait have an estimated velocity of 2 to 3 knots during large tides. At the W end of Kupreanof Strait near Onion Bay, high and low water occur about the same time as at Seldovia. The diurnal range is 14.4 feet. The tides meet in the strait a little W of Dry Spruce Island.

(132) **Routes.**–Enter Whale Passage on a **262°** course from Kizhuyak Bay, passing S of the buoy off **Yuzhni Point** and 0.25 mile N of Ilkognak Rock Light 1. When Ilkognak Rock Light 1 bears 118°, 0.5 mile, and **Inner Point** bears 180°, change course to **298°**. Gori Point open a little S of the S end of Koniuji Island heads S of the 2½-fathom rock. When **Uzkosti Point** bears 023°, 0.3 mile, change course to **317°** until 0.3 mile N of Koniuji Island, then change to course **292°** until 0.4 mile off Gori Point where a **286°** course will lead into Shelikof Strait, passing 0.5 mile S of Malina Point Light 8. This route passes 0.5 mile N of a buoyed 2½-fathom shoal, 3.9 miles W of Gori Point.

(133) Some of the courses are at an angle with the axis of the current; natural ranges should be used to aid in maintaining the courses.

(134) **Dry Spruce Bay,** on the N side of Kodiak Island and on the S side of Kupreanof Strait, may be entered on either side of Bare Island.

(135) Approaching Dry Spruce Bay from E, give Dry Spruce Island a berth of 0.8 mile and steer for the W end of Bare Island on any bearing S of **226°** until past Dry Spruce Island Rock Light 7; then haul E and pass midway between Dry Spruce and Bare Islands, course about **139°.** This route is contracted to about 400 yards by a low water rock about 200 yards from shore inside the W end of Dry Spruce Island. Shoal water extends from the E end of Bare Island.

(136) In approaching Dry Spruce Bay W of Bare Island, care is necessary to avoid the foul ground extending over 0.2 mile from the S shore of Kupreanof Strait, 1.8 miles W of Bare Island.

(137) **Port Bailey** cannery and wharf are on the S shore of Dry Spruce Bay. The cannery is operated by Columbia-Wards Fisheries and manned from about mid-May through August. The cannery's VHF-FM radio has call sign, KJD-83; the single sideband (SSB) radio has call sign, KWC-56. The cannery uses 2450 kHz SSB and VHF-FM channel 79A as working frequencies. During the open season, the services of a nurse are available and water can be had at the wharf. The cannery has a machine shop and a store; emergency supplies of diesel fuel and gasoline are usually available. The 150-foot-long wharf has depths of 27 feet alongside. Unlighted mooring dolphins are along the shore SE of the cannery.

(138) Air service is available to and from Kodiak once a week during the off season and daily except Sunday during the open season.

(139) The best anchorage for large vessels is about 0.5 mile E of Bare Island and 0.4 mile off the cove in Dry Spruce Island, in 16 to 19 fathoms. A small vessel can anchor in the middle of the entrance to this cove in about 6 fathoms taking care to keep clear of the flat, that extends 250 yards from its NE side, and the unlighted mooring dolphins across the entrance to the cove. With strong SW winds, some williwaws are felt from Kupreanof Mountain. A midbay rock awash is 0.8 mile from the head of Dry Spruce Bay.

(140) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(141) The Kodiak Island area is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(142) Vessels using Southwest Alaska Pilots Association pilots and en route to Port Bailey can meet the pilot boat about 1 mile N of Dry Spruce Bay Entrance Light (57°57.3'N., 153°06.2'W.).

(143) The pilot boat can be contacted by calling "PORT BAILEY PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(144) **Outlet Cape** is the W end of **Kupreanof Peninsula,** included between Kupreanof Strait and Viekoda Bay. The cape has a steep slope to a peak 1,607 feet high, E of which is a low divide. **Laida Rocks** are a cluster of bare rocks 350 yards off the NW end of the cape.

(145) Viekoda Bay is described later in this chapter.

(146) **Onion Bay** makes into Raspberry Island about 2 miles, and from its head a low divide extends through to Shelikof Strait. The entrance is narrow, and just inside, the bay is blocked by shoals partly bare at low water, between which are narrow channels suitable only for small craft. The tidal currents have an estimated velocity of 3 to 5 knots in the entrance. Temporary anchorage can be had 0.4 to 0.5 mile off the entrance in 10 to 15 fathoms.

(147) **Malina Point Light** (58°02.3'N., 153°22.0'W.), 80 feet above the water, is shown from a small house with a red and white diamond-shaped daymark at the S end of the mountainous headland on the SW part of Raspberry Island. The point itself is projecting and prominent. It has a grass-covered knoll at its end, with a low neck behind it, and then a steep slope to 1,570 feet.

(148) During NE weather, small craft can find excellent protection behind Malina Point.

(149) **Raspberry Cape,** at the W end of the mountainous headland on the SW part of Raspberry Island, is steep and high and has areas of bare rock. There are some bare rocks in the water close to the foot of the cape.

(150) **Local magnetic disturbance.**–Differences of as much as 3° from normal variation have been observed in Kupreanof Strait about 0.4 mile S of Raspberry Cape.

(151) **Kizhuyak Bay** is the continuation of Marmot Bay, and from Whale Island and Kizhuyak Point it extends S for about 14 miles into Kodiak Island. The outer bay is exposed to NE weather, and only at or near the head is protection afforded from seas sweeping in from Marmot Bay. A landlocked anchorage for small vessels is available in Anton Larsen Bay, but local knowledge is required to navigate its narrow entrance channel. Sharatin Bay, another arm, is exposed to seas from the NE.

(152) A midchannel course in Kizhuyak Bay is clear of known dangers; however, a bank of 6 to 9 fathoms, irregular in outline and rocky in places, extends across the bay, 2 to 3 miles S of Peregrebni Point. A somewhat similar bottom exists between opposite shores in the locality of the islet, 2.5 miles from the head. A small rock and a rock awash are 300 yards W of the islet.

(153) **Peregrebni Point,** on the W side of Kizhuyak Bay, is on a wooded peninsula that is backed by **Settler Cove.** The bottom of the cove, favoring the W shore, is sandy, and rises gradually from a depth of about 2 fathoms just inside the entrance to the mudflats at the head of the cove.

(154) **Port Lions** is the name given in 1965 to a settlement near the head of Settler Cove, created when all the inhabitants of Afognak moved in and declared it their new home. A good small-craft anchorage is 0.5 mile NE of the village. Two breakwaters forming a small-boat harbor are about 0.5 mile NE of Port Lions. A light is on the E end of the outer breakwater, and a daybeacon marks the E side of the harbor entrance. In June 1992, the controlling depth was 1¼ fathoms in the approach and harbor entrance, except for shoaling to 1½ fathoms just NE and E of the daybeacon and 1¼ fathoms off the end of the outer breakwater. Depths of 1½ to 2¼ fathoms were available along the piers. The small-boat harbor has moorage for about 125 vessels. A graded landing field is here, providing Port Lions with mail service three times weekly from Kodiak. The Alaska State Ferry will make flag stops at Port Lions.

(155) **Port Wakefield** is at the head of Port Wakefield, a cove on the W side of Kizhuyak Bay about 0.7 mile SW of Peregrebni Point. A reported shoal, marked by a lighted buoy, is off the entrance to Port Wakefield. A causeway across the shallow head of Settler Cove connects Port Wakefield with Port Lions.

(156) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(157) The Kodiak Island area is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(158) Vessels using Southwest Alaska Pilots Association pilots and en route to Port Wakefield can meet the pilot boat about 1 mile NW of Kekur Point (57°51.5'N., 152°47.2'W.).

(159) The pilot boat can be contacted by calling "PORT WAKEFIELD PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(160) At Peregrebni Point the bay narrows to a width of 1.5 miles. The W shore from 1.2 to 4.5 miles S of Peregrebni Point is foul; a rock awash is 2.3 miles S of the point and 0.4 mile from the W shore.

(161) A flat extends 0.5 mile from the head of Kizhuyak Bay, where there is a large valley. Vessels may anchor off this flat in 19 fathoms, mud bottom; the depths are regular and there is ample room.

(162) **Kekur Point** marks the N end of the E shore of the narrow part of Kizhuyak Bay. A rocky patch of 6 fathoms and probably less depth, is 0.9 mile 032° from Kekur Point.

(163) Between Kekur Point and Kizhuyak Point, the W shore of the outer bay is indented by Sharatin Bay and Anton Larsen Bay. The waters along the intervening shore between the two bays, from **Three Pillar Point** to **Crag Point,** have several submerged rocks about 0.3 to 0.4 mile from that shore; and a patch of broken ground, with a depth of 9 fathoms, is 1 mile offshore in Kizhuyak Bay. Off Anton Larsen Bay is a kelp patch with a depth of only 3 feet, 0.9 mile 006° from Crag Point.

(164) **Sharatin Bay,** E of Kekur Point, has a small grass-covered islet near the center of the bay. A rock, covered 3 feet, is 400 yards N of the islet. A rock, that uncovers 9 feet, is 300 yards off the projecting point of the bay shore W of the islet. A rock, covered 6 feet, is about 0.5 mile NNW of Three Pillar Point. A tide flat extends 0.8 mile from the head of the bay.

(165) **Anton Larsen Bay,** between the point 0.9 mile S of Kizhuyak Point and Crag Point, has its entrance nearly blocked by islands; and only small craft can enter. A rock, covered 3 feet and marked by kelp, is about 0.5 mile N of the outer entrance island N of Crag Point. A reef, bare at minus tides, lies 260 yards 045° from Crag Point. The passage into the bay E of Crag Point and the two passages at the N entrance are very narrow.

(166) The northernmost passage into Anton Larsen Bay was used by a survey tender, 77 feet long and drawing 6½ feet. The entrance to this passage is between the northernmost island in the bay entrance and the N point of the bay. About 0.3 mile inside this entrance and about 130 yards from the mainland is a large rocky patch, part of which uncovers. The channel is S of this rocky patch. At the narrowest part of this passage is a small, narrow islet which hugs and parallels the mainland. The survey indicates that the channel borders close along the outer side of the narrow islet and makes a slight turn around the W end of the islet. Opposite the W end of the islet, the SW side of the channel is bordered by rocks. Extreme caution and local knowledge are necessary.

(167) Anton Larsen Bay has a 3-mile stretch of water about 0.5 mile wide, extending in a S direction from the N entrance passage. A rock, awash at high tide, is in the middle of this stretch, about 1 mile from the entrance passage. The channel is between the rock and the shore W of it. A vessel may anchor about 0.3 mile S of the rock in about 15 fathoms.

(168) A road runs from the W side of Anton Larsen Bay to Kodiak. It is closed during the winter.

(169) **Kizhuyak Point** marks the outer end of the E side of Kizhuyak Bay. A 2¼-fathom depth in a kelp patch is about 0.8 mile 210° from Kizhuyak Point.

(170) The broad point 0.8 mile NE of Kizhuyak Point is partly wooded and terminates in white cliffs in places. A rock, which uncovers about 4 feet, is 400 yards N from this point. Shoal water extends 300 yards N of the rock.

(171) Between the broad point and Shakmanof Point is **Shakmanof Cove.** A rock, covered 3 feet, is near the center of this cove.

(172) **Shakmanof Point,** on the S side of Marmot Bay about 2 miles W of the entrance to Narrow Strait, is prominent and heavily wooded. Some rocks awash are close to the point, and it should be given a berth of over 300 yards.

(173) **Shakmanof Point Light** (57°55.5'N., 152°35.3'W.), 60 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark.

(174) **Low Island Anchorage,** the cove between Shakmanof Point and Low Island, affords anchorage in suitable depths but it is exposed to N weather. N winds in this locality are infrequent.

(175) **Three Brothers,** 1.2 miles E of Shakmanof Point, is a kelp-marked reef 600 yards long and steep-to on its W side. Parts of the reef uncover about 2 feet. Near its SW end are two rocks which uncover about 4 feet, and at its NE end is a rock which uncovers about 3 feet. A light is on the southwesternmost rock. Kelp extends about 250 yards S of the light toward Low Island.

(176) **Low Island,** in the middle of the bight on the S shore of Marmot Bay between Shakmanof Point and the W entrance to Narrow Strait, is grass covered, and about 40 feet high at its S end. Most of the island is wooded.

(177) Vessels cross the 7-fathom bank or bar about 0.3 mile NNE of Low Island, bound to or from Narrow Strait. A range consisting of Prokoda Island Light just open on the nearly vertical bluffs of Ouzinkie Point leads between a red buoy marking a submerged rock on the N side of the crossing and a green buoy marking a 3½-fathom shoal on the S side of the crossing. A wire drag examination along the range reveals a clear depth of 30 feet. It is required, however, that no deviation from the range be made. The submerged rock is 800 yards from Low Island and has less than 14 feet over it. The 3½-fathom shoal is at the end of a reef extending N from Low Island. These dangers are marked by kelp.

(178) The passage S of Low Island is blocked by shoals that bare at low tide.

(179) Narrow Strait and Ouzinkie Narrows are described later in this chapter.

(180) **Spruce Island,** on the S side of Marmot Bay, is about 6 miles long in an E and W direction. The island is rugged, with **Mount Herman,** 1,595 feet high 2 miles W of East Cape. The lower elevations are in general heavily wooded, with a low wooded area 0.8 to 1 mile wide extending between the E shore of the island and the base of Mount Herman. Grass is quite pronounced on the higher slopes of Spruce Island. The higher summits are barren. The waters adjacent to the N and E shores of the island have not been completely surveyed.

(181) About 1 mile off the W shore of Spruce Island and approximately on a line between Three Brothers and Wooded Island are two dangers: a kelp-marked shoal with a depth of 2 fathoms is about 1 mile from Three Brothers, and a rocky islet, 24 feet high, is 0.9 mile from Wooded Island.

(182) Reefs extend 600 yards off the W shore of Spruce Island, 0.8 mile N of Ouzinkie Point, described later in this chapter.

(183) **Wooded Island,** 174 feet high, is 300 yards off **Zapadni Point,** the promontory on the W side of Spruce Island. It is heavily wooded. A fair anchorage protected from

E winds can be had just to the S of the island. A 3-fathom shoal is 700 yards 098° from the SW end of Wooded Island.

(184) **The Triplets,** 2 miles W of North Cape, are a chain of three high, grassy islets extending 1 mile in a general N and S direction. The northernmost islet, 275-foot **Taliudek Island,** is the highest of the group.

(185) **North Cape,** the N headland of Spruce Island, is a wooded knob 551 feet high. Rocky islets and rocks awash at various stages of the tide fringe the N side of the cape within 400 yards of the shore. A shoal of 2¼ fathoms is 0.4 mile off the E point of the cape.

(186) **Island Bay,** just S of North Cape and opening to the E, has not been surveyed. It affords fair anchorage for medium-size craft from W wind. If small craft use the head of the bay, care should be taken to pass N of a rock awash at low water about 0.3 mile from the head.

(187) **Knee Bay** is the outer portion of the indentation in the N shore of Spruce Island about 2 miles S of North Cape. **Balika Cove,** narrow and about 1 mile long, is the continuation of Knee Bay. The bay and cove have not been surveyed. The first enclosure of Balika Cove affords excellent shelter for small craft, but can be entered only at high tide because of a ledge at the entrance to the cove.

(188) The N shore of Spruce Island between Knee Bay and East Cape is bordered by rocky islets and rocks awash at various stages of the tide. Some of these are over 0.3 mile offshore.

(189) **East Cape,** the NE end of Spruce Island, is a wooded flat extending about 0.8 mile inland to the base of Mount Herman. A group of bare rocks is within 300 yards E of the cape. Banks with depths partly under 10 fathoms extend nearly 2 miles NE of the cape.

(190) A rock awash at low water is about 0.5 mile S of the point of East Cape and 400 yards from the E shore of Spruce Island.

(191) Two wooded islands, forming **Ostrof Point,** about 1 mile S of East Cape, are surrounded and connected to the E shore of Spruce Island by a reef. The outer part of this reef terminates in a rock, which uncovers about 2 feet, 300 yards E of the outer island. Rocks awash at low tide are 0.3 mile NE of the outer island. A rock, which uncovers about 4 feet, is 250 yards S of the outer island.

(192) **Icon Bay** is the small indentation in the E shore of Spruce Island halfway between East Cape and South Point. This bay, as well as the adjoining small bays to the S, has not been surveyed. It is reported that a medium-sized craft may find temporary anchorage in W weather. A rock awash baring near low water, is 300 yards from the head and 150 yards from the N shore of Icon Bay.

(193) **Narrow Strait,** between Spruce and Kodiak Islands, is used by vessels bound from Kodiak to Shelikof Strait. It has a clear width of 1 mile at its E end, while at its W end the channel is 100 to 300 yards wide with a least depth of about 7 fathoms. With E gales a heavy swell sets into the strait, but this generally loses much of its force toward the W end.

(194) Ouzinkie Narrows, the narrow passage of Narrow Strait in the vicinity of Otmeloi Point and Prokoda Island, is described later in this chapter.

(195) The W approach to Narrow Strait is S of Three Brothers and across the buoyed 7-fathom bank 0.3 mile NNE of Low Island.

(196) The best anchorage in Narrow Strait is in the middle of Ouzinkie Harbor between Prokoda Island and Ouzinkie, in 18 to 20 fathoms, somewhat exposed to an E swell. A small vessel and small craft can anchor at the head of Ouzinkie Harbor near Ouzinkie, slightly favoring the W side, in 5 to 10 fathoms.

(197) **South Point,** the E end of Spruce Island, is marked by a high black rocky islet about 600 yards off the point. This rocky islet is 65 feet high; several lower ones are just to the S and W thereof.

(198) Two islands are on the N side of Narrow Strait. **Eider Island,** the E one, is very uneven and grassy on top. A small low rocky islet is 400 yards E of the E island, and a rock awash at low water is 200 yards S of the E island. **Nelson Island,** the W one of the two islands, is higher and wooded. A group of rocks, which uncover 5 feet, is 350 yards S of Nelson Island and similar rocks are 0.3 to 0.4 mile W of the island.

(199) The passages leading to the cove back of Nelson Island are mainly foul or composed of broken bottom. They should be avoided by vessels of any size, except perhaps by small craft with local knowledge.

(200) **Sunny Cove,** the bight on the N shore of Narrow Strait, 2.3 miles NW of South Point, affords anchorage for small craft in 3 to 4 fathoms, sand bottom. A ledge covered 1½ fathoms is 0.3 mile S from the W point of the entrance to Sunny Cove. Two bare rocks are off the middle of the entrance. A rock awash is 90 yards NW from the E point of the entrance. In entering, the W shore of Sunny Cove should be favored.

(201) A rocky patch, covered 2¾ fathoms and marked by kelp, is 0.3 mile from the N shore of Narrow Strait just SE of **Black Point.**

(202) **Prokoda Island,** in the middle near the W end of the strait, is 114 feet high and partly wooded. An islet is 100 yards off its NE end, and kelp extends 100 yards off the islet and the SE side of the island.

(203) **Prokoda Island Light 2** (57°54.6′N., 152°30.4′W.), 40 feet above the water, is shown from a small house with a red triangular daymark on the SW point of the island. The light is a guide for navigating the passage S of the island.

(204) The channel N and W of Prokoda Island is 300 yards wide and clear, but the turns are sharp and difficult to make when the current is running.

(205) **Ouzinkie** is a small native village at the head of the cove in Spruce Island N of Prokoda Island. The most conspicuous features in the town are the warehouse close to the near shore of the cove, the Russian Orthodox Church spire, and the boardwalk which runs around the N side of the cove. Fishing is the principal industry in Ouzinkie.

(206) An L-shaped pier, connected to land at both ends, is on the W side of the cove and can handle vessels up to 120 feet long and drawing about 15 feet. A grid of sawed-off pilings is along the E side of this pier; the grid is considered hazardous because of the steel spikes protruding upward from the piles. A foul area is about 100 feet SW of this pier. A cannery and pier were built over the water on the E side of the cove. The pier can accommodate vessels 80 feet long and drawing 12 feet. A rock, covered 6 feet, is 400 feet SSE of the S corner of the pier; the rock is usually marked with a fishing float. Fuel is available on the W pier. There is scheduled air service between Ouzinkie and points on Kodiak Island. Radiotelephone and radiotelegraph communications are maintained.

(207) In entering Ouzinkie from the E, care should be taken to avoid the reef that extends some distance off the SE shore of Prokoda Island. A small general store is in the warehouse at Ouzinkie.

(208) **Ouzinkie Point,** SW end of Spruce Island, is the point on the N side of the W entrance to Narrow Strait. At the point are cliffs above which a wooded slope rises steeply to a knoll about 110 feet high. The knoll is connected with the land back of it by a low, narrow, grass-covered neck.

(209) Kelp is close to Ouzinkie Point and the point should be given a berth of about 125 yards.

(210) **Entrance Point,** on the S side at the W entrance of Narrow Strait, is grassy with some scattered trees, and a rock 12 feet high is 100 yards off its E side. A kelp-marked shoal, with 7 to 12 feet over it, extends 250 yards N from Entrance Point. A rocky ledge, covered 7 feet and marked at the outer end by a buoy, extends about 325 yards NNE of the point.

(211) **Neva Cove,** between Entrance Point and Otmeloi Point, provides good anchorage for medium-size craft from all winds except NW, in 13 fathoms, soft bottom.

(212) Mariners using **Ouzinkie Narrows,** the narrow passage of Narrow Strait in the vicinity of **Otmeloi Point** and Prokoda Island, should be careful because the currents will set a vessel into danger rapidly. Depths of 5 fathoms or less extend 200 yards SE of Prokoda Island, and depths of 4 fathoms or less extend 200 yards N from the small mainland point 0.5 mile E from Otmeloi Point. Between these areas are depths of over 10 fathoms for a width of 150 yards. The best route through Ouzinkie Narrows from the E is midway between the SE point of Prokoda Island and the small mainland point to the SE, thence proceed at midchannel until abreast of Prokoda Island Light 2. From abreast the light to abreast of Ouzinkie Point, the route is practically a straight course that passes between Otmeloi Point and a rock which uncovers about 6 feet. The rock, marked by a daybeacon, is about 275 yards N of Otmeloi Point. The channel between the rock and a shelving spit with kelp that extends 125 yards from Otmeloi Point has a depth of 7 fathoms, and is about 100 yards wide. Vessels usually pass about 80 yards S of the daybeacon to avoid the shelving spit. Mariners should favor the N half of the passage between Entrance Point and Ouzinkie Point, so to pass clear of a 2-fathom ledge which extends 350 yards N of Entrance Point. The ledge is marked by a buoy.

(213) **Course Point,** on the S shore of Narrow Strait, about 2 miles E of Otmeloi Point, is prominent and is marked by a small rocky, grass-covered islet, 150 yards from shore.

(214) A pinnacle rock, 70 feet high, is near the S shore of Narrow Strait about 0.9 mile SSE of Course Point. The cove SE of the pinnacle is foul except for a small area in the center. A 4¼-fathom shoal is 400 yards from the S shore near **Azimuth Point.**

(215) **Termination Point** is the E limit of the S shore of Narrow Strait. Foul ground extends nearly 0.5 mile N of the point.

(216) **Monashka Bay,** just E of Termination Point, is clear inside except within 0.3 mile of the shore. Anchorage may be found near the SE part of the head of the bay, but there is full exposure to NE weather.

(217) **Miller Point,** on the E side of Monashka Bay entrance, is partly wooded and terminates in a rocky bluff. High, bare rocks extend more than 200 yards off the point, and rocks baring at various stages of the tide are outside of them. The outermost rock uncovers 9 feet and is 0.6 mile 040° from Miller Point. The range, consisting of the NE end of Long Island open N of the outer Hanin Rocks, clears the rocks off Miller Point.

(218) Tidal currents in Narrow Strait are weak except in the W entrance where the velocity is about 1.5 knots. The times of the slacks and strengths may be obtained from the Tidal Current Tables.

(219) **Charts 16594, 16593, 16595.–Chiniak Bay,** a 13-mile-wide indentation in the NE coast of Kodiak Island between Spruce Cape and Cape Chiniak, is the approach to the important commercial port of Kodiak on the N side and a Coast Guard base in Womens Bay on the W side.

(220) **Spruce Cape,** the NW point of Chiniak Bay and marked by a light, is a low bluff, grass covered on top and backed by woods. Bare rocks and foul ground extend 0.6 mile N from the cape to **Hanin Rocks** which are two rocks about 30 feet high with an extensive surrounding ledge. **Hanin Rock Light** (57°50.1'N., 152°18.7'W.), 43 feet above the water, is shown from a white cylindrical house on the SW rock. A reef, mostly bare at low water, extends 250 yards N of Hanin Rocks.

(221) **Williams Reef,** 5 miles E from Spruce Cape, is the outermost danger in the NE approach to Chiniak Bay. The reef consists of two rocks, 100 yards apart, that uncover at lowest tides; deep water is close-to and breakers generally occur, except near high water with a smooth sea. A lighted whistle buoy is NE of Williams Reef.

(222) A small patch, covered 3¼ fathoms, is 1.7 miles 285° from Williams Reef.

(223) **Hutchinson Reef,** 0.8 mile NE of Spruce Cape, is 0.4 mile in extent with a least depth of 1¾ fathoms. A large kelp patch is between the reef and Hanin Rocks. A lighted whistle buoy, 0.4 mile NE of Hutchinson Reef, marks the W side of the N approach to Kodiak.

(224) Broken ground, 0.9 mile E of Spruce Cape, is covered 4¼ fathoms and marked by a lighted whistle buoy.

(225) On the W side of the channel, 0.4 to 1 mile S of Spruce Cape, are two bare reefs; the outer edges are about 600 yards from shore. The E edge of the S reef is marked by a lighted buoy. **Channel Rock,** on the S reef, is black, 7 feet high, amid extensive ledges. Kelp surrounds the reefs and extends SSW of Channel Rock, gradually trending toward the shore and joining the shore kelp. Deep water extends close to the edge of the kelp at 150 yards off Channel Rock.

(226) A rock, covered 1½ fathoms, is 0.9 mile SE from Spruce Cape; it is marked by a lighted whistle buoy.

(227) **Woody Island,** 2 miles S of Spruce Cape, is about 200 feet high and heavily wooded except for a high grass-covered bench at the S end and a small area back of **Icehouse Point,** the site of an orphanage. The orphanage buildings are conspicuous from the W. Just N of Icehouse Point is a 200-foot finger pier with two floats; depths alongside range from 6 to 9 feet. Ruins of an old concrete pier are 75 yards NE of the present pier; caution is necessary. An aero radiobeacon is on the SE side of the island.

(228) Anchorage is prohibited in the area between Woody Island and the Kodiak shore as shown on chart 16595.

(229) Foul ground extends 1.3 miles N from the NE side of Woody Island. A shoal, covered 3¾ fathoms, is 1.5 miles 092° from Woody Island Light.

(230) There are three large white buildings back of **Shahafka Cove** on the N shore across the channel from Woody Island.

(231) **Woody Island Light** (57°47.8'N., 152°20.2'W.), 50 feet above the water, is shown from a square frame with a red and white diamond-shaped daymark at the top of the bluff on the W side of the N point of the island. The light marks the E side of the passage between Woody Island and the mainland. The outer limits of foul ground and kelp surrounding the N part of Woody Island are 0.4 mile W and 0.6 mile NNE from the light.

(232) A kelp patch of a 4-fathom shoal, marked by a buoy, is 0.35 mile 255° from Woody Island Light. Another kelp patch of a 4-fathom shoal, marked by a lighted bell buoy, is 0.7 mile 265° from the light. The recommended channel is between these shoals.

(233) The group of islands W of Woody Island is surrounded by foul ground. **Bird Islet,** the easternmost of the group, is 68 feet high, small, and grass topped; foul ground and kelp extends 550 yards N and 350 yards S of the islet. A 2¼-fathom spot is about 550 yards SSW from the southernmost extremity of Bird Islet. **Holiday Island,** W of Bird Islet, is 131 feet high and wooded on its N half. **Near Island,** the largest of the group, is 202 feet high and grass covered.

(234) The area between the N side of Near Island and the Kodiak shore is shoal and mostly foul, except for the 200-foot-wide dredged channel at the E approach to Kodiak. **Cyane Rock,** 350 yards NE of Near Island, is awash at lowest tides; a lighted bell buoy marks the rock. The NE entrance to the dredged channel is between the buoy marking Cyane Rock and the foul ground which extends nearly 200 yards from the bight NW of the rock.

(235) **Long Island,** the easternmost island in the N end of Chiniak Bay, is 3.5 miles long, 251 feet high, hilly, with cliffs at the water, and wooded except toward its N end. The NE end of the island is formed by two grass-covered knolls, the E one is joined to the other by a narrow neck almost covered at high tide. The NW corner of the island is a prominent vertical bluff more than 100 feet high, rising to a grass-covered knoll 178 feet high. Two prominent pinnacles, 50 feet high, with lower bare rocks nearby, are off the N extremity of the island.

(236) **Kodiak Rock,** covered ¾ fathom, is about halfway between Long Island and Williams Reef. Extensive reefs, partly marked by kelp and having some high bare heads, extend 0.6 to 0.9 mile N from the N shore of Long Island. Shoal spots are between the end of these reefs and Kodiak Rock. Shoal rocky spots, covered 3¾ to 8 fathoms, extend 1.8 miles E of Kodiak Rock; a rock, covered 2½ fathoms, is 1.6 miles W of Kodiak Rock.

(237) The SE side of Long Island is fringed with rocks and kelp; detached dangers are 0.3 to 0.5 mile from the shore. **Refuge Island,** a small, steep, grass-covered rocky islet, 80 feet high, connected with Long Island by a reef, is off the S extremity of Long Island.

(238) An extensive covered ridge with extremely broken bottom extends NNE for 10 miles from the S side of Chiniak Bay. A distinctive submarine valley borders the W side of the ridge; its seaward outlet leads around the N end of the ridge, while the S part leads into Kalsin Bay. The valley forms a deep basin S of Long Island.

(239) The outermost danger on the ridge is a rock, covered 4¼ fathoms, 4.2 miles E from Refuge Island, which breaks in a heavy swell.

(240) **Humpback Rock,** 2.8 miles SE from Refuge Island, is low and of small extent. Vessels should pass not less than 1 mile N of the rock to avoid the broken ground; a lighted whistle buoy is 0.6 mile NE of the rock.

(241) Numerous reefs comprise the ridge from Humpback Rock to the S shore. **Kalsin Reef,** 1.8 miles SW from Humpback Rock, is awash at high water.

(242) A well-enclosed bay, making in from the W side of Long Island, is accessible to small vessels and affords good shelter and holding ground of mud. An island, just inside the middle of the opening, is connected with the E bay shore by a bar. A black rock, about 6 feet high, is between the island and the S point of the opening. To enter the S part of the bay, steer **179°** and pass between the black rock and the S point, slightly favoring the rock and then the W bay shore at the point. Anchor in the center of the basin. Access to the N part of the bay requires local knowledge.

(243) **Vasilief Rock,** covered ½ fathom and marked by kelp, is about halfway between the S point of Woody Island and Refuge Island.

(244) **Inner Humpback Rock,** 0.5 mile 170° from the S point of Woody Island, is an 11-foot-high pinnacle; the intervening area is foul. Foul ground extends 600 yards SW of Inner Humpback Rock.

(245) A detached rocky patch, covered 3 fathoms and marked off its SW side by a lighted buoy, is 0.6 mile W from the S end of Woody Island.

(246) A rock that uncovers is 0.4 mile SW of Icehouse Point. A shoal, covered 3½ fathoms, is 600 yards 348° from the point. A rock that uncovers is between the 3½-fathom shoal and Bird Islet. The channel W of Woody Island is marked by buoys.

(247) **St. Paul Harbor,** the W part of Chiniak Bay between **Crooked Island** on the N and Cliff Point on the S, is fronted with many reefs and islets, but affords a S passage to Kodiak.

(248) **St. Paul Harbor Entrance Light** (57°44.3'N., 152°25.8'W.), 38 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark, 0.9 mile NNE of Cliff Point. A buoyed channel through the reefs is 500 yards N of the light. A lighted whistle buoy marks the approach to the channel.

(249) A 3½-fathom spot and a 4½-fathom spot are about 600 yards W, and 900 yards SSW, respectively, from the light.

(250) **Puffin Island,** near the center of St. Paul Harbor, is 80 feet high, small, and grass covered. The end of the foul ground, extending 600 yards SW from the island, is marked by a lighted bell buoy. A 4½-fathom spot, marked on its SE side by a lighted buoy, is about 0.38 mile W of Puffin Island.

(251) A 4-fathom spot and an obstruction, covered 6 fathoms, are 175 and 475 yards NW, respectively, from the NW extremity of Puffin Island.

(252) The W part of St. Paul Harbor is bordered by dangerous reefs and shoals up to 0.6 mile offshore.

(253) **Gull Island,** 0.5 mile W of Near Island, is 24 feet high and narrow. A shoal extending 350 yards SW from the S point of the island is marked at the W extremity by a lighted buoy. The foul ground N of the island is marked by a lighted buoy about 260 yards off the N point. More foul ground, marked by a buoy at the outer extremity, extends about 300 yards SE of the island.

(254) **Kodiak** is the fifth largest and one of the oldest towns in Alaska; the domes of the old Russian church are conspicuous. Most of the people are employed in the fishing industry.

(255) **Weather.**–Kodiak has primarily a marine climate that is exemplified by the limited daily and annual temperature ranges. For instance, the mean annual temperature range is about 25°F. The normal monthly temperature is less than 32°F for December through February, and 50°F or higher, July through September. During the summer, the mean air temperature closely approximates the mean sea surface temperature, rising slightly above it during August but falling below again in September. In winter, the mean maximum air temperature more closely resembles the mean sea surface temperature curve. Because of the proximity of a large landmass to Kodiak, the absolute temperature range is 98°F regardless of the marine influence. Records show a low of –12°F in February 1971, and a high of 86°F in June 1953. In summer, maximum temperatures will vary 10° to 20°F, depending on whether the NW gradient is strong enough to maintain a flow of air from over the island, or whether it is weak enough that the sea breeze predominates. The highest daily maximum temperatures occur with NW winds in summer.

(256) Precipitation is normally abundant throughout the year. Maximums normally occur in September and October

with March and July the driest months. All months, however, have a wide variation in the amount of precipitation. The normal annual precipitation is over 56 inches but ranges from about 40 to 80 inches. A very high percentage of the precipitation falls during NE to SE winds. Small amounts of snow may fall as late as May or as early as September with good ground cover anticipated in November. The mean annual snowfall is about 90 inches with extremes of 178.1 inches in 1956 and 15.9 inches in 1945. Precipitation measurement is often difficult due to strong, gusty surface winds which frequently accompany precipitation. Drifting and blowing snow occasionally close the airfield for periods of up to twenty-four hours.

(257) Although the prevailing wind direction is NW every month except May, June and July, and the average speed is about 10 knots, these data may be misleading because of the extreme variability in both direction and speed. The maximum gust recorded at the station was 99 knots in January 1950. However, Coast Guard cutters docked in Womens Bay, have reported williwaw winds off Old Womens Mountain in excess of 120 knots, in January 1973. Gusts of over 50 knots have occurred during each month of the year, but are most likely to occur in the winter months. An average of eight storms each year brings winds in excess of 55 knots with the average duration of gusts in excess of 55 knots about eight hours per storm.

(258) **Prominent features.**–The N part of Kodiak Island W of Chiniak Bay is mountainous; there are several prominent peaks near the shore. Spruce Cape, Cape Chiniak, and the islands overspreading the N part of the bay are comparatively low.

(259) **Devils Prongs,** 2 miles NW of Kodiak, are three prominent peaks that appear nearly equal in height approaching from SE; the middle one is flat on top and the N prong is 2,075 feet high and sharp.

(260) **Pillar Mountain,** a short 1,274-foot ridge, rises steeply from the shore back of Kodiak.

(261) **Barometer Mountain,** 5 miles SW of Kodiak and 2 miles inland from the W shore of Chiniak Bay, is 2,488 feet high and a useful guide in clear weather for the N approach. A notch shows the W side of its summit from N. An aerolight, 1.5 miles E of Barometer Mountain, is 178 feet above the water and useful in the approach to Chiniak Bay when it is not obscured by the islands to the NE and the mainland to the S.

(262) The gantry crane at the Container Terminal, 1 mile WSW of Kodiak, and the landslide just NE of the terminal are prominent when approaching Kodiak from the S.

(263) **Channels.**–There are three marked approaches to the wharves in **Kodiak Harbor.** From N, the channel is N of Woody Island and Near Island. In June 1992, the controlling depth was 22 feet, except for shoaling to 18 feet along the S channel edge in the vicinity of the fixed highway bridge, in the 200-foot-wide dredged feet (22 feet at midchannel) in the 200-foot-wide dredged channel N of Near Island. From S, the channel is S of Long Island, W of Woody Island, and N of Near Island; controlling depth, about 22 feet; or S of Long Island, SW of Puffin Island, and thence in St. Paul Harbor W of Gull Island; the controlling depth is 29 feet.

(264) **Anchorages.–Inner Anchorage,** locally known as Winter Anchorage, is 0.4 mile W of Kodiak, 250 to 300 yards off the Kodiak Island shore. In May 1985, the City of Kodiak declared that vessels do not anchor within this area due to possible fouling and damage to the waste water discharge lines of the canneries in the vicinity. (Kodiak City Ordinance No. 653, §18.28.190(g) applies.) The mooring buoy in the anchorage, still in use, has capacity for mooring large vessels. Other vessels may anchor just outside the Inner Anchorage, location depending on weather conditions and vessel size; however, never anchor in or near the cable area crossing the narrow passage between Near Island and Kodiak. Anchoring information is available from the **harbormaster** who monitors 4125 kHz and VHF-FM channels 12, 14, and 16.

(265) A fixed highway bridge with a clearance of 101 feet crosses Kodiak Harbor, connecting Kodiak and Near Island.

(266) **Dangers.**–Chiniak Bay and approaches are full of dangers that must be avoided.

(267) **The March 1964 earthquake caused a bottom subsidence of 5.8 feet at Kodiak. Until a complete survey is made of the area, caution is necessary because depths may vary from those charted and mentioned in the Coast Pilot.**

(268) **Routes.**–From Northward: In coming from Narrow Strait, pass 1 mile N of Hanin Rock Light, thence E of Hutchinson Reef Lighted Whistle Buoy 4, and then follow the buoyed channel N of Woody and Near Islands to Kodiak Harbor. From Marmot Strait, a **206°** course will enter Chiniak Bay E of Hutchinson Reef Lighted Whistle Buoy 4, then follow the buoyed channel to Kodiak Harbor. The routes from N pass over or near a 5½-fathom spot NE of Spruce Cape which has not been examined with the wire drag.

(269) From Northeastward: Keep N of the line to Spruce Island summit bearing **294°** until the cliffs near the SW end of Long Island are well open W of the sheer cliff at its NW corner. Then steer **241°** for about 4 miles with Barometer Mountain ahead and Spruce Cape slightly to the right. This course passes E of Hutchinson Reef Lighted Whistle Buoy 4, thence through the buoyed channel to Kodiak Harbor.

(270) The N approach to Kodiak Harbor is not difficult in clear weather, but is dangerous at night or in thick weather. Exercise care to avoid Williams Reef and the other dangers in the entrance. Depths are irregular in the approach so that surroundings cannot be relied upon as a guide to the entrance or to avoid danger.

(271) The narrow passage N of Near Island leading to Kodiak Harbor requires careful piloting: strangers should not attempt it without thorough knowledge of the dangers, and tide and current conditions.

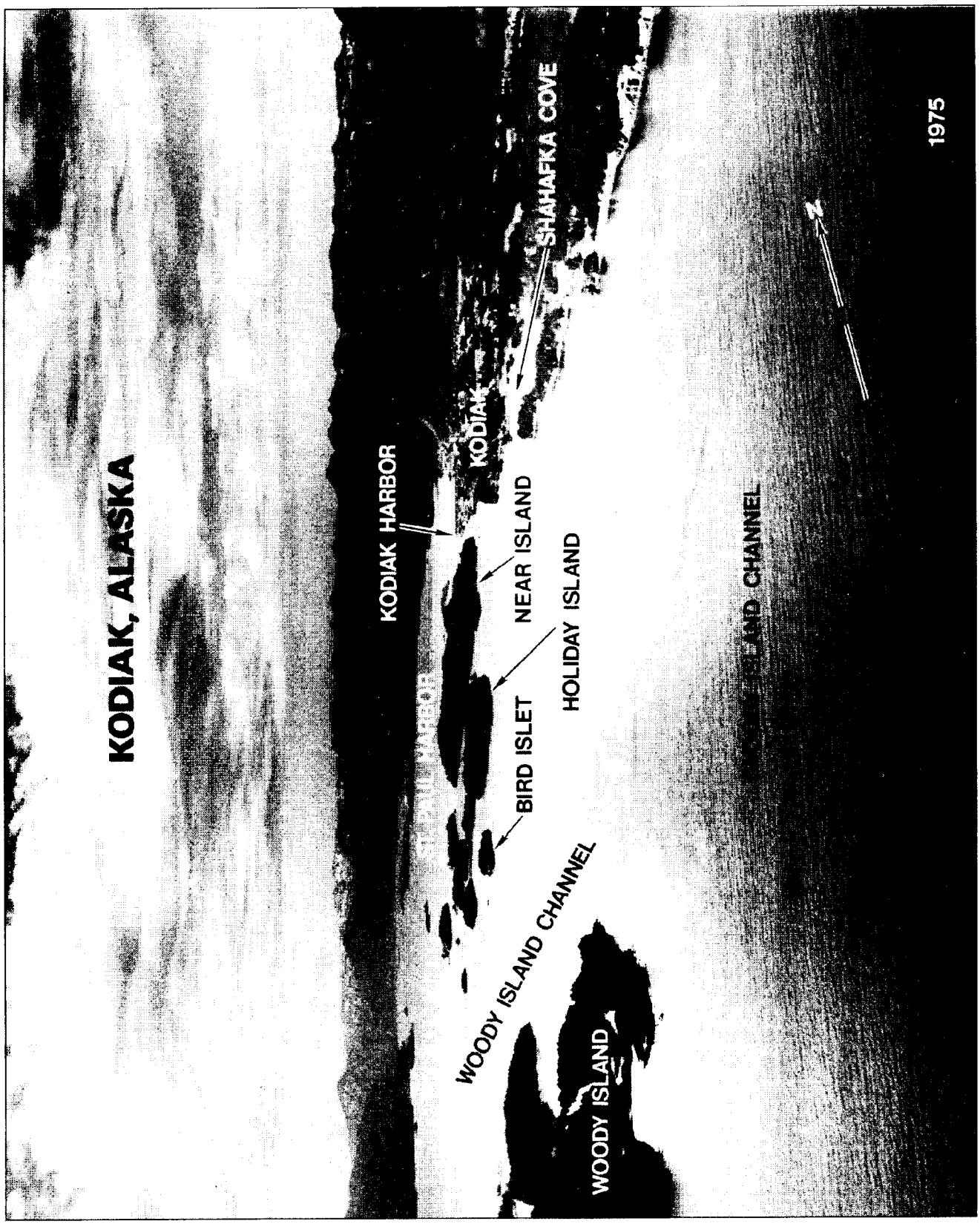
(272) From Eastward and Southward: Enter Chiniak Bay N of Humpback Rock Lighted Whistle Buoy 1, then follow the buoyed channel through the reefs N of St. Paul Harbor Entrance Light and St. Paul Harbor to Kodiak Harbor. If it is desired to approach Kodiak Harbor through the narrows N of Near Island, use the buoyed channel W of Woody Island after entering Chiniak Bay N of Humpback Rock. Exercise caution to avoid Inner Humpback Rock and the dangers SW of it.

(273) In approaching Chiniak Bay, the bank with a least depth of 4¼ fathoms, 3.5 miles SE of Long Island, and the reefs extending from Humpback Rock SW to the mainland should be avoided.

(274) **Tides and currents.**–The diurnal range of tide at Kodiak is 8.5 feet. Daily predictions for Kodiak are given in the Tide Tables.

(275) In Chiniak Bay, the flood current sets NE and the ebb current SW with considerable velocity in places around the islands. In the N entrance, the tidal currents have a velocity of 2 to 3 knots during the strength of the larger tides. They turn sharply around Spruce Cape and across the reefs N of it.

(276) In the narrows off Kodiak, the current velocity is about 0.9 knot. The flood sets NE. (See the Tidal Current Tables for predictions.)


KODIAK, ALASKA
KODIAK HARBOR
KODIAK
SHAHAFKA COVE
NEAR ISLAND
BIRD ISLET
HOLIDAY ISLAND
WOODY ISLAND CHANNEL
WOODY ISLAND
ISLAND CHANNEL
1975

KODIAK, ALASKA
KODIAK HARBOR
NEAR ISLAND
BREAKWATER
ROUND ISLAND
GULL ISLAND
ST. PAUL HARBOR
1975

(277) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(278) The Kodiak Island area is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(279) Vessels using Southwest Alaska Pilots Association pilots and en route to Kodiak or Women's Bay can meet the pilot boat about 2 miles 100° from St. Paul Harbor Entrance Light (57°44.3'N., 152°25.8'W.).

(280) The pilot boat can be contacted by calling "KODIAK PILOT BOAT" or "KODIAK KING" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(281) **Quarantine, customs, immigration, and agriculture quarantine.**–(See chapter 3, Vessel Arrival Inspection, and appendix for addresses.)

(282) **Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(283) **Customs.**–Kodiak is a **customs station.**

(284) **Kodiak Coast Guard Support Center** is in Womens Bay, 5 miles SW of Kodiak. It is described later in this chapter. **Kodiak Coast Guard Air Station** is at the Support Center.

(285) **Wharves.**–The waterfront facilities at Kodiak consist of three deep-draft municipal wharves, administered by a Port Director; a small-boat harbor, administered by a **harbormaster**; and many private wharves used mostly by the fishing industry.

(286) Kodiak City Pier 3, Container Terminal (57°46'55"N., 152°26'00"W.): a wharf 1 mile SW of Kodiak; 360-foot face, 660 feet of berthing space with dolphins; 38 feet alongside; deck height, 19 feet; one 27½-ton gantry crane; receipt and shipment of containerized general cargo; storage space for 180 containers; owned by the City of Kodiak and operated by Sealand Service, Inc.

(287) There is a heavy surge at the Container Terminal during and after SW through SE gales.

(288) Kodiak City Pier 2, Cargo Terminal: a wharf 0.4 mile NE of the Container Terminal; 925-foot face; 38 feet alongside; deck height, 19 feet; receipt of conventional and containerized general cargo; storage for 170 containers; owned by the City of Kodiak and operated by Alaska Terminal & Stevedoring Co., Inc.; the Port Director's office is on this wharf.

(289) Union Oil Pier: a T-pier just NE of the Kodiak City Pier 2, Cargo Terminal; 125-foot face, 180 feet total berthing space; 35 feet alongside; deck heights, 18 feet; receipt of petroleum products; bunkering vessels; 30-foot floating pier adjacent; gasoline, diesel fuel, and water are available; pipelines extend from wharf to storage tanks in rear, total capacity 35,700 barrels; owned by Union Oil Co. of Calif. and operated by Kodiak Oil Sales, Inc.

(290) There are many cannery wharves from the Union Oil Pier NE to the small-boat harbor.

(291) **Kodiak Small-Boat Harbor,** just SW of downtown Kodiak, is protected by two breakwaters. A light marks the outer end of the W breakwater. In 1975, depths of 8 to 12 feet were available in the basin. In April 1981, a submerged rock was reported in the entrance in the vicinity of Kodiak Boat Harbor Daybeacon 2; caution should be used in the area. The basin has 150 commercial berths, 66 berths for pleasure boats and skiffs, and 587 feet of transient space; contact the harbormaster for berthing assignments. Electricity and water are available on the floats. Two loading wharves, two boat grids, and a launching ramp are available. A seaplane float is just outside the basin. The basin is owned by the State and operated by the City.

(292) Star of Kodiak Wharf: E of the small-boat harbor; 200 feet of berthing space; 30 feet alongside; deck height, 20 feet; receipt of seafood; owned and operated by All Alaskan Seafoods, Inc.

(293) The STAR OF KODIAK, a grounded 440-foot ship, is used as a seafood processing plant and cannery.

(294) Alaska State Ferry Terminal, City Pier No. 1: a wharf just NE of the STAR OF KODIAK; 204-foot face; 28 feet alongside; deck height, 19 feet; landing for passenger and vehicular ferry; receipt of petroleum products; bunkering vessels; pipelines extend from wharf to storage tanks in rear, total capacity 41,700 barrels; owned by the City of Kodiak and operated by the State and Chevron, U.S.A., Inc.

(295) Vessels moored at the Ferry Terminal must be attended by a crew member at all times and be capable of moving on notice. No vessel may moor at the wharf when the amber light on top of the terminal building is flashing.

(296) City of Kodiak, Transient Float: 200 yards E of the Ferry Terminal; 425 feet of berthing space on each side; 28 to 30 feet alongside; deck height, 1½ feet; mooring transient vessels; owned by the State and operated by the City of Kodiak.

(297) Berthing assignments at the transient float are made by the harbormaster; his office is on the NE side of the small-boat harbor.

(298) There are more private commercial wharves NE of the transient float for a distance of about 500 yards.

(299) In 1982, a small-boat harbor, protected on its SW side by a floating breakwater, was under construction between **Uski Island** and Near Island. The outer end of the breakwater is marked by a light.

(300) The National Marine Fisheries has a pier and New England Fish Co. has a wharf in Gibson Cove, 1.3 miles SW of Kodiak. There is a heavy surge in the cove during NE through SE gales. The entrance to the cove is foul, with rocks on either side, and an obstruction is 0.15 mile E of the entrance in 57°46'41.5"N., 152°26'17.0"W.

(301) **Supplies.**–Marine supplies and provisions are available in limited quantities. Water, gasoline, and diesel fuel are available at the Union Oil Pier and the Standard Oil facility at the Ferry Terminal.

(302) **Repairs.**–General repairs can be made by local machine, electronic, and welding shops.

(303) **Communications.**–Freight vessels call weekly. Alaska Marine Highway System has ferry service to Seward, Seldovia, Homer, Dutch Harbor, and connecting ports. Air transportation is available daily to Anchorage and bi-weekly to Seattle from Kodiak Airport, which is 5 miles SW of town.

(304) Telephone, radiotelephone, and radiotelegraph communications are maintained.

(305) **Chart 16596.–Womens Bay,** SW of St. Paul Harbor at the extreme W end of Chiniak Bay, is the site of the Coast Guard Support Center, Kodiak.

(306) Prior to entering into the channel to Womens Bay, the master of the vessel must first obtain channel clearance permission from the Port Services Officer, Coast Guard Support Center, Kodiak, via 2182 kHz or 156.80 MHz.

(307) **Naval Defensive Sea Area and Airspace Reservation.**–Under the authority of Executive Orders 8717 of March 22, 1941, 8597 of November 18, 1940, and 9720 of May 8, 1946, the area in and about Womens Bay is a designated Naval Defensive Sea Area and Airspace Reservation. Restrictions imposed under the authority of the above executive orders have been suspended subject to reinstatement without notice at any time that the interests of national defense may require such action.

(308) **Channels.**–The entrance to Womens Bay is obstructed by numerous and extensive rocks and reefs; some are awash at extreme low water while others are up to 6 feet high. A 400-foot-wide buoyed channel passes through this foul area NW of Zaimka Island to deeper water inside. The channel is marked by buoys and a **211.1°** lighted range. The controlling depth to the wharves is about 29 feet.

(309) In the winter, buoys are often moved off station due to ice floes.

(310) **Cliff Point,** on the S side of the entrance to Womens Bay, is the end of a prominent 192-foot-high headland that is covered with grass and scattered brush; two prominent pinnacle rocks are among the reefs E of the point. Broken ground and rocks extend about 0.5 mile NE of the point. **Cliff Island,** 0.3 mile N of Cliff Point, is small and 62 feet high with steep cliffs on all but the SE side; pinnacle rocks are on the NE and S sides.

(311) **Zaimka Island,** the largest of the islands at the entrance to Womens Bay, is 151 feet high, bordered with cliffs, and covered with bushes and grass. **Blodgett Island,** 0.7 mile SW of Zaimka Island, is 70 feet high.

(312) **Nyman Peninsula,** on the W side of the entrance to Womens Bay, forms a protected inner bay. **Nyman Spit,** a submerged sandspit, extends about 800 yards SE from the S end of the peninsula; a lighted buoy marks its outer end.

(313) **Tides and currents.**–The diurnal range of tide in Womens Bay is 8.8 feet.

(314) In the outer part of Womens Bay, the currents follow the general direction of the channel, flowing SW on the flood and NE on the ebb with a velocity of about 1 knot. An eddy has been reported N of Blodgett Island which will set a vessel to the S at the strength of an ebb current; this should be guarded against. Also, the ebb current flows NE across Nyman Spit. Ships passing near the spit at such a time might experience a set onto it. There are marked eddies near **Frye Point** at the W end of Womens Bay. Although deep water is close to this point, ships should guard against passing too close to it.

(315) **Routes.**–Vessels entering Womens Bay, may approach from NE through the channel W of Woody Island, thence through the buoyed channel N of St. Paul Harbor Entrance Light, and then follow the marked channel SW into Womens Bay. From E and S, the approach is the same as that for the S approach to Kodiak until St. Paul Harbor Entrance Light is passed, then the buoyed channel should be followed to Womens Bay.

(316) Permission will not be granted for large vessels to navigate the channel to or from Womens Bay and between the shoal waters of St. Paul Harbor entrance after dark or during low visibility unless a qualified pilot is on board or the master assumes full risk. Nor will vessels, except at the master's risk, enter or depart from Womens Bay and between the shoal waters of St. Paul Harbor during periods of wind velocities of 35 knots or more, except in emergencies or extreme necessity, and then only by authorization of the Commanding Officer, Coast Guard Support Center, Kodiak.

(317) **Wharves.**–The Coast Guard's waterfront facilities are in Womens Bay on the NW side of Nyman Peninsula. They consist of three deep-draft wharves. The Coast Guard facilities are used only by U.S. Government vessels and commercial vessels handling military cargoes. Mooring spaces are assigned by the Port Services Officer, Coast Guard Support Center, Kodiak.

(318) Coast Guard Marginal Wharf (57°43.4'N., 152°31.3'W.): 1,680-foot face; 27 to 39 feet alongside; deck height, 10 feet; (awash up to 1 foot at extreme high water); water and electricity are available; docking of U.S. Government vessels. This wharf is in poor repair and submerged broken fender pilings are at the face of the wharf.

(319) Coast Guard Fuel Pier: 250 yards NNE of the Coast Guard Marginal Wharf; 570 feet long; 29 to 34 feet reported alongside; deck height, 18 feet; water, electricity, and fuel for government vessels are available.

(320) Coast Guard Cargo Wharf: 500 yards NNE of the Coast Guard Fuel Pier; 1,015-foot face; 33 feet reported alongside; deck height, 18 feet; water and electricity are available; receipt of military cargo.

(321) **Local magnetic disturbance.**–Differences of as much as 20° to 40° from the normal variation have been observed just off the Coast Guard Cargo Wharf.

(322) **Chart 16593.–Middle Bay,** between Cliff Point and Broad Point, is exposed to NE weather. **Viesoki Island,** near midentrance, is 101 feet high, small, and flat topped with sheer rock bluffs. A rock that uncovers is 0.4 mile NE from the island.

(323) **Broad Point** is the end of a long peninsula separating Middle Bay from Kalsin Bay. Broken ground with some dangers extends 1 mile N from the point.

(324) **Kalsin Bay,** the largest indentation in the SW side of Chiniak Bay, provides anchorage for large and small vessels. The low valley between Kalsin Bay and Ugak Bay, 9 miles SW, is used as a portage.

(325) **Queer Island, Kalsin Island,** and other small islands in the W part of the entrance to Kalsin Bay, are surrounded by foul ground. A large expanse of reefs and small islands overspreads the E part of the bay.

(326) The foul ground can be avoided by entering Kalsin Bay 0.8 mile SE of Queer Island, then favoring the W shore. The recommended anchorage is 2 miles from the head about 0.5 mile off the E shore in 9 to 10 fathoms; this anchorage may be untenable during a NE storm. Caution is necessary to avoid the rock that uncovers 9 feet on the W side of the bay and the rock that uncovers 4 feet on the E side of the bay.

(327) A well defined channel along the E shore of Kalsin Bay leads to a V-shaped cove SE of **Svitlak Island,** where excellent anchorage for small vessels is afforded in any weather.

(328) **Routes.**–To reach the V-shaped cove SE of Svitlak Island from a position 1.2 miles 000° from Cape Chiniak Light, steer **267°,** heading for **Kekur Island** with **Middle Island** summit on range, until the sharp point on the W end of Isthmus Bay bears 191°. Then turn left to course **240°** and head for the large square rock S of Svitlak Island until abeam of the N end of Svitlak Island, then turn left to **220°** and head for the point at the S entrance of the cove until the large square rock bears four points on the starboard bow. Then steer **180°** and anchor in 6½ to 7 fathoms 400 yards off the S shore. To go farther into the cove requires local knowledge. The channel abreast Svitlak Island is narrow with shoal water on both sides; caution should be exercised to avoid depths of less than 10 fathoms. The shoal water on the E side of the channel is extensive and surrounds the point forming the N limit of the cove.

(329) **Isthmus Bay,** just E of Kalsin Bay, affords anchorage for vessels in S weather. The range of Kekur Island and the summit of Middle Island, course **267°,** clears the dangers off the E end of Isthmus Bay. In an emergency, a vessel may be beached on the sand at the head of the bay.

(330) **Chart 16580, Kodiak Island, southeast coast.**–A comprehensive survey was made of the waters along the SE coast of Kodiak Island to and including part of Albatross

Bank. A vessel equipped with echo sounding apparatus would be aided in determining its position by soundings taken while cruising over this area.

(331) The shoaler, outer parts of two extensive submarine plateaus form Albatross Bank. A trough of deep water lies between them and branches extend into both entrances of Sitkalidak Strait and toward Sitkinak Strait. A very regular trough, NE of Albatross Bank, leads directly from seaward to Chiniak Bay.

(332) A depth of 8 fathoms, rocky bottom, is in 56°22.5'N., 152°56.0'W. on Albatross Bank.

(333) **Chart 16593.–Cape Chiniak,** the SE point of Chiniak Bay, is low and wooded for 0.8 mile back and then rises to higher land. **Chiniak Island,** 0.5 mile NE of the cape, is flat and grass covered; numerous high bare rocks extend 1.1 miles NE from it. **Cape Chiniak Light** (57°37.7'N., 152°09.1'W.), 120 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the NW side of the island. An anchorage, 1.3 miles NW of Cape Chiniak Light, provides protection from S weather in 18 to 20 fathoms. The cape should be cleared by 1.5 miles to avoid the offshore rocks.

(334) **Cape Greville,** 2 miles S of Cape Chiniak, is fronted by several rocky islets. Broken bottom extends 0.8 mile NE from the cape. In approaching from the vicinity of Ugak Island, Cape Greville should not be mistaken for Cape Chiniak.

(335) The land is thickly wooded for about 5 miles S from Cape Chiniak, then to Narrow Cape it is bare except for scrubby brush in the gulches and valleys and some grass and scattered clumps of small spruce trees on the lower slopes. The valley, 8 miles S of Cape Chiniak, terminates in a sand beach.

(336) Submerged rocks and rocks awash extend up to 0.5 mile offshore for 8 miles S from Cape Chiniak, then they extend up to 1 mile offshore to Narrow Cape; there is thick kelp in the vicinity of Narrow Cape. Outside these areas the bottom is mostly sand and gravel with some rocky sections off the points. No anchorages are recommended along this coast.

(337) A 10-fathom bank is 8.3 miles 166° from Cape Greville.

(338) **Narrow Cape,** 13 miles S from Cape Chiniak, is flat, but gradually drops close to sea level about 0.3 mile back of the cliff, having the appearance of an island when seen off Cape Chiniak. From this low part, grassy slopes with a few scattered spruce trees roll gradually upward to the mountains N of Ugak Bay. The SE face of the cape is an abrupt grass-topped cliff, 165 feet high and 1.1 miles long.

(339) **Ugak Island,** 2.5 miles off Narrow Cape, is discernible against the distant background of higher mountains from well out to sea. A ridge over 1,000 feet high runs the full length of the island close to the offshore side. The shore is steep and rocky and fringed with rocks and reefs, except at the NW end where a grassy slope spotted with a few scattered spruces descends gradually to a sandspit.

(340) In February 1984, a submerged obstruction was reported about 1.2 miles S of Ugak Island in about 57°20'51"N., 152°16'39"W.

(341) A rock and sandbar extends from Ugak Island to the S tip of Narrow Cape; the least found depth near the middle is 6½ fathoms. Although not wire dragged, the passage is considered safe for moderate-sized vessels. It is regularly used by fishing boats of 8- to 10-foot drafts. Tide rips are experienced, particularly on and near the bar, except at slack water. These rips increase with strong NE winds, producing breakers and causing the false impression that the passage is foul. At such times the passage is dangerous for small craft.

(342) The **current** floods NE through the passage between Ugak Island and Narrow Cape. There are strong cross currents N and S of Ugak Island and tide rips near the shore.

(343) If the passage S of Narrow Cape is used to Ugak Bay, avoid the rock awash at minus tides 0.7 mile SW of the S tip of Narrow Cape, a rocky 4-fathom shoal 3.6 miles W of the cape, and a ½-fathom rock 6.6 miles W of the cape.

(344) **Ugak Bay** has its entrance between Pasagshak and Gull Points and extends W about 19 miles; its inner end branches into a basin at the N and a narrow arm at the S. In entering, vessels should pass S of the ½-fathom rock a little N of midentrance. Depths of 40 to 55 fathoms will be found 1 mile off the points along the S shore from the entrance to Saltery Cove, then the bottom abruptly shoals to about 16 fathoms and deepens again to about 45 fathoms near the junction of the basin and arm at the head of the bay.

(345) **Local magnetic disturbances.**–Magnetic boat compasses have been observed to swing 15° to 180° in Ugak Bay.

(346) **Pasagshak Point,** 4 miles W of Narrow Cape, is a prominent, narrow mountainous headland 894 feet high. The point presents the appearance of a pyramid when viewed from the SW.

(347) **Pasagshak Bay** is rectangular shaped, 1 mile wide at its entrance, and has its E side formed by Pasagshak Point. It is shallow a short distance inside and exposed to any existing swell.

(348) **Long Island,** the 127-foot-high island off the N shore of Ugak Bay W of Pasagshak Bay, is rocky and grass topped. It is surrounded by a reef and numerous rocky islets. Foul ground is between the island and the N shore and 1.2 miles SE of the island.

(349) **Portage Bay** is the rounded bight 4.5 miles W of Pasagshak Bay. This bay is identified by a small flat-topped, sheer-bluff islet 42 feet high in the middle of the entrance, and a pinnacle rock 34 feet high 270 yards SW from it. Both are surrounded by deep water. The bottom has a gentle slope toward the head of the bay.

(350) **Eagle Harbor** is an open cove on the S side of Ugak Bay, 5.5 miles from the entrance. Its NW point is marked by two pinnacle rocks. At the NW shore of the cove are several shacks of the deserted village of **Eagle Harbor.** There is no secure anchorage here. The cove is exposed to E swells.

(351) Between Portage Bay and Kalsin Bay, and between Eagle Harbor and Shearwater Bay are portages.

(352) **Saltery Cove,** on the N shore of Ugak Bay and 8.5 miles above the entrance, is a half-moon shaped bight. It is marked on its E extremity by a reef point surmounted by a pinnacle rock 32 feet high. The cove has a gently sloping sand and mud bottom, but shoals abruptly to flats along the shore. A rock is just outside of the flats near the head of the cove. The recommended anchorage is along the 10-fathom curve near the E end of the bight. This is regarded as the best general anchorage in Ugak Bay.

(353) **Hidden Basin,** the N branch at the head of Ugak Bay, has a slightly curving bottle-neck entrance. The controlling depth through the approach is only 5 feet. The channel is along the W shore of the approach. Strong currents are encountered in the entrance. Depths charted in the approach to the basin are reported to be inaccurate; this and the swift and turbulent current during periods of maximum and minimum flood make the entrance hazardous.

(354) The S branch at the head of Ugak Bay is about 7 miles long and about 0.5 mile wide. A rock, which bares 5½ feet at about half tide, is near the middle of the constricted part of the arm. The channel is S of the rock which may be avoided by keeping 200 yards off the S shore in 10 fathoms.

(355) **Gull Point** and the point 1.8 miles S have bold rocky faces with islets of massive rock close by. The small cove on the S shore of Ugak Bay W of Gull Point provides anchorage for small boats in S weather. A sand beach is at the head.

(356) The cove about 3 miles S of Gull Point is connected by a tidal channel to a marsh which is flooded at high tide. The bottom at the entrance to the lagoon and along the beach for about 1 mile N is sandy and apparently free from rocks. A rock, covered 2½ fathoms, is 0.8 mile NE from the rocky point at the S end of the cove.

(357) **Chart 16592.–Dangerous Cape,** on the SE coast of Kodiak Island between Ugak and Kiliuda Bays, is the S end of a ridge. On the S side of the cape is a bluff over 500 feet high. A large rock, about 30 feet high, is about 400 yards S of the cape.

(358) **Boulder Bay,** just W of Dangerous Cape, affords poor anchorage on hard sand bottom. There are numerous rocks several hundred yards offshore. These rocks are mostly submerged or awash at high water, and extreme care should be taken in navigating this bay.

(359) Inner and Outer Right Capes form a double cape 3.5 to 5 miles SW of Dangerous Cape. **Outer Right Cape** is comparatively low with eroded bluffs about 100 feet high; however, landslides extend almost to the summit of the mountains along the coast 1 mile NE of the outer cape. On a clear day these are recognized a long distance offshore. **Inner Right Cape** rises to 493 feet. Broken ground extends about 1 mile offshore between the outer and inner capes.

(360) **Kiliuda Bay** has its entrance between Left Cape and Inner Right Cape. It extends about 4 miles NW and then about 6 miles W.

(361) Indenting the NE side of Kiliuda Bay are Santa Flavia Bay and Shearwater Bay. The shore between these bays is fringed with islands and rocks.

(362) **Kiliuda Rock,** 2 feet high and about 1 mile W of Inner Right Cape, is on the range of the tangents of Inner and Outer Right Capes and about on the range of the small points along the W shore of Santa Flavia Bay. The rock is surrounded close-to by depths of 17 fathoms.

(363) **Santa Flavia Bay,** between Inner Right Cape and Ermine Point, is apparently clear in the center with depths of 12 to 15 fathoms, sand bottom, but is exposed to swells and seas accompanying SE weather. Kiliuda Rock should be avoided in entering.

(364) **Shearwater Bay,** the NE arm of Kiliuda Bay, is about 2.5 miles in extent. Rocks awash extend from either side of the entrance. In the entrance channel between the rocks there are depths greater than 20 fathoms for a width of 0.4 mile. The rocks extending 0.2 mile W of Pillar Point bare at low stages of the tide, and shoal water extends about 200 yards channelward from the outermost rock. Near the outer end of the group of rocks on the NW side of the entrance is a dry patch of rock 3 feet high. The outermost rock uncovers and is 300 yards from the dry patch in a direction toward the head of the bay.

(365) **Pillar Point** marks the SE side of the entrance to Shearwater Bay. A small islet is about 110 yards N of Pillar Point. **Bluff Point,** 0.5 mile farther inside the bay, is marked by the eroding bluff of a knoll which overlooks the lowland back of Pillar Point.

(366) The small enclosure, back of the narrow strip of land at Bluff Point, provides secure shelter for small craft with local knowledge.

(367) About 0.7 miles from its head, Shearwater Bay contracts to a width of about 0.4 mile between **Observation Point** and the opposing point on the SE side. The ruins of a cannery are on Observation Point. Anchorage may be had about 0.3 mile beyond this contraction midway between the shores in about 6 fathoms, mud bottom, avoiding shoal water extending 200 yards N of the opposing point and the shoal depths adjacent to the flats along the NW side at the head of the bay.

(368) **Routes, Shearwater Bay,** from the southwestward.–Round Cape Barnabas 2 miles off and make good the following courses: (1) **331°** for 9.5 miles to Pillar Point bearing 069°, 1.4 miles; this course passes 1.1 miles off Left Cape and heads for Shearwater Point. (2) **048°** for 1.4 miles to Pillar Point abeam, 0.5 mile; this course heads for the deteriorating cannery wharf at Observation Point. (3) **056°** for 1.6 miles to anchorage.

(369) From the northeastward.–Round Dangerous Cape 3.5 miles and make good the following courses: (1) **276°** for 3.5 miles to Outer Right Cape (E end) bearing 000°, 2.5 miles. (2) **305°** for 3.4 miles to Inner Right Cape bearing 052°, 1.6 miles; this course heads for the tangent of the bold shore about 2 miles NW of Left Cape. (3) **330°** for 3.8 miles to Pillar Point bearing 069°, 1.4 miles; this course heads for Shearwater Point. Then follow courses (2) and (3) of the preceding paragraph.

(370) The N side of Kiliuda Bay is indented by an open bay about 1.2 miles wide between **Shearwater Point** and **Coxcomb Point.** Foul ground extends 0.3 mile from Shearwater Point to Coxcomb Point. A rock, 4 feet high, is 0.5 mile E of Coxcomb Point. The entrance channel is 200 yards E of this rock. A N course leads to the center of the open bay which has a depth of 3 fathoms. The bottom has a gentle rise to an extensive sand beach at the head. A vessel may be beached here in the event of an emergency.

(371) A rock, 45 feet high and 0.5 mile SW from Coxcomb Point, marks the outer limit of shallow depths. A triangular-shaped bank is outside the line drawn from the rock to Shearwater Point and N of **Pivot Point.** Anchorage depths on the bank are 14 to 17 fathoms, sand bottom.

(372) The point on the N side of Kiliuda Bay, about 3 miles to the W of Coxcomb Point, is a low grass-covered sandspit. The axis of a channel of deep water is 300 yards from the sandspit, and the 40-fathom curve is only 150 yards from the spit. Just S of this channel the depths are very irregular and the area should be avoided.

(373) **Left Cape** is a bold headland separating Kiliuda Bay from the E part of Sitkalidak Strait. The SE face of the cape is covered with a series of long rockslides extending almost to the mountain summit back of the cape. Numerous boulders are close inshore, and submerged rocks fringe the cape.

(374) **Sitkalidak Island,** about 18 miles long, is adjacent to the SE coast of Kodiak Island. The island is grass covered and in general devoid of trees. The easternmost mountain summit at Cape Barnabas is a good landmark from the E and SE.

(375) **Sitkalidak Strait** borders both the N and W sides of Sitkalidak Island, separating that island from Kodiak Island. Sitkalidak Passage is the name applied to the narrow part of the strait.

(376) That part of Sitkalidak Strait N of the Sitkalidak Island extends from the E entrance between Dangerous Cape and Cape Barnabas to Sitkalidak Passage. The broken bottom NE of Barnabas Rock had been examined with a wire drag and no dangers were revealed. This part of the strait is navigable by all vessels as far as Sheep Island, and offers several secure anchorages. The controlling depth through Sitkalidak Passage is 7 feet. The passage and its E approach are marked by lights and a lighted buoy.

(377) During June and July thick white fogs occur around the S end of Kodiak Island which sometimes last for several

days. These fogs generally drift about the sea, but frequently do not enter the strait and adjacent bays. The E entrance to Sitkalidak Strait is frequently clear when a thick fog is less than 1 mile offshore.

(378) **Cape Barnabas,** the E end of Sitkalidak Island, is marked by a conspicuous mountain 1,719 feet high. There are rockslides on the slopes of this mountain and a series of eroded bluffs along the NE face. Submerged rocks and rocks above high water border around the cape and numerous kelp patches are several hundred yards offshore. In thick weather this cape is usually easier to pick up than Dangerous Cape.

(379) Vessels making Sitkalidak Strait from the SE should pass Cape Barnabas 2 miles off and steer **321°**, heading for the NE tangent of Left Cape until Table Island Light bears 195°, then change course to **252°** and follow directions given below.

(380) **Barnabas Rock,** which uncovers about 3 feet, is 0.8 mile 075° from Table Island. The sea breaks over this rock at high tide when there is a moderate swell, but often in calm weather at high tide there is no indication of the rock. It has no kelp. The passage between the rock and Table Island is apparently clear and has been used by steam whalers operating from Port Hobron; but because of uncertain currents the passage is not recommended. The water between Table Island and Sitkalidak Island is foul with submerged pinnacles.

(381) **Table Island** is a flat-topped island about 100 feet high 2 miles WNW from Cape Barnabas. **Table Island Light** (57°11.4'N., 152°55.1'W.), 106 feet above the water, is shown from a small house with a red and white diamond-shaped daymark on the N end of the island.

(382) **Tanginak Anchorage,** the bight E of the entrance to McDonald Lagoon, is a good anchorage in S weather. A rock awash at low water is about 0.5 mile off the eroded bluff forming the W end of the bight. Shoal water is between the rock and the point.

(383) **McDonald Lagoon,** about 4.5 miles W of Table Island, almost divides Sitkalidak Island. It has a bottleneck entrance. A bar channel, 13 feet deep, is W of the ½-fathom shoal 0.2 miles NW of the bottleneck and follows the N side of the W entrance point until about 200 yards W of the bottleneck; here it is necessary to avoid a small shoal making out from the N side of the point. Strong currents run in the entrance and in N weather the bar breaks all the way across. Small vessels with local knowledge may enter the lagoon which deepens inside and has good holding ground.

(384) **Port Hobron** is the second deep-indenting bay along the N side of Sitkalidak Island W of Table Island. The bay is a good harbor for all vessels except during a NE gale, when a comparatively heavy sea enters the bay.

(385) A former whaling station and wharf in ruins are on the E side of Port Hobron.

(386) At the head of Port Hobron is a small settlement known as **McCord.** A cattle ranch is on the E shore.

(387) **Cathedral Island,** the largest island in Sitkalidak Strait, is in the middle of the strait at the entrance to Port Hobron. The island is 192 feet high and covered with grass. It is dome shaped, with steep eroded cliffs on all sides except on the S side. The best water is found passing S of the island.

(388) **Nut Island Light N** (57°12.2'N., 153°09.6'W.), 40 feet above the water, is shown from a square steel frame with a red and green triangular daymark 0.9 mile W from Cathedral Island.

(389) **Aberdeen Rock,** in the middle of Sitkalidak Strait 0.7 mile W of Nut Island, is covered 1 fathom. It is unmarked and breakers occur over it only in the heaviest NE weather at extreme low tide.

(390) The recommended passage in the vicinity of the three midstrait obstructions, Cathedral Island, Nut Island, and Aberdeen Rock, is to the S of them. To avoid Aberdeen Rock when using the passage and when in the vicinity of the rock, do not go N of the line between Nut Island Light N and Bush Point Light 2. The passage N of the three midstrait obstructions is clear and is used by local craft. **Three Sisters Rocks,** near the N shore, are low; after passing S of these when bound W in the N passage, care must be taken to stand well over toward the N shore in the vicinity of Aberdeen Rock.

(391) **Amee Bay,** 2 miles W of Port Hobron, is clear in midchannel and offers fair anchorage, but violent williwaws blow out of this bay in S weather.

(392) **Shag Rock,** 6 feet high, is about 150 yards N of **Cub Island** which in turn is about 2.4 miles W of Cathedral Island. Shag Rock forms an important turning point for vessels using the narrow parts of Sitkalidak Strait. It is reported that on the rising tide a S set is noticeable between Shag Rock and Bush Point.

(393) **Bush Point** is on the N shore of the narrow part of Sitkalidak Strait 2.8 miles W of Cathedral Island. **Bush Point Light 2** (57°13.1'N., 153°13.0'W.), 17 feet above the water, is shown from a skeleton tower with a red triangular daymark on the S extremity of the point.

(394) **Midway Bay,** known locally as **Sheep Bay,** is that part of Sitkalidak Strait between the narrows at Bush Point and Sitkalidak Passage. **Sheep Island,** 50 feet high, covers the central part of Midway Bay. The bay affords the best anchorage in the general vicinity of the strait. The recommended anchorage for large vessels is between Sheep Island and Bush Point; small vessels usually anchor NE of Sheep Island in 5 fathoms, sticky bottom.

(395) The through passage is S of Sheep Island. A shoal bar, strewn with boulders, extends W from the shoal area surrounding Sheep Island to the E end of the N shore of Sitkalidak Passage. The channel for entering Sitkalidak Passage borders the S side of the shoal area and bar. The shoal on the S side of this channel is marked by a lighted buoy.

(396) **Sitkalidak Passage** separates the N end of Sitkalidak Island from Kodiak Island and is the link between the two sections of Sitkalidak Strait. The controlling depth is only 7 feet through the passage. The passage is fairly straight and about 1 mile long. Inside the E entrance the channel slightly favors the N shore; in the W half of the passage it slightly favors the S shore.

(397) **Sitkalidak Passage Light 4** (57°12.6'N., 153°16.4'W.), 30 feet above the water, is shown from a skeleton tower with a red triangular daymark on the N side of the W end of the passage.

(398) **Currents.**–The currents seem to meet at Sitkalidak Passage under ordinary conditions of wind and weather, but in strong S weather the current occasionally flows NE continuously. No current velocities have been measured, but it is estimated that the maximum velocity never exceeds 3 knots.

(399) **Routes.**–From eastward, enter Sitkalidak Strait on a midchannel course. Proceed to 0.5 mile 163° from the E end of Cathedral Island, thence 600 yards S of Nut Island Light N, thence 300 yards S of Aberdeen Rock, thence 150 yards N of Shag Rock, thence 175 yards S of Bush Point Light 2, thence 400 yards 155° from the W end of Sheep Island, thence 125 yards E of Sheep Island Lighted Buoy 3, and leave Buoy 3 to port. From this point, make a slow left turn to enter the narrows, avoiding the shoals W of Sheep Island. Keep in midchannel through Sitkalidak Passage, favoring the SE side opposite Sitkalidak Passage Light 4. Continue on a midchannel course through the SW end of the strait.

(400) **Outer coast of Sitkalidak Island.**–For several miles W from Cape Barnabas, the outer coast is particularly bold and rocky and seldom free of breaking seas. A series of mountain peaks stands close to the rounded outline of this projecting coastal section.

(401) About 5 miles W of Cape Barnabas, a channel navigable by launches in moderate weather leads to a lagoon. Practically all of the lagoon dries at low water.

(402) **Partition Cove,** having a small islet in the center and separated from McDonald Lagoon by a low narrow neck of land, is foul.

(403) **Ocean Bay,** the pronounced indentation of the outer coast of Sitkalidak Island, has a wide sand beach several miles long. The waters adjacent to a long section of the beach are apparently free of rocks. A sheltered anchorage during prevailing SW weather may be found in 4 fathoms in the lee of the prominent rocky point marking the S end of the sand beach.

(404) On the coastal ridge between Ocean Bay and Black Point are two tips, 1,715 feet and 1,527 feet high, between which the ridge sags in a smooth curve. This feature may be recognized from seaward even against the distant background of higher mountains.

(405) **Black Point,** the SW end of Sitkalidak Island, is a low grass-covered cape sloping gently to the adjacent hills. It does not show darker than the surrounding country, but there are some low eroding bluffs around the cape and scattered boulders along the shore.

(406) A coastal shelf, approximately defined by the 18-fathom curve around Black Point, extends 4 miles offshore and spreads fan shaped about the point. Very broken bottom exists on the shelf. In some places the survey indicated rather deep water where live kelp appeared. It is recommended that Black Point be given a berth of at least 4 miles.

(407) That part of Sitkalidak Strait W of Sitkalidak Island extends from its S entrance between Black Point and Twoheaded Island to Sitkalidak Passage.

(408) The most prominent point on the SW end of Sitkalidak Island is at the W extremity of the coastal ridge back of the lowland in the vicinity of Black Point.

(409) **Ship Rock,** 6 feet high, is at the SE entrance of Sitkalidak Strait. Vessels should give the rock a wide berth to avoid the broken bottom extending almost 2 miles SW of it.

(410) **Puffin Island,** 75 feet high, is a grass topped irregular mass of rock 0.6 miles NE of Ship Rock. Several bare rocks, some of the pinnacle type, are near the island. The passages on either side of the island are not safe.

(411) **Tallapoosa Shoal,** with the least depth of 9 fathoms over it, is in the middle of the strait 3.5 miles NW of Ship Rock.

(412) **Rolling Bay,** the first bay on the E side of Sitkalidak Strait from the S entrance, has a sand beach and tide lagoon at the head, and a valley leads to Ocean Bay. The bay is exposed to the prevailing SW swell.

(413) A prominent rock, 83 feet high, having vertical sides and terminating in a dome-shaped top, is on the extensive reef projecting from the N point of Rolling Bay. A needle-top rock, 40 feet high, is near the point.

(414) **Sitkalidak Lagoon** is the upper part of **Natalia Bay,** the 5-mile inlet just N of Rolling Bay. The restricted entrance to the lagoon around the end of the spit is navigable only by small craft.

(415) **Natalia Peninsula,** the rectangular mountainous headland on the E side of Sitkalidak Strait opposite Cape Kasiak, has two knolls; one of these is at the NW end of the headland, the other is at **Natalia Point,** the SW end. A 3½-fathom shoal is 0.5 mile off the headland.

(416) **Newman Bay** is on the E side of Sitkalidak Strait opposite Three Saints Bay. A 5-fathom shoal is 0.5 mile off the N entrance point. Several dangers are near the S shore. A shoal of 4 fathoms extends 400 yards N of the point marked by a 50-foot elevation which appears as an island from a distance. Anchorage is available in 8 to 9 fathoms in the center of the upper bay.

(417) **Old Harbor** is a native village on the W side of Sitkalidak Strait 1 mile from the W end of Sitkalidak Passage. A school and a trading post are in the village.

(418) An L-shaped pier, at Old Harbor, has a 67-foot face with about 15 feet reported alongside. A dolphin is about 45 feet NE of the pier and parallel with the face.

(419) Commercial air service is available from Kodiak.

(420) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(421) The Kodiak Island area is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(422) Vessels using Southwest Alaska Pilots Association pilots and en route to Old Harbor can meet the pilot boat about 1 mile E of Cape Liakik (57°06.9'N., 153°27.0'W.).

(423) The pilot boat can be contacted by calling "OLD HARBOR PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(424) A **small-boat basin** has been dredged at the head of the unnamed cove on the W side of Sitkalidak Strait, about 700 yards N of Old Harbor. A marked dredged channel leads W from the strait to the basin. A diversion dike protects the basin on the N side, and a 240-foot-long groin on the S side of the entrance protects the channel from shoaling. In 1976, the entrance channel and basin had depths of 8 feet. The basin will provide protected moorage at a 562-foot float in the SW end of the basin for resident and transient commercial fishing vessels.

(425) Between Old Harbor and the round point on the opposite shore, Sitkalidak Strait narrows to about 0.5 mile. The W half of this part of the strait is a sandy shoal having depths less than 3 fathoms. Some piles are at the S end of the shoal, 450 yards E of the L-shaped pier, at Old Harbor. A small reef, which uncovers 4 feet, is 100 yards off the E shore of the strait opposite Old Harbor.

(426) **Barling Bay** is the first bay S from Old Harbor. In NW weather violent williwaws blow out of the bay. The bay near its head affords excellent holding ground for small craft and is secure except in NW weather. The anchorage for large vessels is just inside the entrance.

(427) A broad grass-covered sandpoint projects into Sitkalidak Strait forming the S entrance point of Barling Bay. One mile S of the point and about 0.6 mile off the W shore of the strait are a cluster of dangerous rocks marked by kelp. The least depth over them is 1 foot at low water. The outermost rock is 0.9 mile 204° from the point. The area between the rocks and the W shore is shoal.

(428) **Three Saints Bay,** on the W side of Sitkalidak Strait, affords anchorage at the head in 14 to 18 fathoms, mud bottom. At the entrance, which is between Cape Liakik and Cape Kasiak, a shoal borders the SW shore.

(429) A spit, with some rocks awash, and covered 2¾ fathoms near its outer end, extends about 0.6 mile SSW of **Cape Liakik. John Island,** 90 feet high, is near the outer end of the spit, with another islet between it and Cape Liakik. Foul ground extends from John Island to a submerged rock 2.2 miles N and about 150 yards off the E shore.

(430) A course through the middle of the entrance leads between the shoal on the SW shore and a 4-fathom shoal 0.5 mile NNW of John Island.

(431) The first Russian settlement on Kodiak Island was established on this bay in August 1784 and named for the vessel THREE SAINTS.

(432) The cannery on the sandspit on the W side of Three Saints Bay, was destroyed by fire in 1931. The face of the cannery wharf remains. Depths at the wharf are 11 feet at the NW corner, 4 feet about 5 yards farther inshore, and 24 feet at the downstream corner. SE of the wharf the low water shore areas extend beyond the line of the face of the wharf. A port landing is always made. With a heavy wind broadside on, it is impossible for a vessel under her own power to leave the wharf.

(433) An excellent anchorage for small vessels is in the cove formed by a long sandspit inside the entrance on the SW side of the Three Saints Bay. A vessel about 65 feet long may anchor here.

(434) Two streams enter at the head of Three Saints Bay draining separate valleys. The S valley is said to have a trail leading across Kodiak Island to Uyak Bay.

(435) The three rocky peaks on the ridge that terminate at the headland at the turn of Three Saints Bay are locally known as **The Three Saints.** The peaks are over 3,000 feet high and when clear form a leading mark at sea for identifying the S entrance to Sitkalidak Strait.

(436) **Cape Kasiak** is a prominent headland on the W side of Sitkalidak Strait S of the entrance to Three Saints Bay.

(437) **Kaiugnak Bay** and **Kiavak Bay,** collectively known as **Wide Bay,** indent the W shore of Sitkalidak Strait between Cape Kasiak and **Cape Kiavak.** A small shoal of 3½ fathoms is 1 mile SW of Cape Kasiak. A shoal of 2 fathoms is near the middle of the upper part of Kaiugnak Bay. A rock, which uncovers 5 feet, is 0.5 mile NE of Cape Kiavak, and a rock awash, about 700 yards offshore, is about 1 mile NW of the cape. There are two lagoons, one at the head of each bay; neither permits entrance except at high water. A large waterfall is in the NW branch of Kaiugnak Bay.

(438) Anchorage for all weather except E gales is provided in the SW part of Kaiugnak Bay. Large vessels should not proceed W of a line bearing S from the small island off the projecting point at the head of the bay.

(439) **Knoll Bay** is about 2.5 miles S of Cape Kiavak and N of Twoheaded Island.

(440) The coast from Cape Kiavak to the N entrance point of Knoll Bay is foul for 0.3 mile offshore. The coast and shore of the bay are fringed with covered and visible rocks, which extend about 0.2 mile offshore.

(441) **Knoll Point,** the S entrance point to the bay, is fringed with many dangers. A rock awash, marked by kelp, is about 0.4 mile E of the point, and a large group of rocks, with kelp close E, are about 0.5 mile S of the point.

(442) Anchorage in Knoll Bay may be had in 12 fathoms during W weather, and small craft may anchor under the bluff in the S corner of the bay.

(443) **Chart 16590.–Twoheaded Island,** off the S extremity of the W shore of Sitkalidak Strait, rises to two irregularly rounded peaks; the higher, 1,837 feet, is NE of the S extremity of the island, and the lower, 1,724 feet, is W. A ridge, 1,442 feet high, extends along the NE part of the island.

(444) The coast of the island is bold and precipitous, with numerous large boulders and rocks awash along the shores. Two bare rocks, 24 and 28 feet high, are near the SW shore. The 28-foot rock is block shaped and the 24-foot rock is shaped like a finger pointing up from a heavy base.

(445) The passage N of Twoheaded Island, to Jap Bay and Kaguyak Bay, has a channel width of 0.8 mile. In navigating the passage, vessels should avoid the foul area extending S of Knoll Point and favor Twoheaded Island.

(446) **Jap Bay,** consisting of an inner and outer bay, is narrow and has its entrance 2 miles NW of Twoheaded Island. A rock, covered 2 fathoms and generally not marked by kelp, is in the middle of the entrance. Broken bottom extends NE of the rock to a group of large rocks, 60 feet high, which overspread the E part of the entrance. The E and W shores of the bay are fringed with many submerged and rocks awash. The channel for entering the bay is W of the 2-fathom rock.

(447) Vessels may anchor near the head of the outer bay. After entering proceed midchannel until the inner tangent of the group of large rocks in the entrance is in range with the outermost of the two high rocks off Twoheaded Island. Then anchor in 15 to 16 fathoms, mud bottom.

(448) The restricted entrance to the inner bay is about 190 yards wide. The channel curves around the end of the gravel spit, but has a depth of 11 fathoms. A vessel may be beached on the N side of the spit. It has been reported that vessels should avoid anchoring NW of the spit, as the holding ground is poor. Several vessels have reported being blown ashore in heavy NE weather.

(449) **Cape Kaguyak** is about 2 miles SW of Twoheaded Island and between them is the passage leading to Jap Bay. The area in the vicinity of the cape is foul. The 163-foot rocky islet at the SE tip of the cape has the appearance of a huge sun dial. The outermost danger is a rock, covered 2½ fathoms, 0.6 mile NE of the cape. **Kaguyak Bay,** immediately W of the cape, affords anchorage at the head of the bay in 6 to 9 fathoms from W and S winds. With NE winds small craft may find a fairly comfortable anchorage under the bluff on the SE side of the head of the bay.

(450) The coast of **Aliulik Peninsula** from Cape Kaguyak to Cape Trinity, the SW extremity of Kodiak Island, is bordered by foul ground. Extensive foul areas also surround Geese Islands and Aiaktalik Island which are along this coast. Geese Channel is not navigable except for small vessels, and ships proceeding along this coast pass through Sitkinak Strait. Old Kaguyak Bay and Russian Harbor provide anchorage for small vessels.

(451) The southernmost peak, 2,215 feet high, on Kodiak Island, is about 5 miles W of Cape Kaguyak. This detached mountain is regular in outline and forms a distinctive mark. From the mountain toward Cape Trinity is a long gradual slope.

(452) **Flat Island,** about 0.9 mile off the entrance of Old Kaguyak Bay and 6 miles SW of Twoheaded Island, is flat topped and 119 feet high. This island has sheer rocky bluffs. A pinnacle rock, 38 feet high, and another rock outside of it, are close to the SW end of Flat Island. The rocky reef extending 0.7 mile to the NE shows in small groups of rocks.

(453) A channel is between Flat Island and the mainland; its width is narrowed by heavy kelp beds on either side.

(454) **Old Kaguyak Bay** affords protection to small craft in N weather. A rock, 28 feet high, is in the center of the entrance and a rock, which uncovers about 3 feet, is 100 yards SW of the elevated rock. To enter pass between the elevated rock and Boot Point but favor the shore around Boot Point to avoid the rock that uncovers 3 feet. Anchor in about 3 fathoms, sandy bottom, a little N of the center of the bay.

(455) **Boot Point,** forming the W side of the entrance of Old Kaguyak Bay, is marked by a humped hill 496 feet high.

(456) About 0.5 mile SW of the W extremity of the headland forming Boot Point are two islets close together. The highest part, the N end of the W islet, is 41 feet. The islet 0.2 mile farther offshore is 19 feet high. The islet 0.1 mile inside is 10 feet high.

(457) **Geese Islands,** three in number, are flat in appearance, the E and highest is 150 feet high. The passages between the islands are dry at low tide and the area for 1 mile S of the islands is foul.

(458) A reef and shoal area extends 3 miles E from the E Geese Islands, terminating in a rock covered 2½ fathoms. The rock breaks in a moderately heavy sea but not in ordinary weather. The reefs, 1 mile inside of the rock, bare 4 to 7 feet. It should be noted that the bottom shoals very abruptly in this locality.

(459) **Aiaktalik Island,** about 2.5 miles W of the westernmost of the Geese Islands, shows as two knolls; the E one, 308 feet high, is the sharper and higher. The area S of the island is foul for 1.5 miles offshore.

(460) A cylindrical grass-covered rock, 50 feet in diameter and 58 feet high, stands on the shore reef at the W end of Aiktalik Island.

(461) **Sundstrom Island** is just off the SW end of Aiktalik Island. Several wart-like projections rise above the general level of the island which is about 70 feet; the highest is 158 feet. The shores consist of rocky bluffs.

(462) The passage between Sundstrom and Aiktalik Islands should prove useful to small craft in that it avoids the whirlpools and tide rips around the SW point of Sundstrom Island. Both sides of the narrow passage are lined with heavy kelp but the midchannel is clear of kelp and has a controlling depth of about 2½ fathoms.

(463) The passage between Aiaktalik and Geese Islands is navigable for small vessels and has a controlling depth of about 6 fathoms. The chart is the best guide.

(464) The passage between Kodiak Island and the chain composing Aiaktalik Island and Geese Islands, via Geese Channel and Russian Harbor, is used considerably by small local vessels.

(465) **Geese Channel,** the passage N of Geese Islands, has a controlling depth of about 3¾ fathoms. Shoals and reefs are scattered in the passage. Several buoys mark the channel; they are numbered from E to W. Heavy kelp marks the shoal patch 0.5 to 0.9 mile W of the W island of the Geese Islands. In October 1979, a submerged obstruction was reported at the W end of the channel, about 200 yards SE of Geese Channel Lighted Bell Buoy 4.

(466) **Russian Harbor,** between Aiaktalik Island and Kodiak Island, is a temporary anchorage in moderate weather, in about 8 fathoms, hard sand bottom. There is but little shelter, and strong tide rips are frequent.

(467) In general it is difficult to make courses good passing through Russian Harbor because of the strong currents, swirls, and eddies. **Aiaktalik Island Light 5** (56°43.9'N., 154°02.9'W.), 57 feet above the water, is shown from a square frame with a green square daymark on the N point of the island. A middle ground in Russian Harbor has depths of 2½ fathoms.

(468) In **Aiaktalik Cove,** the seas and wind sweep around the point in moderate weather, making the cove an uncomfortable anchorage. The best anchorage for small vessels, affording excellent protection from the prevailing NE weather, is on the Kodiak Island side of Russian Harbor. This anchorage is 0.8 mile N of the point 3.4 miles E of Cape Trinity, opposite a stretch of sand beach in a break of the shore reef. The anchorage is in 4 fathoms, soft sand bottom.

(469) **Sitkinak Strait** is the broad strait lying between Trinity Islands and Kodiak Island. It is navigable for large vessels.

(470) The E approach is marked by Geese Islands on the N and **Cape Sitkinak,** the E end of Sitkinak Island, on the S. As viewed from seaward, this end of Sitkinak Island shows as precipitous dark rock and shale bluffs dominated by two peaks or heads; the N one is 605 feet high and the S one is 821 feet.

(471) Two groups of two bare rocks are 0.5 mile and 1 mile off Cape Sitkinak. The outer group, light gray in appearance, is 17 feet high, and the inner group is 13 feet high. Rocks awash are outside of the outer group of bare rocks.

(472) An extensive fan-shaped reef, the limits of which are marked by thick growing kelp, extends almost 2 miles E and S of the SE point of Aiaktalik Island. It is made up of two rocky ledges and many individual rocks, most of which uncover. It is believed that the rock on which the PAVLOF struck is located near the edge of this reef.

(473) A bank of considerable extent, with a least depth of 4¼ fathoms, is near the middle of Sitkinak Strait about 2 miles N of Whirlpool Point.

(474) **Whirlpool Point,** N point of Sitkinak Island, is low, flat, and sandy. **Whirlpool Point Light** (56°37.0'N., 154°05.5'W.), 51 feet above the water, is shown from a small house on a skeleton tower with a red and white diamond-shaped daymark on the point. The tower is reported to be a good radar target.

(475) **Currents.**–The currents in Sitkinak Strait set WNW on the flood and ESE on the ebb. There are heavy tide rips in the strait particularly SW and W of Aiaktalik Island. So far as observed, they are heaviest with a W wind and a flood current. The tide rips are often dangerous for small vessels. At times when the current opposes seas from E in the vicinity of Whirlpool Point, the seas become very steep. Current predictions for Sitkinak Strait may be obtained from the Tidal Current Tables.

(476) **Routes, Sitkinak Strait.**–A rocky ridge on Albatross Bank on which a depth of 8 fathoms was found, is in the seaward approach to Sitkinak Strait from the SE. The ridge is about 42 miles 105° from the summit of Sitkinak Island. It should be avoided.

(477) Enter the strait on a **270°** course passing about 4.3 miles N of Sitkinak Cape and 1 mile off Whirlpool Point Light. Continue on this course for 4 miles until Dolina Point bears 190°. Then change to **000°** and continue to a position 2.2 miles W from Cape Trinity. Due regard must be had for the strong currents in this strait.

(478) If bound for Alitak Bay, follow routes given later in this chapter.

(479) **Chart 16580.–Albatross Bank,** about 45 miles off the SE coast of Kodiak Island, has depths of 8 fathoms to about 61 fathoms.

(480) An area, having depths of 12 to 20 fathoms and covering about 50 square miles, is between 153°00'W. and 153°20'W., and between 56°20'N. and 56°28'N. The bottom characteristics noted on this area include gray mud, fine black sand and gravel, and rock. Kelp has been seen in this area at various times. On occasion, moderate tide rips have been noted.

(481) A rocky shoal is a short distance to the E of the large shoal just described. The depths range from 8 to 20 fathoms with a very irregular rocky bottom. The shoalest part, in 56°22.5'N., 152°56.5'W., is a sharp rocky ridge with a depth of 8 fathoms. Currents with a velocity of about 3 knots were observed in this area. It should be avoided in heavy weather because of possible breakers.

(482) A 16-fathom bank is in 56°40'N., 152°10'W. There may be less water. This shoal is separated from the shoals previously described by an extensive trough of deep water. This trough extends N, and branches extend into both entrances of Sitkalidak Strait and toward Sitkinak Strait.

(483) **Trinity Islands,** off the S end of Kodiak Island, consist of Sitkinak and Tugidak Islands inhabited only by occasional hunters and fishermen in the summer and trappers in winter. Unsurveyed areas include the SW coast of Sitkinak Island and all of Tugidak Island except the N end. Soundings in these unsurveyed areas are from reports.

(484) The island beaches are heavy shingle, gravel, and in places fine sand; a few alder bushes are on both islands. Landings are easy with offshore winds, but with any change the sea makes up rapidly. Water can be obtained from the ravines and pools on the islands.

(485) **Sitkinak Island** (see also chart 16590), the E island, is divided into two parts by **Sitkinak Lagoon,** which is navigable through the N entrance by small vessels, except during E swells or seas. The S entrance, fringed with rocks that uncover, should be attempted only with a calm sea; a small launch may enter at high water. The lagoon is a flat traversed by tidal channels, which are fairly deep near and inside the entrance, but the connecting channel between them is only 3 feet deep at high water.

(486) **Sitkinak Dome,** 1,600 feet high, prominent, and with a smooth rounded top, dominates the W side of Sitkinak Island. A parabolic antenna is just NE of the dome.

(487) The E end of Sitkinak Island and Whirlpool Point have been described under Sitkinak Strait.

(488) The island E of the lagoon is composed of many hills, some of which are separated from one another by low valleys. The NW side of the island, SW of **Dolina Point,** is made up of earth cliffs several hundred feet high, broken by narrow ravines.

(489) The S coast of Sitkinak Island is foul and should be avoided. Kelp beds extend 0.5 to 2 miles off the E and S shores. A bank with its center 9.5 miles SSW from Cape Sitkinak has not been fully surveyed. The bank has depths of 11 fathoms to 20 fathoms, and covers an area about 0.5 to 1.5 miles wide and about 6 miles long. It extends in a NNE-SSW direction and is an extension of an extensive area along the S coast of Sitkinak Island having depths less than 20 fathoms with irregular bottom in most places.

(490) A temporary anchorage is off the S entrance to Sitkinak Lagoon. This part of the S coast of the island is recognized offshore by the flatland at the lagoon. A prominent rocky point with an arched opening 50 feet high marks the entrance to the lagoon. To reach this anchorage from outside the 20-fathom curve, steer for the point with the arched opening bearing **026°**, and anchor in not less than 11 fathoms about 1 mile from the point.

(491) **Tugidak Passage,** between Sitkinak and Tugidak Islands, has very strong and freakish tidal currents and rips. Only the N approach has been surveyed. The S approach is apparently blocked by shoals. Tide rips in the middle of the passage are extremely dangerous to small boats and should be avoided by hugging the Tugidak Island shore.

(492) **Tugidak Island,** in its N part, is chiefly sandflats, but little above high water. A level boulder patch that uncovers is 0.5 mile off the N coast of Tugidak Island, 5 miles W of Tugidak Passage.

(493) The higher parts of the island are low grassy sandhills which terminate in bluffs in places along the shores. The N part is separated from the S or higher part by a large lagoon having one entrance from the SE.

(494) The lagoon is reported to bare, except near the SW side of the entrance where there is a pocket or basin of about 5 to 6 fathoms, sand bottom. The basin is a suitable anchorage for small boats, and is protected from the sea by a long sandspit that extends E from the entrance point on the SW side. A narrow channel follows the SE side of Tugidak Island, however, it is almost bare at low water so passage in and out is possible only at half or greater tide.

(495) In 1909, Mr. S. Applegate located the foul and broken area which extends about 10 miles S from the S end of Tugidak Island, as shown on the chart, by compass bearings on Tugidak Island and the summit of Sitkinak Island. Until a survey is available it is considered unsafe for vessels to cross this area. The bottom is very uneven, the depths changing abruptly from 2 to 4 fathoms in places, and boulder reefs with little depth may be expected. There are strong currents and heavy rips and overfalls.

(496) The waters off the N end of Tugidak Island have been surveyed. The general absence of kelp in this comparatively shoal area may be taken as an indication of the existence of but little if any ledge rock. The bottom apparently is composed of loose material including boulders leveled down by the action of the sea to form the more or less flat area of this region of 5 to 7 fathoms. Slight shoaling occurs in patches where apparently there is a predominance of boulders resisting the general leveling action of the sea.

(497) The N and W sides of Tugidak Island may be generally approached as close as 1.5 miles in good weather by a careful use of the lead. Care should be exercised near the middle of the W side of the island, as an unsurveyed bank reported to be covered as little as 2 fathoms is possibly 2 or 3 miles off. Anchorage can be found on the E side of the island between the entrance to the lagoon and the foul area extending off the S end.

(498) Ptarmigan have been found in great number on Tugidak Island.

(499) **Chirikof Island** (see also chart 16013) is about 60 miles SSW of the Trinity Islands. The S part of the island has bold, high peaks and bluffs, from which it gradually slopes to the N end, terminating in a low, green undulating country. An islet is near the SE end. The island is easily recognized and is visible for many miles in clear weather.

(500) The S shore of Chirikof Island is a Steller sea lion rookery site. There is a 3-mile vessel exclusionary buffer zone around the southern half of the island. (See **50 CFR 227.12,** chapter 2, for limits and regulations.) In emergency situations anchorage may be found in the bight at the SW corner, **Southwest Anchorage,** at the mouth of the stream and opposite the houses; or in 10 fathoms, on the W side off the bluff just S of the stream, possibly 2 miles from the NW point. Anchorage can also be found in the wide bay on the NE side of the island. In May-June 1978, it was reported that depths less than those charted were in this area, possibly due to the March 1964 earthquake. Anchorage difficulties may be experienced in heavy weather due to williwaws and limited swinging room. Foul ground is between Chirikof Island and the islets W of it. These islets are known as **Round Rock,** which is the largest and resembles a haystack, and **Nagai Rocks.**

(501) On numerous occasions breakers have been observed off the S end of Chirikof Island. The position of the breakers is reported to be 55°42'N., 155°36'W. A least depth of 4 fathoms was reported on the reef. The area of possible shoal water does not appear to be over 50 to 100 yards in diameter.

(502) A shoal is reported to extend from the E side near the middle of the island; breakers have been reported 3 miles 114° from the middle of the island. A breaker is reported in an estimated position 4 miles ESE from the SE point of the island. A shoal with kelp is reported to extend about 1 mile W from the NW point of the island.

(503) In 1923, the U.S.S. CARDINAL was wrecked on the E side of Chirikof Island and the survey ship DISCOVERER while engaged in rescue work struck a reef about 1.5 miles offshore.

(504) The wide passage between Chirikof Island and Tugidak Island has not been adequately surveyed. From widely scattered soundings taken in this locality, it appears that a submarine ridge with depths less than 19 fathoms extends from one island to the other. Foul and broken bottom extends about 10 miles S from Tugidak Island. Fairly regular depths across the ridge are indicated in the more closely sounded area 10 miles N of Chirikof Island. Tugidak Island is low and featureless and cannot be used as a navigational guide in the passage. Vessels bound for Chignik from the E use this passage.

(505) **Currents.**–Between Sitkinak and Chirikof Islands the general set of the current is reported to be about 249°, 0.5 knot. The current between Chirikof Island and Lighthouse Rocks has a S set, less than 0.5 knot. From Lighthouse Rocks to Kupreanof Point the current sets generally 260° and varies from 0.3 to 0.7 knot.

(506) On three runs between Chirikof Island and Castle Rock on the Shumagin Islands, a S set was experienced each time, an average of as much as 1.5 knots having been noted.

(507) Vessels crossing the Gulf of Alaska westbound are often subjected to a strong N set and should verify their position by sounding when approaching the meridian of Chirikof Island. It was this N set in conjunction with thick weather that was responsible for the loss of the CARDINAL in 1923.

(508) **Charts 16590, 16591.–Alitak Bay,** at the S end of Kodiak Island has its entrance between Cape Alitak and Cape Trinity, and extends 26 miles in a N direction to the head of Deadman Bay. Lazy Bay is a good anchorage.

(509) The country is treeless and except for outcropping ledges of bare rock on the knolls and peaks, the land is covered by thick moss and grass. A herd of reindeer is maintained in the vicinity of Lazy Bay by the natives.

(510) The prominent feature in the approach is Twin Peaks on the peninsula between Lazy Bay and Kempff Bay. It can be seen from off Cape Ikolik on a clear day. The peninsula between Kempff Bay and Olga Bay is mountainous and rises to 2,000 feet.

(511) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(512) The Kodiak Island area is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(513) Vessels using Southwest Alaska Pilots Association pilots and en route to Alitak Bay can meet the pilot boat about 2 miles SE of Cape Alitak (56°50.7'N., 154°18.2'W.).

(514) The pilot boat can be contacted by calling "ALITAK BAY PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(515) **Cape Trinity,** the S entrance point to Alitak Bay, is a tableland terminating in an almost vertical bluff. Rocks and reefs extend a short distance off the cape.

(516) **Cape Alitak,** the N entrance point of Alitak Bay, is the S end of a sloping ridge with numerous knolls. It is partly grass covered with much bare rock. Deep water extends close up to the cape on its SW side, but a long shoal of fine gray sand makes off its SE side in the direction of Cape Trinity. Numerous rocks are also close off the N, E, and W sides of the cape. The 10-fathom curve extends 3 miles off the cape and the 5-fathom curve is about 1.3 miles off. At the outer end of the shoal the depth increases rapidly to 20 fathoms. **Cape Alitak Light** (56°50.6'N., 154°18.3'W.), 63 feet above the water, is shown from a small house with a red and white diamond-shaped daymark on the S end of the cape.

(517) **Lazy Bay,** 4 miles NE from Cape Alitak, is well marked by Twin Peaks and Egg Island on its N side, and some white rocky ledges close to its S entrance point. The shore S of the entrance is clear if given a berth of 0.4 mile with the exception of the shoal making off the SE side of Cape Alitak.

(518) A cannery with a wharf, operated by the Columbia-Wards Fisheries, is on the N shore about 1 mile W from Egg Island. The wharf is 180 feet long with 30 feet reported alongside the face. Water is available at the wharf, and the cannery has limited machine shop facilities. Diesel and fuel oils are stored in some quantity for cannery use. The cannery season is May through September. Caretakers man the cannery in the off-season. The cannery monitors VHF-FM channel 16 and 4125 kHz single sideband (SSB); call sign is KBL-75. VHF-FM channel 79A is used as a working frequency; 2450 kHz SSB is also available. Telephone service is available at the village of Akhiok. The cannery maintains a store seasonally. A nurse or first aid technician is available during the canning season, but there are no hospital accommodations. Injuries or illnesses requiring hospitalization are flown to Kodiak. Air service is available to and from Kodiak on Tuesdays and Fridays during the off-season, and six days a week during the open season.

(519) A slipway capable of hauling out vessels up to about 130 tons, with a maximum draft of 6 feet forward and 8 feet aft is at the cannery.

(520) The N part of the bay beyond the sandspit above the cannery consists of mudflats and many boulders.

(521) Anchorage in 9 to 15 fathoms, mud bottom, may be had between the cannery and the E entrance point to Rodman Reach. With E gales the wind blows directly in Lazy Bay and there is little room in case of dragging or parting a cable. Northwesters blow with great force into Lazy Bay from over the ridge back of the head of the bay. Small craft can find excellent shelter and smooth water in the entrance to Rodman Reach during E weather.

(522) **Rodman Reach** is a narrow arm that extends SW from Lazy Bay and inside of **Tanner Head** to Cape Alitak where it forms a shallow basin from which **Alitak Lagoon,** also shallow, extends 3 miles N, being separated from the sea by a narrow shingle spit. About 100 yards off the E entrance point are two rocks awash. Excellent shelter for small craft will be found in the entrance to Rodman Reach.

(523) **Egg Island** is the low, flat rocky islet off the N entrance to Lazy Bay. **Lazy Bay Light 2** (56°53.5'N., 154°12.9'W.), 25 feet above the water, is shown from a skeleton tower with a red triangular daymark on the S side of the island.

(524) **Twin Peaks,** between Lazy and Kempff Bays, are a mark from as far W as Cape Ikolik. **North Twin Peak,** the higher one, is 1,494 feet and **South Twin Peak** is 1,310 feet. Both peaks are fairly definite, devoid of vegetation, and very rocky and stony. From the W they are first raised as an island.

(525) **Kempff Bay,** on the N side of Twin Peaks, is too deep for convenient anchorage and on its N side has broken bottom that should be avoided. There are neither settlements nor improvements in Kempff Bay.

(526) Favoring somewhat the S shore through the bay, anchorage can be selected near the head in about 18 fathoms. A spit with deep water close-to extends 350 yards from the N shore at a point 0.7 mile from the head.

(527) A reef, covered at high water, is between **Drake Head** and **White Rock,** and extends 0.5 mile from the shore

just S of Kempff Bay. White Rock, 10 feet high, should be given a berth of 0.3 mile when passing E of it in Alitak Bay and the same distance when passing N of it entering Kempff Bay.

(528) **Akhiok,** a native village on the beach of **Akhiok Bay** about 1.5 miles NE from Kempff Bay, has a schoolhouse and a Russian Orthodox Church. The village has telephone service. A foot trail leads from the cannery at Lazy Bay to Akhiok. Akhiok is best reached by launch via the passage from Kempff Bay. This passage is shoal and has many rocks. A pilot can usually be obtained at the Lazy Bay cannery.

(529) **Round Hill,** 193 feet high, is a symmetrical, round grassy knoll at the E end of **Akhiok Island** which forms the N side of the entrance to Kempff Bay.

(530) **Akhiok Reef,** awash at extreme high water and always showing, is a group of black jagged rocks about 0.6 mile off the SE point of Akhiok Island. In clear weather the reef makes a good landmark. A deep pocket of 30 fathoms is 350 yards SE of Akhiok Reef. A 4¼-fathom spot, marked on its E side by a buoy, is 0.4 mile E of Akhiok Reef.

(531) Small vessels, with local knowledge, when bound from Lazy Bay to Moser Bay pass between Akhiok Reef and Akhiok Island. Strangers are advised to keep to the E of the buoy marking the 4¼-fathom spot.

(532) **Middle Reef** covers an area about 2 miles long in the central part of Alitak Bay. The NW end of the reef area is marked by a group of black rocks that uncover about 7 feet and will usually be seen or breaking. A kelp-marked rock, which uncovers 2 feet, and a ledge, which uncovers 5½ feet, are along the E side of the reef area. The kelp-marked shoal at the S extremity is covered 2¾ fathoms. There is little if any warning of shoaling of the general depths of the bay adjacent to the reef area.

(533) **Nelson Reef,** which has a least known depth of 2½ fathoms, is 1.5 miles N of Middle Reef and 2.7 miles ESE from the entrance to Moser Bay. A thin growth of kelp is sometimes seen on this reef.

(534) **Moser Bay,** the large NW arm of Alitak Bay, has depths of 10 to 15 fathoms, soft mud bottom. It is a secure harbor and an excellent anchorage. The entrance is between **Bun Point,** low, sandy, and marked by a light, and **Amik Island,** rocky, on the S; it is obstructed by a rocky shoal that makes N from Amik Island for about 0.5 mile. The N end of the shoal is marked by a buoy.

(535) The channel between Bun Point and the N end of the rocky shoal is 175 yards wide and is close to Bun Point. It has a least depth of about 5½ fathoms, and strong tidal currents flow in the direction of the axis of the channel.

(536) About halfway between Bun Point and Fassett Point is a shoal that extends halfway across from the NE shore toward a spit on the opposite shore. The shoal has a depth of 3 fathoms at its outer end which is marked by a buoy.

(537) A gravel shoal, which uncovers, extends 400 yards ENE from the spit on the S shore opposite the shoal described above.

(538) **Fassett Point,** a low grassy head with lower land back of it, is the turning point on the NE side of Moser Bay, about 2 miles inside the entrance.

(539) **Trap Point** is the low point across the channel from Fassett Point. The Alaska Packers Association maintains a warehouse, wharf, and ways for hauling out scows here. The wharf has a face of 100 feet and a least depth of 34 feet alongside.

(540) **Snug Cove,** SW from Trap Point, shoals gradually to its head. A pass between the mountains extends from Snug Cove to the sea.

(541) **Chip Cove** is on the W side of Moser Bay, 1.5 miles N of Trap Point. The cannery pier, on the W side of the cove entrance, has depths of 20 feet alongside the working faces.

(542) Radiotelephone and radiotelegraph communications are maintained by the cannery.

(543) **Olga Narrows** connects Moser Bay with Olga Bay. It is possible to carry about 21 feet through the passage only by carefully following the narrow and crooked channel. It should not be attempted except with local knowledge.

(544) The **current** in the narrowest part of Olga Narrows attains an estimated velocity of 8 knots. During large tides there is no stage at which there is slack water the entire length of the narrows. During small tides there is said to be a period of slack water lasting from ½ to 1½ hours.

(545) **Olga Bay** is an irregularly shaped body of water 17 miles long. The W end is separated from the ocean by a strip of land 1 mile wide at a point 6 miles N of Low Cape. The shores of Olga Bay are rocky except at the W end where low grassy bluffs are from 10 to 80 feet high. On the N and S shores of the bay the land rises abruptly from 800 to 2,000 feet.

(546) The bay has the appearance of a lake and the rise and fall of the tide is only from 1 to 2 feet at the former cannery which was on the N shore about 8.5 miles above the narrows. The buildings and wharf of the former cannery now are used as a base camp for big-game guides. The wharf has depths of 7 to 11 feet alongside.

(547) Anchorage for fishing craft can be found at several places along the shores. The best anchorage is in Anchor Cove on the S side of Olga Bay, 5.5 miles above the N end of the narrows. The cannery company had dolphins here where small boats tied up over the winter.

(548) **Deadman Bay** is deep except near the head where it divides into two arms. The N arm terminates in a mudflat, while the E arm, known as Alpine Cove, affords excellent anchorage. The NW shore of Deadman Bay is fringed with numerous rocks and reefs, while the SE shore is bold and unusually clear. No settlements are along the bay, only an occasional cabin used by trappers during the winter.

(549) Between Bun Point and Fox Island are several off-lying islets and rocks and much foul ground. The shore here should not be approached closer than 1 mile except with local knowledge.

(550) **Fox Island,** about 0.5 mile off the W shore near the entrance to Deadman Bay, is bordered by bluffs and is 90 feet high. It is grass covered, comparatively flat, and a good mark in entering Deadman Bay.

(551) **Alpine Cove,** the E arm at the head of Deadman Bay, is a beautiful cove surrounded by high rugged mountains. An excellent anchorage is near the entrance in 12 to 15 fathoms, mud bottom, and sheltered from all winds and seas.

(552) From Cape Trinity, the E shore of Alitak Bay trends NNE for about 14 miles to Shag Bluff, the S entrance point of Portage Bay. This section of the coast has many visible and submerged rocks, and reefs, extending in places as much as 0.6 mile offshore.

(553) **Portage Bay** opens into Alitak Bay from the NE. **Bert Point,** dark and rocky, 3.7 miles E of Cape Hepburn, separates the bay into two arms.

(554) **Sulua Bay,** the main or W arm, extends 3.5 miles N from Bert Point. Between **Cape Hepburn** and the W entrance point of Sulua Bay, a bank, with reefs and rocks, submerged and awash, extends as much as 0.5 mile offshore.

(555) The shores of Sulua Bay are precipitous, except at its head where a stream enters through the flats. Several short gravel spits extend from the W side, and on the two nearest the entrance are cabins used by fishermen during the season. Mooring piles are on the N side of these spits.

(556) On the E side of this arm, a bank, with depths of less than 5 fathoms, extends about 0.3 mile offshore. Two rocks, the S one of which uncovers 2 feet, are on this bank, and are about 1.7 and 2.1 miles, respectively, N of Bert Point.

(557) The E arm of Portage Bay is short and terminates in a large shoal lagoon extending 2.5 miles NE. A stream enters through the flats at the head of the lagoon.

(558) **Shag Bluff** is on the S side of Portage Bay, 2.4 miles S of Bert Point. A group of rocks, bare and awash, the highest, 10 feet, is about 1 mile W of the bluff. Between Shag Bluff and the head of the E arm, a bank covered less than 3 fathoms, extends about 0.4 mile offshore. A shoal covered 3½ fathoms, is on this bank about 0.5 mile SW of Bert Point.

(559) A good anchorage is about 0.5 mile SE of a 44-foot pinnacle rock at the head of Sulua Bay in 10 fathoms, mud bottom.

(560) **Routes, Alitak Bay.**–Coming from the W, steer **075°** for 88 miles from Foggy Cape bearing 327°, 10 miles. This will lead to a position in the middle of the entrance to Alitak Bay 3.6 miles 145° from Cape Alitak. The southernmost peak, 2,215 feet, on Kodiak Island should be about 3° on the port bow while passing Cape Alitak on the course given.

(561) If following the SW coast of Kodiak Island in approaching Alitak Bay, follow the routes given later in this chapter–Cape Karluk to Cape Alitak bearing 010°, 1.5 miles. Then steer **121°** for 2.7 miles to clear the shoal making SE from Cape Alitak. This will lead to the midentrance position 3.6 miles 145° from Cape Alitak.

(562) **To enter Lazy Bay:** (1) From Alitak Bay midentrance position given above, steer **015°** for about 5.5 miles until the S shore of Lazy Bay is abeam. Then change to **309°** until Egg Island is abeam on the starboard hand, 350 yards, then change to **284°** and enter the bay. (2) If coming from Sitkinak Strait, follow routes given earlier in this chapter, to a position 2.2 miles W from Cape Trinity. Then steer **003°** for about 8 miles until the S shore of Lazy Bay bears 287°. Then change to **309°** until Egg Island is abeam on the starboard hand, 350 yards. Then change to **284°** and enter the bay.

(563) **To enter Moser Bay:** (1) From Alitak Bay midentrance position given above, steer **034°** for 9.2 miles until Akhiok village bears 297°, 3 miles. Then change to **348°**, heading 150 yards off Bun Point. When nearly up to Bun Point change to **005°**, passing 150 yards off the highwater line at the point. When the buoy bears 237°, haul W to a **290°** course, passing about 275 yards N of the buoy.

(564) Continue on this course for 1 mile until past the buoy marking the end of the long shoal that makes out from the NE shore. Then haul to the N and anchor as desired.

(565) Strong tidal currents will be found at Bun Point setting along the axis of the channel. Large vessels should wait for slack water.

(566) (2) If coming from Sitkinak Strait, follow directions given earlier, to a position 2.2 miles W from Cape Trinity. Then steer **019°** for 11.5 miles until Akhiok village is abeam on the port hand, 2.6 miles. Then change to **348°**, heading 150 yards off Bun Point, and follow directions given above for entering Moser Bay.

(567) **To enter Deadman Bay:** From a position with the NW Middle Reefs bearing 121°, 1.5 miles, make good a **041°** course for about 4 miles until the S end of Fox Island is on the port beam, nearly 1 mile. This course leads 0.5 mile NW of Nelson Reef, a shoal with a least known depth of 2½ fathoms. When the S end of Fox Island is abeam haul to the N and steer midchannel courses up Deadman Bay, if anything favoring the SE shore.

(568) **Chart 16580.–Shelikof Strait** separates Kodiak and adjoining islands from the mainland of Alaska. The strait is reached from the E via the passages N and S of the Barren Islands, or via Kupreanof Strait.

(569) From Barren Islands to Cape Ikolik, depths ranging from 80 fathoms in the N end to 140 fathoms in the S entrance will be found in midchannel. Along the E shore, the 100-fathom curve is from 1 to 3 miles off the various headlands. Suitable depths for temporary anchorage will be found near the shores in most places.

(570) In thick weather when not sure of the position, depths should not be shoaled less than 50 fathoms. For deep-draft vessels it is considered safer to favor the E shore.

(571) **Currents.**–The limited current data available for Shelikof Strait indicate that the flood sets into the strait from both ends.

(572) Current observations have been made for short periods at various anchorages used by surveying vessels near the shore. On the W side of the strait currents of 1 knot have been recorded, setting alongshore in either direction, with the current in the SW direction predominating. Apparently the current is less along the W coast of Afognak Island than on the opposite side of the strait.

(573) At the NE entrance to the strait in the vicinity of Dark Island and Latax Rocks, heavy tide rips, variable in position, are frequent; strong tidal currents are encountered along the coast of Shuyak Island.

(574) **Weather.**–NE winds invariably bring rain and thick weather, and it is from this direction that most of the heavy weather comes.

(575) SE winds generally bring clouds, but may be accompanied by either rain or fair weather.

(576) SW and W winds are invariably accompanied by fine clear weather, but they often blow with great force. The SW gale is perhaps the most to be dreaded in Shelikof Strait, as it raises a short, heavy sea that is trying to a small vessel.

(577) S winds generally bring haze, which is sometimes so thick as to resemble fog.

(578) NW winds bring fair weather and a clear atmosphere; however, in the wake of the Katmai region, the air may be hazy due to volcanic dust.

(579) During the early spring NW gales are often accompanied with freezing weather and vessels are in danger of becoming iced down. Small craft especially should hug the NW shore under such conditions, so that they may seek shelter before the icing becomes serious.

(580) Gales in this region last without intermission anywhere from 1 to 3 days.

(581) NE winds are generally accompanied by a low barometer and SW winds by a high barometer, but the rule is not invariable. The barometer is of little or no value in foretelling the weather, as it accompanies rather than precedes corresponding conditions. The slope of the barometric curve is apt to change suddenly, the weather changing with equal suddenness. A sure sign of rainy weather and wind from the NE is the gathering of clouds on the NE side of the mountains.

(582) During strong W winds, the atmosphere often becomes filled with a fine volcanic ash reducing visibility to 1 mile or less.

(583) Blinding snowstorms are frequent in early spring.

(584) In May-August 1975, the NOAA Ship FAIRWEATHER, working in Shelikof Strait, reported the following weather conditions: July and August afforded the best weather and May the worst. Storms with winds to gale force occurred about twice a month. Some snow showers were experienced in May.

(585) The wind in Shelikof Strait usually blows in only two directions, either "up" (SW to NE) or "down." The direction usually depends on whether the area S of Kodiak Island contains a low pressure (when down the strait winds result accompanied by driving rain) or a high pressure (when up the strait winds result). Winds and seas can increase suddenly and subside just as quickly.

(586) During windy conditions, wind force is sharply higher in the vicinity of, and even in the lee of the capes and point which extend into Shelikof Strait. During these conditions, entry well into the bays is necessary for refuge. With "down" wind conditions, seas on the W side become considerably worse as one progresses NE from Kukak Bay, and with "up" wind conditions, the same applies along the W side from Cape Kuliak to the SW.

(587) Weather conditions in Shelikof Strait can also be of wide variance from one location to another at any one time. However, as a rule, weather and seas are much more amenable on the Kodiak Island side of the strait than on the mainland side. In 1975, there was no longer much evidence of volcanic dust in the air.

(588) The W coasts of Shuyak and Afognak Islands trend 218°. The distance from the northernmost Latax Rocks, described earlier in this chapter, to Raspberry Cape is 48 miles. From Raspberry Cape the E coast of Shelikof Strait trends 230° for 45 miles to Cape Karluk.

(589) **Chart 16604.**–The W side of **Shuyak Island** is irregular and fringed by a chain of islets and rocks about 1 mile offshore. Between them and the island are many rocks and kelp patches. The outer ones are nearly on a line through Gull Island from Black Cape.

(590) **Shag Island,** a group of grass-covered islets, is 36 feet high and 0.9 mile W of Party Cape. A bare rock, 3 feet high, is 0.6 mile N of Shag Island. A shoal with a least depth of 4 fathoms is about 1.7 miles NW of the islets.

(591) **Wonder Bay,** SE of Shag Island, is rock strewn and should not be entered except by launches with local knowledge.

(592) **Gull Island,** 2.8 miles SW of Party Cape, has a distinctive dome-shaped top, grass covered, and 83 feet high. Several large reddish rocks are to the N of it. It marks the entrance to **Western Inlet,** which is shallow and foul. Gull Island is connected to the large island at the entrance of Western Inlet by a sandspit which bares at minus tides. This area is extremely foul.

(593) **Big Bay,** 2.5 miles S of Gull Island, is of considerable size, having a main arm branching into four smaller arms at its head. The main arm has a controlling depth of 2¼ fathoms, and although it affords protection in NE weather, it should not be attempted without local knowledge, as its entrance is obstructed by numerous rocks, many of which uncover. The smaller arms are not accessible except to very small craft.

(594) In 1971, the 231-foot NOAA Ship RAINIER anchored a number of times off the W side of Shuyak Island in about 58°33.6'N., 152°42.4'W., 1.7 miles NW of Eagle Cape, in 18 fathoms for protection from E winds. The ship reported that the anchor nearly always dragged some when dropped before setting in rocky bottom. The holding quality was fair, though on one occasion no dragging was experienced in winds of 50 knots.

(595) **Chart 16605.–Shuyak Strait,** between Shuyak and Afognak Islands, is not recommended as a through passage for ships because of its restricted E entrance and broken bottom in the seaward approach from the E. Its W approach in Shelikof Strait is characterized by less uneven bottom and the W entrance is mainly clear and 1.5 miles wide.

(596) Entering Shuyak Strait from Shelikof Strait, vessels pass about 1 or 1.5 miles N of Rocky Island and head for the middle of the strait on a course of about **113°.**

(597) Islets and rocks, which uncover, are on both sides of the W approach to Shuyak Strait. The best water is found by favoring the N side of this approach.

(598) Shuyak Strait is apparently clear of dangers in midchannel except as noted below. Soundings indicate depths of 60 to 80 fathoms near midchannel as far E as Redfox Bay. Wooded hills, about 400 feet high, line the rocky shores on both sides, and there is practically no low flatland.

(599) **Rocky Island,** 4 miles W from Lighthouse Point, is on the S side of the W approach to Shuyak Strait. It is a bare rock 12 feet high and about 100 feet wide. Midway between Rocky Island and Lighthouse Point, but S of a line between them, is a reef bare at half tide. The reef is marked by kelp and surrounded by shoal water.

(600) The outermost danger on the N side of the W approach to Shuyak Strait is a group of submerged rocks with a least depth of 2¼ fathoms about 3 miles 052° from Rocky Island. A rock baring at minus tide is 400 yards NE of the rocky shoal, and the area inside of them to **Green Island** and thence to the shore at Neketa Bay is foul.

(601) **Neketa Bay** is a small bay E of Green Island, very shoal, with a reef extending nearly across its entrance.

(602) A rocky bank of 12 to 17 fathoms is about 1.5 miles NE of Rocky Island. In approaching the W entrance of Shuyak Strait it would be advisable to pass N of the bank.

(603) **Alligator Island,** so called from the resemblance from certain directions, is grass covered, 0.3 mile in diameter, and 64 feet high; the island is 1.3 miles S from Rocky Island. **Alligator Island Light** (58°28.5'N., 152°47.1'W.), 72 feet above the water, is shown from a small house with a red and white diamond-shaped daymark on the NW side of the island.

(604) **Cape Newland,** the SW extremity of Shuyak Island, is 75 feet high and grass covered to the tree line. Rocks awash at various stages of the tide, are detached 500 yards W and about 600 yards S from the cape. Broken bottom extends into the entrance to Shuyak Strait about one-third the way from the cape to Lighthouse Point.

(605) **Lighthouse Point,** 4.2 miles E of Alligator Island and grass covered to the tree line, is on the S side of the W entrance to Shuyak Strait. The bight just E of the point is foul. **Lighthouse Point Light** (58°28.9'N., 152°39.2'W.), 60 feet above the water, is shown from a small house with a red and white diamond-shaped daymark on the point.

(606) **Shuyak Harbor** is about 1.3 miles N of Lighthouse Point and SE of Cape Newland. Two bare rocks, 12 and 5 feet high and 100 yards apart, are in midentrance to the harbor; they are surrounded by rocks awash and are nearly connected at low water. A pinnacle rock, covered 1¼ fathoms, is E of the midentrance rocks, leaving a narrow channel between it and the E entrance point. The better channel into Shuyak Harbor is W of the midentrance rocks. The harbor has about 200 yards of swinging room. The salteries in this harbor have been abandoned and the wharves are no longer maintained.

(607) **Port Lawrence** is a bight on the N shore of Shuyak Strait, 1.5 miles from the W entrance. A small grass-covered 10-foot islet, surrounded by foul ground, is in the E part of the bight. The wharf at the abandoned herring plant is in bad condition and unusable.

(608) **Port William,** 0.5 mile E of Port Lawrence, is 0.3 mile wide and 0.5 mile long. The wharf of a former cannery is in disrepair.

(609) Rocks awash are about 250 yards offshore between Port Lawrence and Port William. Nearby and closer inshore is a rock about 10 feet high.

(610) **Redfox Bay,** the largest indentation on the S side of Shuyak Strait, has general depths of less than 20 fathoms, mud bottom, and affords excellent anchorage in any weather.

(611) An islet, 158 feet high, and wooded on its S half, is in the middle of the entrance. W of the islet, about 100 yards off the W shore of the bay, is a rock awash. Freight steamers use the channel between these rocks and the islet, which is about 200 yards wide and clear, and anchor just S of the islet to discharge cargo to boats and barges; swinging room of about 700 yards is available here.

(612) A rock awash, unmarked by kelp, is off the entrance to a small cove on the E shore of the bay 0.8 mile S from the entrance islet.

(613) **Tide.**–The diurnal range of tide in Redfox Bay is 13.7 feet.

(614) The bay, about 1 mile E of Redfox Bay, is foul in places and has an irregular bottom.

(615) **Daylight Harbor** is 0.5 mile SE of Port William. The herring plant here has been abandoned, and the wharf is in ruins. From this harbor to **Cape Current,** about 3 miles, there are no important indentations.

(616) A dangerous patch of small rocky heads with a least depth of 3¼ fathoms is in about the middle of the strait 2.3 miles from its E end. This danger is abreast of two small islets, the W one is about 100 yards in diameter, partly grass covered and wooded. The kelp marking this spot usually is drawn under by the current.

(617) **Cape Current Narrows,** about 1 mile long, forms the E end of Shuyak Strait. Rocky obstructions in the narrows near the E end greatly reduce the width of the channels on either side of them.

(618) The Shuyak Island shore of the narrows is abrupt, wooded, and about 500 feet high. The Afognak side is grass covered for about 200 feet back from the shore and about 50 feet high with level top and abrupt shore.

(619) In the middle of the W part of the narrows, general depths are about 8½ fathoms or more. In the E part of the narrows, broken ground with numerous rocks awash extends almost completely across from Cape Current to Shuyak Island. Two narrow channels lead through the broken ground, one about 450 yards NW of Cape Current, and the other about 75 yards off the S shore of Shuyak Island. The former channel has a least found depth of 4½ fathoms; the latter channel has a least found depth of 5½ fathoms. Mariners are advised to seek local knowledge before attempting to make passage through Cape Current Narrows.

(620) The **tidal currents** at Cape Current Narrows are strong, and bad tide rips are frequent. Current predictions may be obtained from the Tidal Current Tables.

(621) A large kelp patch is NE of the E entrance to the narrows just S of Big Fort Island.

(622) **Bluefox Bay,** indenting the shore of Afognak Island SW from Lighthouse Point, has an entrance about 2 miles wide.

(623) **Teck Island, Hogg Island,** and **Bear Island** are the three principal islands overspreading the entrance and the area inside of Bluefox Bay. The buildings of an abandoned herring reduction plant, now used as family dwellings and for the storage of fishing gear, are on the S side of Hogg Island.

(624) Three channels lead into Bluefox Bay. The W channel has been used by small craft, but it is foul and is not recommended.

(625) The E channel is the one in general use, but it also has several dangers and should be navigated with caution. A 4¼-fathom spot is in midchannel about 200 yards off the middle of the E side of Hogg Island. A rock with a least depth of 1½ fathoms is 375 yards E from the SE point of Bear Island. A rock awash is about 0.5 mile S from the same point. At this rock the tangents of Hogg and Bear Islands are nearly in range. A rock with 2¼ fathoms over it is 200 yards off the SE side of the small island just S of Bear Island.

(626) To enter Bluefox Bay, vessels are reported to hold the course into Shuyak Strait until the E channel opens; then to change course to about 177° and proceed through the E entrance in midchannel, heading for a wooded point on the E side of the bay near its head, but favoring the W side of the channel near the 4¼-fathom spot mentioned above. Navigation beyond Bear Island is difficult, and the chart should be followed closely.

(627) **Chart 16604.**–The W coast of Afognak Island from Shuyak Strait to Black Cape is irregular, rocky, and wooded to an elevation of about 700 feet. Some grass appears on the points. The small island about halfway between Black Cape and Alligator Island is about 0.3 mile in diameter, 48 feet high, and covered with grass. Inside a line from Black Cape to Alligator Island the water is generally foul with numerous rocks and islets.

(628) **Devil Inlet,** 3 miles NE from Black Cape, has wooded shores. About 0.3 mile inside the entrance, rapids run heavily except for short periods of nearly slack water preceding and following high tide. The inlet level inside the rapids is about 11 to 12 feet above low water. Vessels drawing 3 feet or less may enter about 2½ hours before high tide. Numerous rocks exist in the channel and caution is required in making the passage. The preferred time to navigate this passage is during the slack before ebb which occurs about 2 hours after high water. Both slack water periods last for about 5 minutes. Within the inlet, shoal areas exist off the inshore points of the two islands about 1 mile S of the entrance. Passage must be made to the W of the northernmost island, thence SE between the islands leading to the S portion of the inlet where depths in excess of 20 fathoms exist. The entrance outside the rapids is a good anchorage in heavy weather for small craft.

(629) **Black Cape** is low and grassy at the end, and rises gradually in a narrow heavily wooded ridge to a prominent bald knob, 1,151 feet high. Bare and submerged rocks extend a short distance off the cape, and a reef, mostly showing above water, is on its S side. A fair anchorage protected from SE weather can be found 1.2 miles NE of the cape in 17 fathoms, rocky bottom.

(630) **Foul Bay,** between Black Cape and Ban Island, is about 4 miles wide at its entrance. The bay extends E about 4 miles where it divides into a N arm extending E for about 2.5 miles and a S arm extending S for about 4 miles. The bay was surveyed in 1973, and depths in excess of 10 fathoms were found throughout most of the bay. Vessels wishing to enter Foul Bay are advised to parallel the Ban Island shore about 0.4 mile off, passing S of the island 1 mile E of the N point of Ban Island. The 231-foot NOAA Ship RAINIER used this passage to enter and anchor about 0.5 mile off the point dividing the bay into N and S arms. The bottom throughout the bay is broken with numerous rocky areas, and several attempts at anchoring may be necessary in any given area before finding soft bottom. Small craft may find shelter in the numerous coves within the bay. The SE arm of Foul Bay leads to an extension of Paramanof Bay and may be navigated by small vessels steering midchannel courses.

(631) **Ban Island,** separating Foul Bay from Paramanof Bay, is mountainous with steep slopes on all but the E end. The island is about 6 miles long in an E–W direction, and about 1.8 miles wide in a N–S direction. Kelp is close to its W end.

(632) **Paramanof Bay,** between Ban Island and Cape Paramanof, was surveyed in 1973 and found to be deep and nearly clear of hazards. In the outer bay, it is recommended to favor the Ban Island side when entering. Care must be taken to avoid two rocks which are about 4.5 miles E of Cape Paramanof. The westernmost rock is bare and is 0.3 mile 025° from a rocky islet close to the S shore of the bay. A submerged rock, covered about 5 feet, is 0.5 mile 065° from the same rocky islet.

(633) An excellant anchorage is in the cove on the S side of the bay about 5 miles E of Cape Paramanof. Vessels should pass N of the rocks mentioned above, thence steer a S course to the center of the cove where good protection is afforded from all but strong NW winds. Holding ground is good in 20 fathoms, soft bottom, with ample swinging room. Smaller vessels may anchor closer in. The long straight inlet leading S from this cove can be entered by small craft at one-half tide or higher.

(634) The E end of Paramanof Bay narrows to a pass with a small wooded island in the center. Passage S of this island provides the best water with a minimum of 4½ fathoms at midchannel. Current measurements just W of the island indicate the existence of weak tidal currents, less than 1 knot. The two bays extending SE from Ban Island are clear of hazards and gradually shoal towards the streams at the head of each bay.

(635) The lower levels of Afognak Island in general are wooded with the exception of the E coast and the SW end S of Paramanof Bay.

(636) **Cape Paramanof** is the NW end of the peninsula included between Paramanof and Malina Bays. It is a low tongue of land projecting 0.5 mile N from the mountains. A reef is on the N side of the cape inside Paramanof Bay, and a part of it, about 0.5 mile from shore, is awash.

(637) The peninsula between Paramanof and Malina Bays is marked by two mountain ridges trending E, with a small stream in the valley between. The land is grass covered, with bare rocks in places, and has no timber. The N ridge rises in steep, grassy slopes to 1,830 feet, with a saddle behind it and then extends E with about the same height. **Tanaak Cape** is the N point at the entrance of Malina Bay.

(638) **Charts 16576, 16594, 16597.–Malina Bay,** indenting the W coast of Afognak Island, is between the mountainous peninsulas terminating in Tanaak and Steep Capes. It is about 10 miles long and is a secure harbor. Water can be obtained from numerous small streams. Some timber is found near the head of the bay and in some of the valleys. Steep Cape and the high cliff at the S point at the entrance and a prominent slide about 1 mile SE of Tanaak Cape on the N side of the bay mark the entrance.

(639) The bay, 2.5 to 3 miles wide for nearly 4 miles, narrows to a neck about 1.5 miles long with a least width of 0.4 mile, and then separates into two arms. The S arm, known as Malka Bay, extends from the S side of the neck 1.5 miles SE. The E arm is about 800 yards wide near its entrance; it then opens out, forming a basin about 2 miles long and about 1.2 miles wide. A shallow arm, about 0.2 mile wide, extends 2 miles E from the E end of the basin.

(640) The outer part of the bay is clear, with the exception of a rock awash 0.2 mile from shore in the bight on the S side about 4 miles inside the entrance. Rocks awash extend 300 yards off the S side at the entrance to the neck, and 0.5 mile W of the island in the entrance of Malka Bay. The depths are suitable for anchorage 0.3 to 0.4 mile from shore nearly anywhere in the bay. Holding is good in 12 to 18 fathoms, sloping bottom, along both shores about 1 mile inside the entrance. An anchorage with fair holding is available on the N side of its E end, about 0.3 mile W of a rocky islet, and the same distance from the shore NE, in 15 fathoms. This anchorage is exposed to W weather, and NE winds sometimes blow with considerable force.

(641) In the neck off the entrance of Malka Bay is an island 0.4 mile long and 115 feet high, with a clump of trees near its middle. There is no safe passage between it and the shore SE. An islet 30 feet high is on the S side of the neck 0.4 mile E of the island, and foul ground extends 225 yards from the S shore just E of the islet. A rock, 15 feet high, with a small one close W, is 400 yards NE of the islet. The best channel is between the 30-foot islet and the 15-foot rock. A rock awash is 400 yards E of the 15-foot rock and over 300 yards from the N shore.

(642) To pass through the neck, pass 200 yards N of the island, steer **121°**, and pass 100 yards S of the 15-foot rock, in the middle of the neck.

(643) The basin has depths of 30 to 47 fathoms in its W half and shoals gradually E, affording secure anchorage. A rock covered at high water is 400 yards W from the N point at the entrance to the narrow arm extending E, and a shoal extends 600 yards SW from a point on the N shore 0.4 mile N of the rock. The best anchorage is about 0.4 mile off the bight at the N end of the basin, with the entrance (neck) just closed, in 15 to 18 fathoms, sticky bottom.

(644) **Malka Bay** is a secure anchorage with a clear width of 0.2 mile. The NW point of the island in the entrance should be given a berth of over 100 yards; a rock awash is 100 yards from the shore SW of the same point.

(645) To enter Malka Bay, steer **163°**, pass 150 yards S of the NW point of the island, and follow the SW shore of the arm at a distance of about 250 yards. Anchor in the broad part about 0.6 mile from the head, in about 10 fathoms, sticky bottom. A flat extends nearly 0.4 mile from the head.

(646) High and low water in Malina Bay occur about 10 minutes earlier than at Seldovia. The diurnal range of the tide is 14.5 feet.

(647) **Raspberry Strait,** between Raspberry Island and Afognak Island, is about 16 miles long, uniformly narrow, and about 1 mile wide from Shelikof Strait, at its NW end, to Afognak Strait at its SE end.

(648) The approach to the NW entrance is clear of dangers, no known shoals or detached rocks are more than 100 yards offshore. The Shelikof Strait sides of Raspberry Island and Afognak Island are rugged with barren cliffs and bluffs except where valleys make into the interior of the islands.

(649) The SE end of Raspberry Strait ends in two passes which lead into Afognak Strait around Little Raspberry Island. Both passes are dry at from 2 to 3 feet above low water, and numerous reefs border the shores of Raspberry Island in this vicinity and of Little Raspberry Island. However, the NE pass is used at high water by local boats drawing less than 8 feet. Neither of these is recommended without local knowledge.

(650) **Steep Cape,** also known as **Twin Heads,** about 2.5 miles N of the NW entrance to Raspberry Strait, is the most prominent headland between Malina Bay and the strait. Its bare, gray rocky sides rise abruptly from the water's edge to its twin summits, 1,535 and 1,562 feet high. A light-colored rockslide is quite noticeable. A prominent 78-foot-high pinnacle rock is about 100 yards offshore; it is indistinguishable when seen against the cape.

(651) Between Steep Cape and the entrance to the strait is a bight with a gravel beach at the foot of a valley blocked by a bluff of glacial moraine about 250 feet high. The shore between the cape and this bight consists of a steep gravel bluff, 213 feet high, grass covered at the top, and giving the appearance of a tableland. The bluff is in the form of a point from which shoals extend for 0.5 mile offshore.

(652) The rounding point of the headland on the SW side of the entrance to Raspberry Strait when seen from the SW is somewhat similar to Steep Cape. However, its cliffs and rockslides are covered with grassy patches and do not have the general gray appearance which makes Steep Cape more prominent. The summit of this headland is 1,996 feet high and the slopes are steep. A pinnacle rock, 25 feet high off the SW shore, makes a good landmark when not seen against the foot of the headland. Between this headland and Raspberry Cape are bights from which low valleys lead into the interior of Raspberry Island. The shores of these bights are gravel and the valleys are easily distinguished from offshore.

(653) **Anchorages.**–Since Raspberry Strait itself is not wide, small vessels may anchor along the shores throughout the strait where depths appear suitable, depending upon the protection required. The following anchorages are recommended for deep-draft vessels:

(654) On the NW shore of Raspberry Island in Shelikof Strait are two bights, with gravel beaches, about 3 and 5 miles SW of the entrance to Raspberry Strait. At the head of these bights deep valleys extend inland. Anchorage may be had in 10 to 15 fathoms, sand bottom, with good protection from E storms but exposed to the W. The NE of these two bights is clear; the SW bight is foul, and coming in from the N vessels should keep at least 800 yards offshore.

(655) N of the entrance to Raspberry Strait and S of Steep Cape is a small bight with suitable protection from E storms and where anchorage may be had in 10 to 15 fathoms, sand and gravel bottom. The shore of this bight is a gravel beach just N of which are low grass-covered hills of glacial gravel.

(656) About 1.5 miles NW of Dolphin Point, vessels may anchor off the NE shore of the strait, in 12 to 15 fathoms, sand bottom, with good protection from E storms about 400 to 500 yards offshore.

(657) Fair anchorage for deep-draft vessels is 0.9 mile about 210° from Dolphin Point Light 3, in 12 to 15 fathoms, mud bottom.

(658) The best anchorage in the strait for large vessels with protection from E storms is 2 miles SE of the mouth of Muskomee Bay and 600 yards off the NE shore. A prominent white cabin, which bears between 250° and 270°, is at the Port Vita Cannery ruins. Depths are 12 to 18 fathoms, sticky bottom.

(659) Another possible anchorage is located in deeper water, in midstrait off Selief Bay in about 18 fathoms, sand bottom.

(660) Anchorage for small vessels with good protection in any weather may be found in Selief Bay.

(661) **Dangers.**–There are no off-lying dangers or shoals at the NW approach and entrance to Raspberry Strait. From the entrance of the strait to Selief Bay, the only dangers are inside 300 yards of the strait shore except for a shoal of 3½ fathoms about in midstrait, 0.75 mile 124° from Dolphin Point Light 3. This shoal is passed to the N as broken bottom is between the shoal and the gravel point on the S side of the strait.

(662) From Selief Bay to the SE end of the strait are numerous shoals and dangers, and local knowledge is required even by small boats. Deep-draft vessels should not proceed beyond the entrance to Selief Bay. Between this bay and The Narrows, are four rocky shoals well offshore; one of these has a least depth of 11 feet and is in midchannel about 0.4 mile N of Tiger Cape. From this cape SE to The Narrows, sandspits make well out into the strait from many of the points.

(663) **Routes.**–The NW entrance to Raspberry Strait may be approached from any direction by keeping 1 mile offshore. Come into the middle of the entrance off Raspberry Strait Light 1 and steer a course **138°** for about 4 miles until Dolphin Point Light 3 is abeam about 700 yards. Thence steer **090°** for about 1.5 miles until abeam the end of a low gravel point. Pass this gravel point about 0.4 mile and change course to **120°**. Hold this course for about 1 mile and when the abandoned Iron Creek Cannery comes abeam, follow the middle of the strait on a course **151°**.

(664) Approaching The Narrows at the SE end of Raspberry Strait from Kupreanof Strait set a course **007°** with the E end of Little Raspberry Island ahead. Approaching from the E, that is from Afognak Strait, set a course **270°** with the S tangent of Little Raspberry Island ahead, and pass 500 yards S of the foul ground S of Shoal Point. Give the E tip of Little Raspberry Island a berth of 400 yards as reefs make out 200 yards off the high-water line. Enter the pass favoring the N side and pass about 100 yards off Nochlega Point and the next point which is adjacent. These two points form a double point with a short gravel beach between them. The Narrows uncovers several feet and is not recommended to vessels without local knowledge. This pass can be negotiated at high water springs by vessels up to 8-foot draft with extreme caution.

(665) **Tides and currents.**–At Dolphin Point the diurnal range of tide is 14.0 feet. The tide at Tiger Cape is 5 minutes later than at Dolphin Point and the ranges are about 0.5 foot more. (See Tide Tables.)

(666) Tidal currents in Raspberry Strait are weak, except at The Slough and The Narrows where the range at the N end is greater than the range at the S end as a result of which it is estimated that from approximately midtide to high tide and vice versa, the current flows from Raspberry Strait into Afognak Strait. This current probably amounts to from 2 to 3 knots during spring tides. At approximately midtide the tidal level at the two ends of The Narrows is equalized and as the tide falls below midtide the current reverses and flows from SE to NW until the pass goes dry at 2.5 feet above low water.

(667) **Weather.**–W winds prevail from June to September, mostly from the SW. This prevailing wind is attended by good weather, mostly clear skies with little rain. These winds, however, often blow with such force as to build up heavy seas in Shelikof Strait, uncomfortable for all vessels except full-powered steamers. The storms with E winds come with a frequency of one or two per month from June to October. During the summer, July is the worst month as the prevailing wind seems to be E attended by much rain although there are no severe E storms.

(668) **Raspberry Strait Light** (58°09.6′N., 153°13.3′W.), 50 feet above the water, is shown from a small house with a red and white diamond-shaped daymark on a small grass-covered island off **Cape Nuniliak** on the NE side of the entrance. This island blends with the shore and it is difficult to pick up except when approaching from the N. Inside the strait, about 1 mile SE from Raspberry Strait Light on the NE side is a prominent light-gray rocky bluff, which rises from the water's edge 150 to 200 feet high.

(669) Both shores of Raspberry Strait, from the NW entrance for about 7 miles, consist of rock ledges and numerous short gravel beaches between small rocky points. The shores rise steeply to the mountains except where valleys intervene. Close along the SW shore about 1 mile inside the

entrance are a number of off-lying pinnacle rocks, 5 to 41 feet high.

(670) **Dolphin Point Light 3** (58°06.3'N., 153°09.1'W.), 17 feet above the water, is shown from a skeleton tower with a square green daymark on a small rocky islet off the end of the point, 4 miles inside the strait. **Dolphin Point,** when approached from Shelikof Strait, appears as a long grass- and tree-covered point with several low hills or nobs between it and the foot of the steep slope inland.

(671) **Muskomee Bay,** receding 1.5 miles, is about 3 miles E of Dolphin Point on the E side of the strait. This bay is not suitable as an anchorage for large vessels, and it offers little protection for smaller vessels as E and W winds draw through the deep valleys at the head of the bay. Along its shores are outcropping ledges and a few gravel beaches. The bottom near the head is rocky. At the S side of the entrance, 200 yards off the shore, is a reef which uncovers 7½ feet. Off the N shore at the entrance to the bay are three rocky shoals with least depths of 6 to 20 feet. The head of the bay is foul except around the N side of an island in the head of the bay.

(672) From Muskomee Bay, the shores of the SE part of the strait consist of boulder and gravel beaches, and several low, grass-covered shale or gravel points. The terrain back of these shores is not as steep as in the NW part of the strait and is timbered from Dolphin Point. The points extend from 200 to 300 yards and have shoals or outcropping ledges extending into the strait another 100 yards or more. One of these is on the NW side of the strait about opposite Selief Bay.

(673) **Selief Bay** is on the SW side of the strait about 6 miles SE of Dolphin Point. The outer part of the small peninsula on the E side of the entrance to Selief Bay is a grass-covered glacial hill 93 feet high, serrated at the top and the most prominent landmark SE of Dolphin Point. This bay offers good protection and anchorage for small vessels in any weather, particularly from SE or E storms. The entrance to the bay is shoal with a bottom formation similar to a bar and with a least depth of 8 feet. Inside the bay the best anchorage is with the end of the point at the E side of the entrance bearing about N and in 1½ to 3 fathoms. The bottom is mud and the W side is shoal.

(674) **Tiger Cape,** about 2 miles SE of Selief Bay on the same side of the strait, is a low grass-covered shale point with several abandoned houses near the foot. More abandoned buildings of a former sawmill are about 0.25 mile farther to the SE.

(675) The two islands opposite Tiger Cape and about 2 miles E of the entrance to Selief Bay are also prominent. The crests of these islands are wooded and the westernmost is 100 feet high, the other 160 feet.

(676) No other landmarks are between Tiger Cape and the S end of Raspberry Strait.

(677) On the opposite side of the strait N of Tiger Cape is **Yukuk Bay,** a shallow bay, about 1 mile wide in a NW and SE direction, locally known as **Cottonwood Bay.** This bay shoals to 1 fathom about 300 yards inside the general trend of the NE shore of the strait. Throughout the bay the depth varies from 2 to 8 feet. A long gravel and rocky spit making into the bay from the N point at the entrance uncovers. Favor the opposite side in entering.

(678) Another bay, locally known as **Waskanareska Bay,** is E of Tiger Cape and on the SE side of a gravel spit which separates it from Yukuk Bay. Depths vary from 3 to 6 feet. The inner part of the bay and the part along the NE shore for 200 yards offshore uncovers. The E half of the entrance is foul and uncovers.

(679) Through **The Narrows,** which is the pass on the NE side of **Little Raspberry Island,** and the approaches in Afognak Strait, the shores are mostly rock ledges with many off-lying dangers, some of which are dangerous to small craft.

(680) Rocks and shoals too numerous to mention are in the passes among Deranof Island, Little Raspberry Island, and Raspberry Island. The pass on the W side of Little Raspberry Island is **The Slough.** These passes are used only by small vessels with local knowledge, and at high tide only.

(681) The W side of Raspberry Island is mountainous and grass covered, the principal points are three high cliffs, between which are two deep valleys trending E. The S valley, about the middle of the island, is especially low and extends through to Onion Bay. The S side of Raspberry Island and Kupreanof Strait have been described earlier in this chapter.

(682) **Viekoda Bay** is on the E side of Shelikof Strait between Outlet Cape and Uganik Island. It extends ESE about 15 miles into Kodiak Island to a narrow head. Uganik East Passage enters Viekoda Bay on the S side about 7 miles inside the entrance. Good anchorage for moderate sized vessels in 12 to 17 fathoms may be had 0.5 to 1 mile NW from the islands 1.5 miles from the head of Viekoda Bay.

(683) Off the entrance, about 3 miles from Outlet Cape, is a bank on which the least depth found is 6¾ fathoms.

(684) A narrow point, its end detached, extends 0.4 mile from Uganik Island 1 mile E from its N end. Broken ground, with depths of 4 and 5 fathoms, extends 0.6 mile N from the point. A fair anchorage in S weather is in the bight on the E side of the point, 0.3 to 0.4 mile from shore, in 10 to 15 fathoms.

(685) A rock covered 4¾ fathoms, which should be avoided, is 0.6 mile from Uganik Island and 2.5 miles NW of **Naugolka Point.**

(686) This point has an islet near it, and a rock that uncovers, is 0.8 mile E of the islet and 0.4 mile from the S shore of Viekoda Bay. Depths of 3 to 5 fathoms extend 0.3 mile N of the rock.

(687) **Uganik Passage** and **Uganik East Passage** border the S and E sides, respectively, of **Uganik Island,** and connect Viekoda and Uganik Bays.

(688) That part of Uganik East Passage on the NE side of Uganik Island is clear of dangers in midchannel except for a flat that extends about 600 yards from the E shore, about 5 miles SSE of Naugolka Point, leaving a channel 350 yards wide. An islet is close to Uganik Island in the bight about 0.2 mile SW of the flat.

(689) **Terror Bay** extends several miles S from the turn of Uganik East Passage at the SE end of Uganik Island. The main part of the bay is clear with the exception of three rocks about 300 yards from the W shore, as indicated on the chart. Secure anchorage for vessels of any size is 3 miles above the entrance and about 2.5 miles from the head of the bay, in 7 to 15 fathoms.

(690) The part of Uganik Passage S of Uganik Island is 9 miles long from the SE end of Uganik Island to East Point, where it joins Uganik Bay.

(691) A rock that uncovers, is 0.3 mile from the S side of Uganik Island and 0.7 mile from its SE end. A 5–fathom spot is reported 500 yards SE of this rock.

(692) A peninsula, 500 feet high, extends S from Uganik Island 2 miles from its SE end and narrows the passage to 0.2 mile. From the point on the S shore SE of the peninsula, a ledge, which uncovers, makes out nearly half way across the narrowest part of the passage. Vessels should favor the SE end of the peninsula in this part of the passage.

(693) An island is in the middle of the passage W of the peninsula. Several rocks, submerged and bare at various stages of the tide, are in the vicinity and W of the island. The more prominent of these dangers are: a rock that uncovers, about

100 yards NE; a bare rock 0.3 mile NW, and a rock that uncovers, 250 yards N of it.

(694) Vessels from E may pass N of the foul ground, and clear these dangers, by following the SW shore of the peninsula at a distance of 200 yards, taking care to avoid a rock awash that is 350 yards offshore, until the island is abaft the port beam, and then steer **300°** for the southernmost point of Uganik Island which shows ahead with the summit of a peninsula a little on the port quarter.

(695) Foul ground and rocks awash extend 0.3 mile from Uganik Island 0.4 to 0.9 mile NW of the peninsula.

(696) The channel S of the island is narrower than that N. To go through this channel from E, bring the S end of the peninsula barely open from the point E, astern; and steer for the prominent point on the S shore 0.8 mile W of the island, course **281°**. Keep close on this line, passing midway between the island and an islet near the S shore 0.3 mile SW of the island. When the islet is passed, haul N and give the point a berth of over 200 yards. The principal dangers are: A rock that uncovers, 200 yards SE of the island; a rock with 8 feet over it 0.4 mile W of the island and 0.3 mile N of the islet. The islet should be given a berth of over 100 yards.

(697) W of these dangers Uganik Passage is broad and free from outlying dangers. In the large bight of Uganik Island 5 miles E of East Point, shoals extend 0.5 mile from the N shore for 1 mile from its head. From this bight a broad, low divide extends across the island.

(698) Anchorage in 12 fathoms, good holding ground, and good protection from all except W weather, can be found 0.45 mile off the N shore of the passage in 57°50.7'N., 153°21.8'W.

(699) Rocks that uncover, extend 0.5 mile from the S shore of the passage 1.8 miles E of East Point, and 0.5 mile farther E rocks make out 600 yards on the NW side of a point on the S shore.

(700) **Charts 16576, 16597.–Uganik Bay** is on the E side of Shelikof Strait between Cape Uganik and Miners Point. In general the bay and its arms, with exception of East Arm, have depths too great for anchoring. Several small shoal spots rise abruptly from the general level of the bottom. One of these is in midchannel about 1 mile NW from Mink Point at the junction of East and South Arms, and two others are in the passage between Sally Island and the shore at Starr Point. The shores of Uganik Bay rise abruptly from cliffs in places and are generally covered with grass and alder bushes.

(701) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(702) The Kodiak Island area is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(703) Vessels using Southwest Alaska Pilots Association pilots and en route to Uganik Bay can meet the pilot boat about 1.5 miles W of East Point (57°50.5'N., 153°28.3'W.).

(704) The pilot boat can be contacted by calling "UGANIK BAY PILOT BOAT" on VHF-FM channel 16 (156.80 MHz) or on a prearranged frequency between pilot and agent/vessel.

(705) **Cape Uganik,** the NW end of Uganik Island, is low and flat for about 0.3 mile back and then rises 1,200 to 1,500 feet. Foul ground extends 1.5 miles S from the cape and 0.3 mile or more offshore. Vessels should give the cape a berth of 1 mile.

(706) **Noisy Islands,** a group of two, are 0.5 and 0.6 mile from Uganik Island and 2.5 miles SW from Cape Uganik. The N island is rolling with round-topped, grass-covered hills, the highest of which is about 192 feet. **Noisy Islands Light** (57°55.9'N., 153°33.8'W.), 80 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the W bluff of the N island. The S island is also grass-covered, but is low and flat. Two fine sand beaches are near the N end of this island and a house is nearby. When off Uganik Bay, these islands are sometimes hard to pick up as they merge into the brown hills of Uganik Island. Noisy Islands should be given a berth of 1 mile.

(707) **Noisy Passage,** between Noisy Islands and Uganik Island, appears to be clear in midchannel with a least known depth of 7 fathoms. It is in constant use by small coasting vessels but it is not recommended for deep-draft vessels. Vessels using this channel should avoid the rock awash, about 0.2 mile N of the N Noisy Islands.

(708) **Miners Point,** 8 miles SW from Cape Uganik, is distinctive in appearance as it terminates in three moundlike hills, the inner one is 390 feet high, and the outer one about 188 feet high.

(709) **Broken Point,** about 3.5 miles ESE of Miners Point, is low and flat for 0.4 mile back and then rises to the highland back of it. The outer end of the point is detached and appears as if it had been broken off. A reef, which uncovers on a 2-foot minus tide, is about 250 yards off the point. The point should be given a berth of 0.8 mile.

(710) Anchorage in 12 to 18 fathoms, fair holding ground and protected from S wind, can be found about 1 mile W of Broken Point in 57°53.4'N., 153°39.0'W.

(711) A stream enters the bay in the bight 1.6 miles S from Broken Point. Good anchorage sheltered from S to W winds is off the mouth of the stream in 8 to 15 fathoms.

(712) **West Point** is a comparatively low rocky cliff that rises rapidly to the highland behind it.

(713) **East Point,** 5 miles SE from Broken Point, is the NW extremity of the peninsula separating Uganik Bay and Uganik Passage. Two flat rocks with bluff sides are close to the point and from the point is a long gentle slope to the high land.

(714) **Northeast Arm,** the first and largest arm in Uganik Bay, is about 3.3 miles S of East Point. **Northeast Arm Light 1** (57°47.1'N., 153°27.2'W.), 58 feet above the water, is shown from a skeleton tower with a square green daymark, and marks the N entrance point to this arm.

(715) **Rock Point,** the S entrance point, has several bare rocks which extend 250 yards N.

(716) **Starr Point** is the low rounding point on the NE side of Northeast Arm where the channel is split by Sally Island. **Starr Point Light 3** (57°45.3'N., 153°22.1'W.), 30 feet above the water, is shown from a skeleton tower with a square green daymark on a rock just off the point. The rock is awash at extreme high tide and attached to the shore at low tide.

(717) **Sally Island,** just 2 miles long, occupies a central position in the basin at the head of Northeast Arm. The 1,000-foot-high island is covered by grass and alder bushes.

(718) **Sheep Island** is a small island just off the SE point of Sally Island and is connected to it by a gravel spit which is covered at high water.

(719) A cannery is about 1.3 miles ESE of Starr Point. The wharf at the cannery has a face 110 feet long, with a least depth alongside of about 30 feet. In approaching this wharf care should be taken to avoid the spit which bares, 150 yards off a small stream 0.3 mile W from the wharf. Deep water extends close up to the spit.

(720) The cannery at **Port O'Brien,** 2.2 miles SE of Starr Point, has a wharf 390 feet long with a 105-foot face, and a depth of about 32 feet alongside. The oil wharf parallel to this main wharf is of equal length with a 30-foot face, and has a depth of about 20 feet alongside. Both canneries store

fuel oil, diesel oil, and gasoline for their own use, and have an abundant supply of water. They have some machine shop facilities and scow ways. Tides of 16.5 feet are necessary to use these ways. There are no marine railways. The cannery at Port O'Brien maintains radiotelephone and radiotelegraph communications.

(721) Deep water surrounds Sally and Sheep Islands except for the narrow passage between Sheep Island and the mainland, where it is nearly bare.

(722) A shoal with a least depth of 5¼ fathoms, sand and gravel bottom, is about 300 yards N from the N tip of Sally Island.

(723) Anchorage may be had off either cannery in about 30 fathoms.

(724) **Village Islands** are numerous islands and rocks 2 to 3.5 miles S from West Point. A cannery back of the islands maintains radiotelephone and radiotelegraph communications. An abandoned native village is in the cove just S of the islands. Anchorage for small craft may be had in 6 to 12 fathoms, but the approach is over broken ground making it safe for launches only. There are apparently no continuous channels between the various rocks and islands.

(725) **East Arm** extends SE from Uganik Bay 7 miles S from East Point. It is 1 mile wide at the entrance and over 3 miles long, but a flat extends 1.5 miles from its head or 0.3 mile below the unnamed island on the bight on the S side of the arm. Depths range from 15 fathoms at the entrance to 3 fathoms near the flats. A rock 450 yards NW from the island near the S shore uncovers 2 feet. Between this rock and the shore is another rock that uncovers. A row of four rocks, covered about 2 feet, is reported near the W shore about 0.4 mile SE of Mink Point and to extend S about 0.2 mile to the beach. A saltery is on the S shore W of the unnamed island. It has a small wharf that bares at low water. In approaching the saltery care should be taken to avoid the rocks mentioned above.

(726) East Arm affords an excellent anchorage for vessels of any size in 10 to 15 fathoms, sticky mud bottom. It is subject to heavy williwaws during S gales.

(727) **South Arm** extends 5.5 miles S from **Mink Point**, the S entrance point to East Arm. The arm near its head is only 0.2 mile wide. A rock, covered ½ fathom, is 225 yards off the E shore, 0.6 mile S of Mink Point. Between the point and the submerged rock is a rock which uncovers 2 feet, 200 yards offshore. Anchorage may be had near the head in 16 fathoms, sticky mud bottom, where the arm is 0.7 mile wide.

(728) **Routes, Uganik Bay.**–From N, round Cape Uganik 1 mile and steer 222° for 3.5 miles to a position 1 mile off of Noisy Islands. Round the islands 1 mile and steer **158°** for about 6 miles to a position midway between East and West Points.

(729) From S, give Cape Ugat and Miners Point a berth of 1.5 miles and Broken Point a berth of 0.8 mile. Then steer **143°** for 4 miles to a point midway between East and West Points.

(730) **To enter Northeast Arm.**–From a position midway between East and West Points steer **163°** for 2.3 miles until the N tangent of the largest and most N of the Village Islands is on the starboard beam. Then change to **133°** for 1.8 miles until Northeast Arm Light 1 is on the port beam, about 0.5 mile. Then change to **101°** for 1.6 miles; thence change to **132°**, heading about 0.2 mile off Starr Point. Round Starr Point 0.2 mile or less and continue in midchannel along the E side of Sally Island to anchorage or wharf.

(731) **To enter South Arm.**–From a position midway between East and West Points, steer **163°** for 2.3 miles until the N tangent of the largest and most N of the Village Islands is on the starboard beam. Then change to **190°**, heading 0.4 mile off Mink Point which separates East and South Arms. From midchannel off Mink Point, steer midchannel courses taking care to avoid the rocks which are as much as 225 yards offshore for 0.8 mile S from Mink Point.

(732) **To enter East Arm.**–Follow courses as above until off East Arm and then enter on a midchannel course taking up anchorage as desired.

(733) **Cape Ugat,** on the E shore of Shelikof Strait 12 miles SW from Cape Uganik, is a high ridge sloping to a low rocky cliff at the point of the cape. A short distance off the cape is a small, rocky, grass-covered islet 104 feet high that can be seen for 15 miles up and down the coast on a clear day. A reef that uncovers about 5 feet is about 175 yards W of the islet. Between the islet and the cape is a channel used by the local cannery tenders. **Little River** is a meandering stream that enters the strait a short distance S of Cape Ugat.

(734) **Cape Kuliuk,** about 5 miles SW from Cape Ugat, is a cliff at the end of a ridge about 2,000 feet high. A peculiar and prominent clump of rocks is on the summit back of the cape.

(735) **Uyak Bay** is on the E side of Shelikof Strait, S of the mountainous peninsula terminating in Capes Ugat and Kuliuk.

(736) The approach between Cape Kuliuk and Rocky Point (see also chart 16598) is about 11 miles wide, E of which the bay converges rapidly to Harvester Island. It extends 25 miles SE from Harvester Island. The shores of the bay rise in steep slopes of 2,000 to 4,000 feet, and have many mountain streams. The only timber is some alders in the gulches and some cottonwoods at the heads of the bays. Uyak Bay is an important salmon fishery. The best anchorage in Uyak Bay is found S of Harvester Island, and in Zachar Bay.

(737) **Chief Point,** on the N shore of Uyak Bay opposite Harvester Island, is formed by a grass-covered island about 90 feet high, and has several ridges and small hills. Several rocks awash are about 0.3 mile W from the NW point of this island. The highest of a group of rocks 0.8 mile SE from Chief Point is 110 feet high.

(738) **Chief Cove** is the narrow strait behind the island forming Chief Point. A rock which uncovers 6 feet is in the N entrance. The S entrance is very shoal. Depths of 8 to 12 feet are in the N part of the cove. It is used as an anchorage by cannery tenders and pile drivers during the fishing season.

(739) **Spiridon Bay** opens into Uyak Bay NE of Harvester Island. It extends 12 miles inland in an E direction. Broken ground extends about 1.2 miles NW from the point on the S side of the entrance. The only good anchorages for large vessels in Spiridon Bay are at the head in 13 to 16 fathoms, sand and mud bottom. Care should be taken to avoid the 2¾-fathom shoal 0.3 mile off the E shore and 1.2 miles SE from Telrod Cove. A temporary anchorage can be had in 16 to 18 fathoms about 0.5 mile N from Clover Rock. The bottom is volcanic ash, which has the appearance of yellow sand and has fair holding qualities.

(740) In entering Spiridon Bay from the N, Chief Point should be given a berth of 1 mile. In approaching from the S, the point separating Spiridon and Zachar Bays should not be approached closer than 1 mile to avoid the rock which is nearly 0.5 mile off the point. From a position 1.5 miles S from Chief Point steer **097°** for about 8 miles until Ditto Islets are abeam to starboard, about 0.3 mile. Then change to **138°** and anchor as desired.

(741) **Clover Rock,** 34 feet high, is a rocky islet 0.2 mile off the S shore and 1.5 miles from the S entrance point to

Spiridon Bay. It is connected to the mainland by a gravel shoal which bares at minus tides. A large stream enters the bay just E of Clover Rock.

(742) **Thistle Rock** is a small islet consisting of black jagged rocks,about 10 feet high, a short distance E of Clover Rock. It is always bare and affords a good mark in clear weather. A rock, which uncovers about 7 feet, is about 300 yards NW from Thistle Rock.

(743) **Ditto Islets,** a pair 30 feet high, are in the middle of Spiridon Bay about 7 miles inside the entrance. The bottom between the pair and the S shore is broken and has several rocks awash and a rock 25 feet high. A group of islands in a foul area adjacent to the S shore is SW of the Ditto Islets; of these, Anguk Island is the largest.

(744) **Telrod Cove** is a small cove on the N side of the bay about 10 miles from Chief Point. It affords good shelter in W weather for small craft. The cove shoals rapidly with mudflats at its head. Anchorage may be had in 7 to 15 fathoms, sand and shell bottom. A large stream enters the bay here.

(745) **Weasel Cove,** which forms the W arm at the head of Spiridon Bay, is 0.3 mile wide and has depths of 6 fathoms, sand and mud bottom. The cove is an excellent anchorage for small craft. To enter Weasel Cove keep from 250 to 300 yards off the W shore and enter the cove in midchannel, taking up anchorage as desired.

(746) **Chart 16599.–Harvester Island,** about 9 miles S of Cape Kulink and 0.3 mile off the SW entrance point to Uyak Bay, is over 1 mile long, 844 feet high, steep sided, and grass covered. The 20-fathom curve is about 0.3 mile off the N and E sides of the island, and foul ground extends off the N and E sides for 350 yards in places. A spit, which uncovers and is steep-to, extends 425 yards SW from the S end of the island. **Harvester Island Spit Light 2** (57°38.3'N., 153°59.5'W.), 22 feet above the water, is shown from a square frame with a red triangular daymark on a dolphin on the end of the spit.

(747) **Bear Island,** 249 feet high and grass covered, is about 1 mile W of Harvester Island. It is 0.3 mile from the shore, with which it is connected by a boulder spit that uncovers about 7 feet.

(748) **Uyak Anchorage,** between Harvester Island and the coast to the SW, is one of the best harbors on the E side of Shelikof Strait S of Uganik Bay. It has two entrances of which the S is preferred. The depths range from about 6 fathoms between Harvester Island and Bear Island to 20 fathoms 0.4 mile NNW of Harvester Island Spit Light 2. The best anchorage is about 0.6 mile NNW of the light, in 12 to 14 fathoms. Good anchorage, except with heavy NE or E winds, can be had about 500 yards S of the light 0.3 mile offshore, in 12 to 14 fathoms.

(749) The NW entrance is 0.4 mile wide between two reefs, partly bare at half tide and marked by kelp, one extending 400 yards W from the NW end of Harvester Island, and the other 250 to 550 yards E from Bear Island. With care this entrance is not difficult in the daytime, especially at low water when the principal dangers show above water.

(750) The better and safer entrance to the anchorage is around the S end of Harvester Island. **Cormorant Rock,** which uncovers about 7 feet, is about 0.6 mile SSE of Harvester Island and 300 yards offshore.

(751) **Uyak** is a native village. The cannery on the SW side of Uyak Anchorage has been abandoned and is in ruins.

(752) **Tides.**–The diurnal range of tide at Uyak Anchorage is 13.8 feet.

(753) **Routes, Uyak Anchorage.**–From northward, round Cape Ugat about 1.5 miles and steer **220°** for 6 miles to a position 2.5 miles off Cape Kuliuk, bearing 102°. Then steer **172°** for 10 miles, giving the E shore a berth of about 2 miles, to a position 0.5 mile E of Harvester Island. (See chart 16597.)

(754) Then steer **237°,** passing about 0.3 mile SE of Harvester Island. Anchor 500 yards NE or N of the slipways, in 10 to 14 fathoms.

(755) To go to the inner harbor, follow the preceding directions, and then haul NW, round the light at 100 yards, and steer **341°** for the NW end of Harvester Island, pass 150 to 200 yards off the ruins of the cannery wharf at Uyak, and continue the course to midchannel.

(756) **From southward.**–Give Cape Uyak, Rocky Point, and Bear Island berths of 1 mile or over, and follow the E shore of Harvester Island at a distance of 0.5 mile or more. Then follow directions as given above.

(757) In passing Rocky Point care should be taken to avoid Wolcott Reef which is 0.3 mile off the point and bares only at extreme low water.

(758) **Chart 16597.**–A rock, covered 2½ fathoms, is inside the entrance of Uyak Bay about 1.9 miles SE of Harvester Island Spit Light 2, 0.9 mile off the W shore.

(759) **Zachar Bay,** about 7 miles SE of Harvester Island, is 0.8 mile wide at the entrance and extends SE for 5.5 miles where the bay terminates in an extensive mudflat that uncovers. This mudflat affords an excellent place for beaching a vessel in an emergency.

(760) **Carlsen Point,** the S entrance point, is low and shows as a bluff when off the entrance.

(761) A dangerous rock, covered 2¾ fathoms, is 1.6 miles N from Carlsen Point and 0.6 mile offshore.

(762) **Carlsen Reef,** which uncovers 10 feet, is a danger about 0.5 mile NW from the NE tip of Carlsen Point.

(763) A reduction plant is on the N shore of Zachar Bay 3 miles above the entrance. The plant has a wharf with a 100-foot face and a least depth alongside of 18 feet. Large vessels dock port-side-to. Radiotelephone and radiotelegraph communications are maintained. There is also float plane service available from Kodiak.

(764) A large stream, with many cottonwood trees along its sides, enters the head of the bay. Kodiak bears are numerous in the area.

(765) Excellent anchorage sheltered from all winds may be had in 12 to 15 fathoms, mud bottom, off the mudflats at the head of Zachar Bay. The anchorage is subjected to moderate williwaws. In anchoring, care should be taken to avoid the mudflats which extend 1.5 miles from the head of the bay.

(766) In entering Zachar Bay, the shore on the port hand should not be approached closer than 1 mile and a course should be laid to pass 300 yards off the 2¾-fathom rock. From this point steer **127°** until Carlsen Point is abeam on the starboard hand, then change to **145°** and continue, keeping in midchannel.

(767) **Amook Island,** formed by a mountainous ridge, divides an 8-mile stretch of Uyak Bay into two passages. The E passage is narrow and obstructed in places, and as a through route should be used only by small vessels with local knowledge. Reefs extend 0.3 mile N from the N end of Amook Island.

(768) The ship passage is W of Amook Island. **Aleutian Rock,** marked by a buoy on its SW side, is 0.3 mile off the SW shore of Amook Island, in the S end of this passage. This dangerous rock uncovers 1 foot and is not marked by kelp. Vessels should pass between Aleutian Rock and Alf Island. The steamship ALEUTIAN was lost here in 1929.

(769) A cannery is on the W shore of Uyak Bay opposite the S end of Amook Island.

(770) In the bight on the W side of Amook Island, 2.5 miles from its N end, is an anchorage for a small vessel in about 10 fathoms, with shelter from E and S winds. The bottom is uneven with a possibility of dangers. The entrance is between the S point of the bight and a bare rock 0.6 mile N from the point and 0.5 mile from Amook Island. Between this rock and the island is a reef, partly bare at low water, which extends 0.5 mile SE from an islet.

(771) The passage E of Amook Island for about 2.5 miles from its N end has suitable depths and sufficient width for anchoring vessels of moderate size. The passage then narrows to 300 yards, and from the point on the E side a kelp-marked reef extends W and NW more than halfway across, leaving a narrow channel between the reef and the W shore. Near the NW end of the reef is a bare rock. An anchorage for small vessels may be found on the W side of the S end of the narrows, around the point, in 5 to 8 fathoms. A small vessel can also anchor 300 yards off the narrow entrance of the shallow lagoon 0.4 mile NE of the point of the narrows, in 5 to 6 fathoms. A 2¼-fathom spot is about 500 yards off the lagoon entrance.

(772) Thence for 2 miles the passage is clear to the second narrows where a spit, partly bare at low water, extends halfway across from a low grassy point on the W side and leaves a channel 125 yards wide between the S end of the spit and an island. The channel is W of this island and the next island 0.4 mile S; the W shore should be favored until over 0.2 mile S of the S island. S of this point the passage is clear. Some prospecting has been done on the E side of the passage 2 miles from its S end.

(773) During the fishing season a floating cannery is usually moored near the old mining camp on the E side of the strait.

(774) Lying 0.8 to 2.5 miles S of Amook Island is a chain of islands with foul ground between them and about 300 yards off the NW end of **Alf Island.**

(775) The safer and recommended passage is E of the chain composing Alf Island. Broken bottom extends about 300 yards into the passage from the central islets of the chain, and directly opposite, a reef extends 200 yards from the E side of the passage. The reef is marked at its outer end by a bare rock visible at all times.

(776) At the S end of the chain of islands is a small inlet in the W shore about 0.8 mile long and 300 yards wide, affording anchorage in about 12 fathoms.

(777) From 3 to 6 miles S of Alf Island, Uyak Bay shoals gradually from 20 to 4 fathoms and anchorage may be selected in any depth desired. The swinging room is about 1,400 yards in diameter.

(778) The upper end of Uyak Bay is bordered by high snow-covered mountains and is a well-known hunting ground for the large Kodiak brown bear.

(779) **Chart 16599.–Larsen Bay** is on the W side of Uyak Bay, 6 miles S from Harvester Island. Depths are 30 to 40 fathoms near its N side and less on the opposite side. From its head, a trail leads over a low divide to the Karluk River. A large cannery is in the bight just S of the inner S entrance point at the village of **Larsen Bay.** Gasoline, kerosene, and diesel oil are stored for cannery use and may be purchased. A machine shop is maintained for cannery use, and a store is available for the purchase of food and clothing in small quantities. A small dispensary and first aid station are available but no doctor is in residence. The cannery maintains radiotelephone and radiotelegraph communications. The marine railway can handle vessels up to 100 tons and 20-foot draft.

(780) The entrance is between a spit extending 150 yards S of the N entrance point and a 20-foot rock near the outer end of the spit extending 150 yards from the outer S entrance point. A buoyed reef, which uncovers, is in the middle of the entrance. Two narrow crooked channels lead on either side of the reef. The preferred S channel, between the midentrance reef and the 20-foot rock, 200 yards SE from it, is marked by a **248°** range. The front mark is a dolphin on the flats bearing a yellow wheel-type device, and the rear mark is a yellow circular disk painted under the gable of a building. This channel has a least depth of 24 feet on the range.

(781) The channel N of the midentrance reef is deeper but necessitates a more difficult turn and for that reason is not recommended. A lighted buoy and a **226°** range of the yellow dolphin and the twin cannery stacks mark the channel. This channel has a least depth of 22 feet on the range. Both channels join SW of the reef, thence form a common entrance WNW into Larsen Bay. The channel into Larsen Bay is marked by unlighted buoys and a **291°30′** lighted range. The channel has a least depth of 28 feet on the range.

(782) A good anchorage for larger vessels will be found about 400 yards N from the small island on the S side of the bay, and about 700 yards off the cannery wharf in 20 fathoms, mud bottom. In W weather winds blow down the bay with great force, but the holding ground is good. In former years the cannery company moored its sailing vessels here during the summer months.

(783) **Routes.**–Small vessels can enter Larsen Bay at any stage of the tide, but large vessels should choose a high-water slack with calm weather for entering or leaving.

(784) Enter on the range and pass midway between the reef marked by a buoy on the N side and the 20-foot rock, 200 yards S from it. Hold this range, **248°**, until within about 300 yards of the yellow dolphin and then pick up the **291°30′** inner range, passing 100 yards off the end of the spit off the N entrance point and 150 yards off the inner entrance point on the port hand. When the inner S entrance point is a little abaft the beam change to **263°** for 0.3 mile, then haul S and anchor as desired.

(785) **Tides and currents.**–The diurnal range of tide in Larsen Bay is 13.7 feet.

(786) A strong tidal **current** sweeps through the entrance with an estimated maximum velocity of 4 to 5 knots.

(787) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(788) The Kodiak Island area is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(789) Vessels using Southwest Alaska Pilots Association pilots and en route to Larsen Bay can meet the pilot boat about 1 mile E of Harvester Island (57°38.8′N., 153°59.5′W.).

(790) The pilot boat can be contacted by calling "LARSEN BAY PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(791) The **wharf** built out over the shoal water is 1,035 feet long and has a depth of 8 feet at its outer end. A 5-ton crane is on the wharf. Water is available through a pipeline.

(792) **Chart 16598.–Sevenmile Beach** is the long boulder-strewn beach from Bear Island to Rocky Point. It is backed by low cliffs from which a broad grassy valley extends back several miles toward Karluk Lake.

(793) **Rocky Point** is a double point on the S side of the approach to Uyak Bay. It consists of bold cliffs which rise rapidly to the ridges of which the point is a termination.

(794) **Wolcott Reef,** a dangerous group of rocks that bare at extreme low water, is 0.3 mile off the E spur of Rocky Point. A channel is between the reef and the point and has a least known depth of 4 fathoms. This channel is used by local cannery tenders in good weather. A buoy is 0.2 mile W of the reef.

(795) **Cape Uyak,** on the E side of Shelikof Strait about 4 miles SW from Rocky Point, is a precipitous high headland at the end of a ridge. From the water the slope rises abruptly to 647 feet. There is then a slight fall to a deep notch in the narrow neck back of the cape, from which there is a rise in steep, grassy slopes to higher land.

(796) **Northeast Harbor** is the bight on the S side of Cape Uyak. In NE weather it affords excellent shelter for small craft that can anchor close under the shore in 3 to 5 fathoms, sandy bottom. Larger vessels anchor farther out in 9 fathoms with some protection but subject to an uncomfortable swell.

(797) Between Cape Uyak and Karluk are two long cliffs about 1,300 feet high, the S one having a marked slide extending from its highest point almost to the water. In the valley between the cliffs are two waterfalls. Beach seining is carried on here during the season, and a number of shacks used by fishermen are on the beach at the foot of the cliffs.

(798) **Chart 16599.–Karluk,** 5.5 miles S from Cape Uyak and 1.5 miles E from Cape Karluk, is a native village with a school and a church. Fishing is the principal industry. The old cannery buildings are still standing but they are no longer used, as the fish are now taken to Uyak Bay for canning. A strong set S toward the shoals inshore has been experienced.

(799) Radiotelephone and radiotelegraph communications are maintained.

(800) The entrance to **Karluk River** is through a narrow channel at the S end of a spit and is only passable by launches at high water. Some wharves are just inside the mouth. About 1.5 miles up the river is a weir where the salmon are counted as they ascend the river. The weir is removed during the winter.

(801) **Karluk Anchorage,** off Karluk, is sheltered from offshore winds but is exposed to winds from the SW around through W to NE. Vessels should be prepared to move on short notice. Anchorage may be had off the town in 12 to 14 fathoms, sandy bottom. During the fishing season a number of scows and launches are usually found moored in the roadstead.

(802) The abandoned cannery buildings and the church spire are the principal objects to be seen in approaching Karluk.

(803) **Tanglefoot Bay** is the bight adjacent to Cape Karluk on its E side. It is separated from Karluk by a high cliff, the base of which is not passable by pedestrians at high water. **Tanglefoot Beach** is very steep and has a bad undertow. Landing here is dangerous if there is any surf.

(804) **Chart 16598.–Cape Karluk** is the most conspicuous landmark along the W coast of Kodiak Island. The cape is a prominent, projecting head, 1,420 feet high, with bare rock cliffs on its seaward face and grassy slopes on its E side to lowland. It is readily identified by its cone-shaped appearance, a notch in the summit, and the lowland behind it.

(805) **Sturgeon River** has its mouth about 2 miles S from Cape Karluk. The entrance is between 2 shingle spits covered with driftwood. It can be entered by small boats at half tide or better. For about 1 mile back of the beach the river flows through a mudflat, which is covered at high water.

(806) **Sturgeon Head** is a high whitish eroded headland 5 miles SW from Cape Karluk. Several rocks and reefs are as much as 200 yards offshore at the foot of Sturgeon Head.

(807) **Cape Grant,** about 10 miles SSW of Cape Karluk, is a rugged headland at the end of a high ridge, the summit of which is marked by a small cluster of peculiar pinnacle rocks.

(808) A rock nearly awash at low water is 0.3 mile off the SW tip of Cape Grant. Shoal water extends some distance beyond this rock and vessels rounding the cape into Halibut Bay should give it a berth of 0.8 mile.

(809) **Halibut Bay** is the large bight just SW from Cape Grant. The bight is bordered by eroded bluffs and a broad sand beach. A stream enters the sea at the S part of Halibut Bay. Vessels anchor in 7 fathoms, hard sand bottom, 0.8 mile off the beach. Small craft may find more protection closer in near the mouth of the lagoon.

(810) Anchorage is also available in the N corner of the bay, but care should be taken to avoid the reef which makes out from the SW tip of Cape Grant.

(811) An abandoned cannery is at the S end of Halibut Bay at the entrance to the lagoon; the cannery wharf dries at low water.

(812) **Middle Cape,** the westernmost promontory on Kodiak Island, consists of two headlands having precipitous, rocky cliffs facing the sea, and smooth grassy slopes facing inland. The N headland is the higher, a little over 1,000 feet. Its summit consists of three rocky clumps, the middle one of which is the highest. These rocky clumps are prominent and easily distinguished from the N.

(813) A prominent high pinnacle rock is at the foot of the N slope of Middle Cape.

(814) **Tombstone Rocks** consist of two detached rocks about 100 yards apart 0.8 mile off Middle Cape. The S rock is 99 feet high while the N rock is only a few feet high. From some directions these rocks appear as the headstone and footstone of a grave. Deep water is close to the rocks.

(815) **Mushroom Reef,** which uncovers 13 feet, is about 0.3 mile offshore and 1 mile SE from Middle Cape. This rock when exposed by the tide is round and has the appearance of a huge mushroom. Deep water is close up to it.

(816) A prominent pillarlike shaft of rock, 170 feet high, with overhanging sides, is about 100 yards offshore and E from Mushroom Reef.

(817) **Middle Bay** is a small bight about midway between Middle Cape and Cape Ikolik. The 5-fathom curve is about 0.3 mile off the beach.

(818) **Gurney Bay** is the bay immediately NE from Cape Ikolik. The head of the bay is shoal with a sand beach strewn with boulders. Anchorage may be had in 10 fathoms, sandy bottom, midway between the two entrance points. This is a comfortable and secure anchorage in E weather.

(819) **Chart 16601.–Cape Ikolik,** 4 miles S of Middle Cape, is a rugged headland 1,008 feet high, with its summit forming a ridge lying in a NE and SW direction.

(820) **Outer Seal Rock,** 1.8 miles W from Cape Ikolik, resembles a sail and is 89 feet high. The rock has deep water close-to except about 200 yards to the SW where there are submerged rocks. Outer Seal Rock is a sea lion rookery.

(821) **Inner Seal Rock,** 0.3 mile W from Cape Ikolik, is a steep-sided bare rock 125 feet high, surmounted by a rocky nub which gives it the appearance of a lighthouse. From some directions it appears as a huge bell.

(822) **Bumble Bay** is 2.5 miles E of Cape Ikolik. The W point of the bay is marked by three pinnacle rocks, while the E point is marked by a single pinnacle rock 127 feet high. Small craft will find shelter from E winds in the E part of

the bay, while large vessels will find anchorage in the center of the bay in 12 fathoms, sand bottom.

(823) **Ayakulik Island,** 5 miles SE of Bumble Bay, is small and 220 feet high. A reef extends E from the E point of the island to a sandspit on the mainland of Kodiak Island. About 300 yards W and N of the island are bare rocks and rocks awash.

(824) Small launches will find shelter in SE or E weather in 5 fathoms, 300 yards NE of the island. Larger vessels will find shelter from E weather in 7 fathoms, 0.5 mile N of the island.

(825) **Ayakulik River,** known locally as **Red River,** discharges at a point 1.8 miles SE of Ayakulik Island. With local knowledge, the river can be entered at high tide in smooth weather by small launches. The Fish and Wildlife Service maintains a station here during the salmon season.

(826) From a point 3 miles N of Ayakulik Island to Low Cape, the shoreline runs in a nearly N-S direction and is marked by earth bluffs varying from a few feet to 267 feet high.

(827) **Ikpik Hill,** a prominent high dark-colored earth bluff is 3.2 miles N of Low Cape, and in approaching from Cape Ikolik, this bluff may be mistaken by a stranger for Low Cape.

(828) **Low Cape,** 11.5 miles NW from Cape Alitak, is the W extremity of the lowland in this vicinity. The extremity of the cape is marked by a peak-shaped light-colored earth bluff about 90 feet high. A spit, bare at low water, extends nearly 0.3 mile off the cape. The water deepens gradually, the 10-fathom curve lying 2.3 miles off the cape.

(829) From a position 2 miles W of Low Cape, heavy kelp extends ESE. Soundings in this kelp showed depths of from 3 to 7 fathoms, but much shoaler water probably exists. Low Cape should be given a berth of about 3 miles.

(830) **Sukhoi Bay** has its entrance about 6 miles S of Low Cape. The entrance is narrow and is between two sandbars. It has a depth of about 6 feet, but should not be attempted except with local knowledge.

(831) The coast from Low Cape to Cape Alitak apparently has no off-lying dangers.

(832) Cape Alitak has been described earlier in this chapter.

(833) **Routes, Cape Karluk to Cape Alitak.**–From a point 2 miles off Cape Karluk (see chart 16598), steer **222°** for 5.5 miles to a position with Sturgeon Head (a high white eroded cliff) abeam. Then change to **213°** for 11.5 miles until Tombstone Rock is on the port beam, 2 miles.

(834) Then change to **196°** for 4 miles or until Outer Seal Rock (a sail-shaped pinnacle) is a little abaft the beam, 2 miles.

(835) Then change to **154°** for 23.3 miles to pass 2.8 miles off Low Cape. On this course Low Cape should be passed in a depth of 14 fathoms.

(836) When Low Cape bears 083°, 3 miles, haul to **132°** for 12.5 miles, passing about 1.3 miles off Cape Alitak, to a position with the cape bearing 010°, 1.5 miles.

(837) If bound to Alitak Bay, follow routes given in the description of that place.

6. ALASKA PENINSULA

(1) This chapter describes the S coast of the Alaska Peninsula from Cape Douglas to Isanotski Strait, as well as the Semidi Islands, Shumagin Islands, Sanak Islands, and many other smaller off-lying islands that fringe this part of the coast. Also described are Katmai Bay, Wide Bay, Chignik Bay, Stepovak Bay, Unga Strait, Pavlof Bay, Ikatan Bay, Isanotski Strait, and many smaller bays and lagoons, and the fishing communities of Sand Point, King Cove, Cold Bay, and False Pass. The N coast of the Alaska Peninsula is described in chapter 8.

(2) **Charts 16013, 16011.–Alaska Peninsula,** extending SW over 400 miles from Alaska mainland (59°30'N., 155°00'W.) to Isanotski Strait (54°52'N., 163°23'W.), is mountainous with many irregular and bold peaks reaching 2,000 to 9,000 feet. **Pavlof Volcano** (55°25'N., 161°54'W.), the most prominent of several active volcanos on the peninsula, has three symmetrical peaks in a general N-S line; the middle and highest peak rises to almost 8,300 feet. **Frosty Peak** (55°04'N., 162°50'W.), a conspicuous snowcapped mountain with several irregular peaks near the SW end of the peninsula, reaches nearly 5,800 feet. There are many lakes and sizable streams on the peninsula; several portages cross between the adjacent bays.

(3) The S coast of the Alaska Peninsula from Cape Douglas (58°51'N., 153°17'W.) to Cape Pankof (54°40'N., 163°02'W.) is irregular and broken by numerous indentations affording anchorage. Some settlements, canneries, and fishing stations are scattered along the coast and among the off-lying islands.

(4) Many of the points are high rugged cliffs with offshore reefs, while other points are low with shoal water extending from the shore. Kelp does not always mark rocks and shoals, especially in early or late summer. Sometimes only thin ribbon kelp grows on the dangers which is either drawn under by currents and seas, or cannot be seen until the kelp is entered.

(5) Many vessels from southeast Alaska use the Shelikof Strait route SE of the Alaska Peninsula to the Bering Sea. The route is described in chapter 3. The run between Shelikof Strait and Shumagin Islands is one of the most difficult in Alaska because of the prevalent thick weather and unknown currents. The current effect near Foggy Cape (56°31'N., 157°00'W.) is particularly confusing.

(6) **Local magnetic disturbance.**–Differences from the normal variation of as much as 14° have been observed along the Alaska Peninsula.

(7) **Currents.**–A continual current of considerable strength follows the coast all the way from Shelikof Strait to the Aleutian Islands. This W current is considered an eddy which accompanies the general E drift across the Pacific S of latitude 50°N., and forms a part of the general circulation of the North Pacific Ocean.

(8) The current along the Alaska Peninsula has been called a warm current originating in the Gulf of Alaska and it doubtless assists in causing the S side of the peninsula to be warmer than the Bering Sea side. It is also well known that the islands off this coast have a milder climate than the mainland; almost the entire population of the area is found on them as a result.

(9) The coastal current searches out all the passages, large and small, between and around the many islands, and in some of them it becomes strong enough to be important. An approaching NE storm gives warning by strengthening this current; in many places the current will indicate NE weather a day before the barometer falls. W winds weaken the current.

(10) On three runs between Chirikof Island and Castle Rock, a survey ship experienced a S set indicating an average strength of current of 1.5 knots.

(11) The tidal currents in the vicinity of the S coast of the Alaska Peninsula are strong in many of the constricted passages. In the open waters offshore they are generally weak.

(12) **Weather.**–Winds along the rugged Alaska Peninsula are local and variable. At Chignik, they are mostly from the W through NW in early winter, the SE in midwinter, and SE through SW from March through September. Strong winds often blow from the Bering Sea through the mountain pass over Chignik Lake. In the Shumagin Islands, summer winds are often out of the SW, while winter winds frequently blow out of the S. At Cold Bay, southeasterlies are common all year around. Northwesterlies are also frequent in winter. In summer, W through NW winds are common. In winter, windspeeds at Cold Bay average 15 to 16 knots and reach gale force 3 to 5 percent of the time.

(13) Annual rainfall ranges from 20 to 60 inches, with heaviest amounts usually occurring on the SE side of the peninsula. At Cold Bay, which averages 33 inches annually, measurable precipitation falls on 320 days in an average year; on about one-third of those days, it snows. August through November are usually the wettest months, while snow is common from October through April.

(14) January and February are usually the coldest months of the year. The average daily maximum is around the freezing mark or above on the SE side of the peninsula, and 3 or 4 degrees cooler on the NW side. Average daily minimum temperatures on the SE side range from 16°F in the N to 28°F in the S. On the NW side, they fall to an average of 16°F at Port Heiden, increasing to 28°F to the S and decreasing to below 10°F to the N. At Cold Bay, extreme low temperatures have fallen to –13°F, while Coal Harbor has recorded a –19°F temperature. Temperatures climb steadily from March through July. In July on the average, daytime highs range from the midfifties to low sixties, while nighttime lows drop into the midforties. Extreme temperatures have reached the mideighties at sheltered locations.

(15) Though fog may be encountered along this coast at any time during the summer, it is most prevalent from June through August. The SE winds bring in the fog banks that lie over the North Pacific. Fog is reported on an average of 18 to 25 days per month at Cold Bay in midsummer; however, visibilities fall below 2 miles on only about 3 to 6 days. Fog often hangs about the headlands and entrances to bays when the upper parts of the bays are clear. Land fog and precipitation reduce visibilities in winter.

(16) All harbors on the SE side of the peninsula are free from ice and open to navigation throughout the year. Pack ice has been known to drift through Isanotski Strait and interfere with navigation in Ikatan Bay.

(17) **Prominent points and most off-lying islands on the S side of the Alaska Peninsula are adequately charted. However, much of the coast between Cape Douglas and Chignik**

Bay has not been surveyed. Notes on the unsurveyed portions are from the most reliable sources available; these waters should be used with caution.

(18) **Chart 16580.–Cape Douglas** (58°51'N., 153°17'W.), the mainland promontory on the W side of the N end of Shelikof Strait, is a grassy peninsula about 3 miles long and 190 feet high. At its W end it breaks off in a bluff to a low, narrow neck which connects it to the mainland. Rocks that uncover, extend about 0.2 mile E from the cape.

(19) The three points on the SE side of Cape Douglas and the small projecting point on the mainland in 58°49.8'N., 153°21.3'W., about 1.5 miles SW of Cape Douglas, are reported to be distinctive radar targets at 10 miles.

(20) In 1971, the NOAA Ship RAINIER reported that good anchorage in 12 fathoms, very even sand and mud bottom, good holding ground, and sheltered from W and N weather, could be found about 1.5 miles S of Cape Douglas and about 1.5 miles off the mainland shore. There is some shelter from SW and NE winds, but if heavy, NE swells roll around the point. In making the anchorage, keep 2 miles NE of the 28-foot-high rock near the center of Douglas Reef, and maintain a distance of 1.5 miles off the mainland shore when anchoring. The small projecting point on the mainland, 1.5 miles SW of Cape Douglas, is a good radar target for approaching the anchorage, and the 28-foot-high rock is also a good radar target at 5 miles, but only when the tide is high enough to cover the rest of the reef (half tide or higher).

(21) **Mount Douglas,** 7,064 feet high, and **Fourpeaked Mountain,** 6,903 feet high, are snow-covered mountains W and SW, respectively, of Cape Douglas.

(22) **Douglas Reef,** 5.5 miles S of Cape Douglas, is about 2 miles in diameter. Part of the reef uncovers; near its middle is a rock 28 feet high. A sounding of 6 fathoms with 40 to 60 fathoms close-to was obtained 1 mile 081° from the rock. Several rocks, close together and awash at high water, are 2.8 miles SW from Douglas Reef and 1.5 miles offshore. A reef bare at low water extends about 0.8 mile SE from them. About 10 miles SW of Cape Douglas is a point marked by a hill 673 feet high. In the valley S of the point is a small glacier. About 1.2 miles from the point and 168° from the hill is a rock awash at about half tide. There is no kelp on the rock, and the sea seldom breaks on it when it is covered.

(23) Two submerged rocks with kelp patches are about 1.5 miles SW of the preceding rock and the same distance from shore. The kelp shows well only at low water, and the sea seldom breaks on the rocks.

(24) Dangerous pinnacles are in the area N of 58°40.0'N., and W of 153°27.0'W., about 5.5 miles NNE of Kiukpalik Island. Mariners are advised to exercise extreme caution while navigating in the area.

(25) **Kiukpalik Island,** 17.5 miles SSW of Cape Douglas and 2 miles offshore, is 1.2 miles long, 155 feet high, nearly level, and grass covered. A reef with a submerged rock at its outer end extends about 0.3 mile N of the island and, a shoal, scantily marked by kelp, is about 0.5 mile NW of the island. The channel between the island and these outlying dangers is not safe. Temporary anchorage, with shelter from E winds, can be had in the bight on the W side of the island in 8 fathoms, muddy bottom. The mainland opposite the island should be avoided, as there is a possibility of shoals on that side.

(26) **Shakun Rock,** a prominent dark pinnacle 50 feet high, is 5 miles 232° from Kiukpalik Island. From the rock, a semicircular reef, partly bare at low water, extends NE 2 miles and S and W to the S end of the chain of grass-covered **Shakun Islets.** A 1975 survey indicated that the channel between the islets and the reef was clear of rocks and had depths of 1½ to 3 fathoms. The waters between the N tips of Shakun Islets and the reef that extends NE of Shakun Rock and the S side of Kiukpalik Island are clear, with depths of 5 to 10 fathoms. The waters between the mainland and Shakun Islets are free of danger, except for reefs just off the mainland. Depths of 1 to 3 fathoms are in this area.

(27) **Swikshak Lagoon,** about 5 miles N of Shakun Islets, is a lagoon which is practically closed at all stages of the tide. The entrance is about 200 feet wide and rocky. Depths inside the lagoon average less than 1½ fathoms. Just SE of the lagoon entrance is a group of reefs, one of which is bare at all stages of the tide.

(28) **Kaguyak,** an abandoned village in ruins, is behind a large bare rock that is joined to the beach at low water. Approaching from SE, a Coast Guard vessel anchored in about 7 fathoms, hard sand bottom, with Cape Chiniak bearing 205°, Shakun Rock 096°, and the rock in front of Kaguyak 346°. Between Cape Chiniak and Shakun Rock, the bottom was found to be uneven, depths 10 to 30 fathoms, mud and hard sand alternating.

(29) **Cape Chiniak,** the N point of Hallo Bay, is 27.5 miles SSW of Cape Douglas. It has a high hill near its end.

(30) **Hallo Bay,** between Cape Chiniak and Cape Nukshak, is 6 miles wide and ends in tidal flats that extend out up to 0.5 mile along the head of the bay.

(31) **Ninagiak Island,** in Hallo Bay, has a knob 305 feet high. A rock, bare at most stages of the tide, is 0.7 mile SE of the island. A reef extends 0.3 mile NE of the rock, and a submerged rock is 0.3 mile SW. Good anchorage, open to NE weather, can be had close into the mainland between the island and the tidal flats to the W. Safe passage can be made on either side of the small island 0.5 mile SW of Ninagiak Island, but the passage between the N side of Ninagiak Island and the mainland is foul.

(32) A reef, about 1.2 miles long E and W, is in Hallo Bay about midway between Ninagiak Island and Cape Nukshak. The reef is bare in places at low water and has no kelp.

(33) **Charts 16576, 16603.–Cape Nukshak** (58°23.5'N., 153°59.0'W.), 36 miles SW from Cape Douglas, is flat and grass covered to the foot of a prominent sharp peak. Just off the cape is narrow **Nukshak Island,** which is 0.5 mile long, 133 feet high, and has two knolls. Between the island and the cape is a narrow passage about 75 yards wide that has a depth of 5 fathoms in midchannel. A prominent pinnacle is close to the W end of the island. Anchorage and shelter from W winds can be had 0.2 mile S of the island in 10 fathoms, sandy bottom. In 1972, the NOAA Ship RAINIER anchored in 31 fathoms, hard bottom, with the pinnacle bearing 233°, 0.6 mile.

(34) Reconnaissance soundings show depths of 17 to 50 fathoms in the area 400 to 1,200 yards N and E of Nukshak Island.

(35) A large reef, that uncovers 9 feet, is 0.5 mile off the mainland and 1.8 miles SW of the outer end of Nukshak Island. A rock, covered 3 feet and not marked by kelp, is 0.6 mile ESE of the reef. From Cape Nukshak to Kukak Bay the cliffs along the shore are irregular, and numerous high-water and submerged rocks extend about 1 mile offshore.

(36) **Yugnat Rocks,** about 3 miles SW of Cape Nukshak, are several prominent rocks about 20 feet high. The area around the rocks is foul and ships are warned to keep outside the 20-fathom curve.

(37) **Kukak Bay,** between Cape Nukshak and Cape Ugyak, has depths as great as 66 fathoms and extends inland about 6 miles. The entrance is 0.6 mile wide and is easy

of access. The shores are steep in most places and anchorage area is limited.

(38) **Kukak Point,** 4.5 miles SW of Cape Nukshak, is low and grassy; a reef extends 0.5 mile SE from the point. **Devils Cove,** between Kukay Point and **Tiny Island,** has a flat muddy bottom and depths of 4 to 7 fathoms. There is a waterfall at the W end of the cove. Entrance to the cove is obstructed by three reefs that are covered at high water. The best passage into the cove is between the W reef and Tiny Island. Strangers are cautioned not to enter unless the reefs are visible.

(39) On the S side of Kukak Bay are two islands; **Aguligik Island** is just inside the entrance and **Aguchik Island** is near the head of the bay. The ruins of an abandoned salmon and clam cannery are in the small cove opposite the E side of Aguligik Island. The face of the cannery wharf bares at extreme low water.

(40) Cannery tenders formerly anchored in a small bight S of Aguligik Island in 28 fathoms, mud bottom. A large anchorage is available S of Aguchik Island in 11 to 27 fathoms, mud bottom. Both anchorages afford good protection against wind and swell. The holding bottom is good. The diurnal range of tide is about 13 feet, and the currents are negligible.

(41) A rock, covered about 8 feet, is near the center of the inner part of Kukak Bay. The rock is 0.5 mile from the N shore, 0.8 mile from the S shore, and about midway between Aguligik and Aguchik Islands.

(42) **Cape Ugyak,** 8 miles SW of Cape Nukshak, is the E end of the moutainous peninsula between Kukak and Kaflia Bays. **Kulichkof Island** is a small grass-topped rock 0.2 mile N of the cape.

(43) The area N of Cape Ugyak is foul for a radius of about 2 miles. Bare and covered rocks, and reefs are numerous. A rock awash, not marked by kelp, is 1.3 miles NNW from Kulichkof Island and 0.8 mile off the mainland. A rock, covered 11 feet, is 0.8 mile NNE from Kulichkof Island; a small patch of thin kelp is visible only at extreme low tides. A small rock, covered 1 foot, is 0.3 mile NE of Kulichkof Island; a small patch of kelp is visible on the lower tide.

(44) **Kaflia Bay,** between Capes Ugyak and Gull, has at its head two small basins with depths of 20 to 35 fathoms in the middle and joined by a very narrow channel which passes S of a large islet just off the N shore. The channel into the first basin is about 30 feet wide and subject to very swift currents during ebb and flood. Approach the channel S of several rocks in the entrance, then turn N passing between the rocks and islet in the center. Hug the E and N sides of the islet as you pass around. The channel has depths of 2 to 3 fathoms but is not recommended to those unfamiliar with the area.

(45) In the outer bay, a rock, which bares at low water, is 0.6 mile SW of the prominent point on the N side.

(46) **Charts 16576, 16580.–Cape Gull,** about 47 miles SW of Cape Douglas, is a bold headland, terminating in a cliff 503 feet high. Temporary anchorage can be had in the cove on the S side in 9 fathoms, sandy bottom. The S point of the cove is a rocky islet about 15 feet high. Foul ledges and reefs extend seaward 0.6 mile from this point to a small grassy island. Dangerous pinnacles are in the area extending about 0.5 mile N, 0.5 mile E, and 1.5 miles S of the island. Mariners are advised to exercise extreme caution while navigating in the area.

(47) Between Kaflia Bay and Cape Gull, the bottom is irregular and rocky for a distance of 1 mile offshore and should be avoided.

(48) **Cape Kuliak,** 52.5 miles SW of Cape Douglas, is the outermost headland on the midsection of Shelikof Strait's W shore. The cape rises gradually from a crumbling bluff at the end to high mountains inland.

(49) **Kuliak Bay,** immediately N of Cape Kuliak and locally known as **Halferty Bay,** is over 4 miles long and 3 miles wide at its entrance. The only obstruction in the entrance is a rock awash about 1.25 miles SW of the small grassy island off the point S of Cape Gull. The area between this rock awash and the N shore of the bay is generally foul and should be avoided. A shoal, covered about 4½ fathoms, is about 1.25 miles SE of the rock awash.

(50) The head of Kuliak Bay is separated into two arms by a peninsula. The S arm is deep and clear of hazards except for a pinnacle covered 4 fathoms in its center. The N arm contains a basin 0.7 mile long with depths of 8 to 15 fathoms but it is separated from the outside bay by a sandbar extending 0.3 mile from the NE shore. The basin is entered through a narrow channel, about 75 feet wide, with depths of about 2 fathoms; the channel is discernable only a low tides.

(51) **Missak Bay,** between Capes Kuliak and Atushagvik, is nearly 4 miles long and has deep but good holding ground. A reef and bare rocks extend from the N shore, and rocks are close to the S shore. A midchannel course should be steered into the bay.

(52) The 231-foot NOAA Ship FAIRWEATHER anchored in Missak Bay in July 1975, but experienced no storms during this period.

(53) **Cape Atushagvik** is 4.2 miles **225°** from Cape Kuliak. It has a low bluff at the water, and rises in a gentle slope to a prominent knoll, 904 feet high, with a decided saddle between it and the higher land farther back. A reef with a submerged rock at its outer end, marked by kelp, extends 0.7 mile S of the cape.

(54) Between Capes Atushagvik and Ilktugitak are Kinak and Amalik Bays. **Kinak Bay** is over 8 miles long and about 3 miles wide at the entrance. On the E side of the bay, 1.5 miles NW of Cape Atushagvik, is a low peninsula 0.6 mile long, with a bluff 150 feet high near its end. **Russian Anchorage,** on the N side of the peninsula, has good holding ground, 300 to 500 yards from shore, in 10 to 18 fathoms. Water, except during dry periods, can be obtained by boat. The only directions necessary are to give Cape Atushagvik a berth of about 1 mile and the islands on the SW and the Russian Anchorage peninsula a berth of at least 0.5 mile. The final course into the anchorage should be SE straight toward the middle of the bight. The bottom levels out between 15 to 20 fathoms where large vessels should anchor. This anchorage is completely protected but is subject to williwaws, during northerly blows, with gusts comparable in force to those blowing simultaneously in Shelikof Strait.

(55) The remainder of Kinak Bay is mostly deep. When en route to **Hidden Harbor,** at the head of Kinak Bay, favor the W side of the bay to avoid reefs and rocks awash on the E side. Take care to avoid the rock awash at 58°09.6'N., 154°26.8'W. The entrance to Hidden Harbor is constricted by ledges on both sides. The channel is about 20 yards wide, clear of obstructions, and 2 to 3 fathoms deep at midchannel. The harbor offers good anchorage for small craft. Fresh water is available from a stream on the SW side of the harbor.

(56) **Amalik Bay,** 3 miles W of Kinak Bay, is separated from Kinak Bay by a high peninsula and numerous small islands. Takli Island, the largest of these islands, is in the entrance to the bay. About 0.6 mile N of Takli Island is an inner chain of islands that extend 1.5 miles W from the high peninsula. Small vessels can find excellent anchorage with

good holding ground and protection from any weather in the basin to the N of the chain of islands. Enter Amalik Bay W of Takli Island, and then around the W side of the chain of islands to the anchorage. Avoid the foul areas which extend about 300 yards N from the westerly and northerly islands in the chain.

(57) **Takli Island** is about 2 miles long, and its E part is low, broken, and rocky. At its W end, a hill, 455 feet high, has a sheer drop to the water. A chain of reefs and rocky islands extend 1.5 miles E from Takli Island. Passage between them is dangerous and should be avoided. When navigating between Amalik Bay and Kinak Bay through the passage N of Takli Island, keep to the center of the channel and pass to the N of the islands at 58°04.8'N., 154°25.5'W.

(58) About 3 miles NW of Takli Island at the head of Amalik Bay is **Geographic Harbor.** The middle of the narrow channel leading into the harbor has a least depth of 5¼ fathoms and is clear of obstructions, except for a rock awash and a 2½-fathom shoal off the NE shore at about 58°06.2'N., 154°33.8'W., and 58°05.5'N., 154°32.7'W., respectively. Geographic Harbor is actually two large bays and two narrow fjords that branch from the entrance channel. The bays are separated by two prominent islands. The S bay is deep and offers numerous anchorages. The N bay is shoal on the N and W sides but offers some anchorage for smaller vessels. The fjords are narrow with uneven bottom and should be avoided.

(59) **Cape Ilktugitak** (58°01.5'N., 154°35.0'W.), just SW of Takli Island, is fairly low, but rises rapidly to the high land back of it. Between the cape and Takli Island is a small islet. The passage between this islet and Takli Island is clear. A reef extends from this islet toward the S and SE for 1.5 miles with numerous submerged rocks. Vessels should stay outside the 25-fathom curve when navigating in this area.

(60) The passage between the small islet and Cape Ilktugitak has depths of 5 to 10 fathoms, except for lesser depths over the pinnacles which are scattered throughout the area.

(61) The steamer GOLDEN FOREST was lost on the S side of Cape Ilktugitak in 1929. In 1980, the remains of the steamer were visible on the beach and in the surf in 58°01.6'N., 154°35.7'W.

(62) **Dakavak Bay,** between Cape Ilktugitak and Katmai Bay, is foul along the W side. A foul area that bares is near the center of Dakavak Bay in about 58°02.1'N., 154°41.6'W. Depths from 8 to 23 fathoms are in the E half of the bay. Fair anchorage, but exposed to S and SW winds, can be found in the NE corner of the bay about 0.5 mile from shore in 15 to 18 fathoms, mud bottom.

(63) Vessels transiting between Dakavak Bay and Katmai Bay should stay at least 1.5 miles offshore because the area is foul in places. An extensive foul area with submerged rocks and rocks awash extends 1.5 miles SW of the W point of Dakavak Bay.

(64) **Katmai Bay** is a large roadstead which offers protection fron N, NW, and W weather. In 1980, hydrographic surveys by the NOAA Ship DAVIDSON revealed that the bay has several large submerged reefs with least depths of 4 to 8 fathoms. In the NW corner of the bay, about 0.5 mile offshore, is a reef with a least depth of 2 fathoms, in 57°58.2'N., 155°00.4'W. In the NE corner of the bay is a reef with a least depth of 2¾ fathoms, in 58°00.0'N., 154°50.2'W.

(65) **Katmai River,** its head extending to Mount Katmai before the eruption in 1912, was navigated by launches at high tide to the abandoned village of Katmai. In 1980, the river was choked with pummice which washes down from the higher slopes faster than the stream can dispose of it. Occasional steam and smoke from Mount Katmai volcanic activity can be seen in the area. Strong N winds raise large clouds of pummice which cause a murky haze throughout the area.

(66) The area in the vicinity of Mount Katmai from Cape Douglas to Cape Kubugakli is the **Katmai National Monument.** The most spectacular feature of the monument is the mountain-encircled **Valley of Ten Thousand Smokes** in the NW portion of the reservation. Here the ground is broken open, giving vent to several million fumaroles or little volcanoes, from which rise jets of steam. Some of the jets throw their steam 1,000 feet into the air, and hundreds of others go up to a distance of 500 feet, all merging above the valley into one colossal cloud.

(67) **Kashvik Bay,** just SW of Katmai Bay, offers good anchorage in 10 fathoms or less near the center of the bay. A submerged reef extends about 0.8 mile from the N shore, and scattered rocks are close off the SW and W shores. The entrance and middle of the bay are free of hazards.

(68) **Mount Katmai,** a volcano 6,715 feet high, is part of a high ridge and is not easily distinguishable from Shelikof Strait. In 1912 this volcano gave vent to a violent eruption, the initial stages lasting three days, during which several cubic miles of material were emitted. This eruption was of such violence as to rank in the first order of volcanic explosions. The volcano is now quiet and in its crater is a lake over 1 mile long and about 1 mile wide.

(69) **Mount Mageik,** a volcano 7,250 feet high, is about 10 miles SW from Mount Katmai. It has a more definite summit and can be easily identified from Shelikof Strait.

(70) **Cape Kubugakli,** 83 miles SW of Cape Douglas, is bold and rises rapidly to **Mount Kubugakli,** a prominent mountain with two summits. The 2,920-foot S peak is the higher. The area off Cape Kubugakli is foul and should be given a wide berth.

(71) **Alinchak Bay,** opening S of Cape Kubugakli, is divided into two arms. **Little Alinchak Bay,** the S arm, is shallow with extensive foul areas and should be avoided by those without local knowledge. **Big Alinchak Bay,** the N arm, is an excellent harbor of refuge with protection from all but NE and E winds. The center of the arm has good anchorage in 10 fathoms, mud and fine sand bottom. Depths decrease to 2 fathoms in the NW and SW corners. Vessels should keep 0.5 mile off the N shore of the bay and 0.15 mile off the S shore. The approach to Big Alinchak Bay is from SE on a course midway between the extensive foul area off the mouth of Little Alinchak Bay and a 7-fathom shoal in about 57°48.0'N., 155°13.0'W.

(72) **Cape Kekurnoi,** between Alinchak and Puale Bays, is fairly low, but rises gradually to over 1,500 feet. Reefs and rocky islets extend 3.5 miles S from the SW tip of the cape. There are bad tide rips off these reefs, which is frequently the case along the W side of Shelikof Strait.

(73) **Puale Bay** is open to the S and is only partly protected on the E by the reefs and islets extending S from Cape Kekurnoi. The N shore has low rocky bluffs and small rocky beaches. The W shore has two long sandy beaches separated by a rocky bluff 400 feet high. The SW shore is formed by the bold rocky bluffs of Cape Aklek.

(74) The E and NE sections of the bay have numerous dangerous rocks and reefs. The W part has fairly regular sand bottom. Reefs and kelp-covered rocks extend 0.2 to 0.4 mile off the E side of Cape Aklek.

(75) **Routes, Puale Bay.** –From Shelikof Strait steer a course of **325°** for the highest point on Cape Aklek. When about 2.4 miles off the cape, change course and steer about **015°** through the bay entrance for about 4.5 miles to a point in about 57°42'N., 155°31'W. From this point, the vessel can

proceed to a variety of anchorages in the inner bay. By steering **338°** for 4.5 miles the vessel will find anchorage near the head of the bay in 10 fathoms on even sand bottom. If seeking shelter from S winds and seas, the vessel may run 2.5 miles on course **276°** to anchorage in 10 fathoms. Protection from E to N winds may be found by steering **075°** for 3 miles to anchorage in 12 fathoms, taking care to avoid the 3½-fathom rock in 57°43'N., 155°27'W.

(76) There are no satisfactory ranges for entering the bay but they are unnecessary. Cape Aklek can be approached with safety on any heading between **305°** and **020°**. The channel between the 10-fathom curves at the entrance to the bay is over 2 miles wide.

(77) Fishing craft sometimes enter the bay from the E, using a narrow channel between the mainland and the S rocky islets. This channel has a least depth of 6 fathoms but is only about 350 yards wide, is bordered by kelp-covered rocks, and has a 4-fathom rock near its outer end.

(78) Anchorages in Puale Bay are indifferent to poor. There is no protection from SE weather. S swells enter the bay a large part of the time and increase in size in the shoal water. Williwaws are frequent. Even in W weather the winds funnel through the low passes to the W of the bay with greater velocity than that encountered in Shelikof Strait.

(79) **Cape Aklek,** the most prominent headland in the vicinity, rises to 1,877 feet within 0.6 mile of the shoreline in a series of bare slides, bluffs, and cliffs. Two large rocks about 75 feet high are off its S and SE shores, but they are inconspicuous from seaward against the rocky background of the cape.

(80) **Dry Bay** is between Cape Aklek and Cape Unalishagvak. As the name implies, the entire inner bay bares at low water. The outer bay has a rocky, irregular bottom. Here again williwaws are frequent and W winds are increased in violence in the low passes to the W.

(81) **Chart 16570.–Jute Bay** is between **Cape Unalishagvak** and **Cape Kanatak.** The part inside **Jute Island** is called **Island Bay**. Reefs marked by kelp and breakers extend SE from Jute Island and WSW from the E side of Island Bay to about halfway to Jute Island; both reefs tend to break the swells during SE winds. The channel between the reef extending WSW and the island has depths ranging from 11 to 5 fathoms. The channel W of Jute Island has depths of 1¼ to 5 fathoms, but its S end is obstructed by rocks and reefs extending SW from the island, and its use is not recommended except by boats with local knowledge. A 2¾-fathom shoal is 0.7 mile SW of Jute Island. Indifferent anchorage, sheltered except from SE winds, can be obtained N of Jute Island in Island Bay.

(82) As in all of the bays in this vicinity, the williwaws are violent with W winds and are very troublesome, if not dangerous, to small craft.

(83) **Portage Bay,** between Cape Kanatak and Cape Igvak, is clear except for reefs and rocks about 1 mile from its head. The bay is open to SE winds and is subject to NW winds, which draw down from the mountains with great force.

(84) A kelp-covered reef extends 0.5 mile SW from **Kelp Point.** Just off the reef and separated from it by a narrow channel is a rock, covered ¼ fathom, leaving a clear channel 0.2 mile wide W of it for entering the inner part of the bay.

(85) The best anchorage is in depths of about 5 to 10 fathoms SE of the ¾-fathom rock; coasting vessels sometimes use the inner anchorage NW of the rock. The anchorages are subjected to violent williwaws with W weather, and at such times the inner anchorage should not be used. The wind is apt to shift from NW to SE with little warning. In such cases, launches make for Kanatak Lagoon for shelter.

(86) Vessels with passengers or freight usually anchor as far in as their draft permits. With NW winds there is but little swell.

(87) **Kanatak Lagoon,** on the W side of the bay about 3.5 miles from the head, has a narrow entrance with less than 4 feet at low water, but has depths of 4 to 15 fathoms, mud bottom, inside. It affords excellent anchorage in E weather, but is a maelstrom with NW winds. Under such conditions the williwaws blow with almost hurricane force, and the water level at the E end is higher than that at the W end.

(88) In approaching Portage Bay from Shelikof Strait, keep a careful track of the reckoning, as the various headlands are similar and the bay is difficult to recognize from a distance. Enter on a midchannel course and, if bound to the inner anchorage, pass 200 yards SW of the ¾-fathom rock, then head N and anchor as desired.

(89) **Cape Igvak** (57°26.1'N., 156°01.3'W.), a conspicuous headland separating Portage and Wide Bays, is the S extremity of a ridge of mountains rising 2,000 to 2,600 feet, and covered with clouds most of the time.

(90) **Wide Bay,** between Cape Igvak and Cape Kayakliut, is obstructed across the entrance by many islands which are surrounded by foul ground.

(91) In August 1983, a 3-fathom shoal was reported about 5.5 miles E of the islands in about 57°20'37"N., 156°06'54"W. The preferred entrance to the inner bay for deep-draft vessels is through a 300-yard-wide channel between **East Channel Island** and **Channel Rock;** the channel has a least depth of 9 fathoms. Rocks and reefs, marked by kelp and usually breakers, extend almost 1.5 miles SE and 0.3 mile N of Channel Rock. Foul ground extends almost 2 miles NE and 0.2 mile S of East Channel Island. Small shallow-draft vessels may enter the inner bay between **Terrace Island** and **West Channel Island** or between **Hartman Island** and the unnamed islet 0.4 mile SW. Ledges and shoals surround the islands, and in the channel between Terrace and West Channel Islands a distance of 175 yards should be maintained off the SW side of West Channel Island; a midchannel course should be maintained in the channel between Hartman Island and the unnamed islet. Passage elsewhere should not be attempted without local knowledge. Moderate rip currents have been observed in all the entrances to Wide Bay during maximum currents. Once inside the inner bay, secure anchorage in any weather is available in 5 fathoms to more than 20 fathoms, excellent holding ground. The williwaws are disagreeable with W winds but are not dangerous to moderate-sized vessels. Small craft can anchor in the lee of the islands.

(92) The ruins of an abandoned pier, causeway, and oil drilling platform are about midway on the W side of Wide Bay. In 1971, it was reported that only about a 150-yard inshore section of the pier remained. The abandoned oil drilling platform, about 0.3 mile offshore, was reported to be about 3 feet in diameter and to stand about 15 feet above the water. Mariners are advised to navigate with caution in this area.

(93) **Local magnetic disturbance.**–Differences of as much as 14° from the normal variation have been observed on Terrace Island and as much as 3° on East Channel Island.

(94) **Chart 16568.**–Small-craft inshore route between Wide Bay Bay and Sutwik Island has many dangers; mariners are advised to used caution when navigating this area.

(95) **Cape Kayakliut** (57°17.7'N., 156°18.9'W.), on the S side of Wide Bay, has a generally flat appearance, sloping smoothly back to the mountains. The shoreline is formed by

low, steep cliffs and close to the point is a prominent grass-topped island.

(96) **Imuya Bay** is 4 miles S of Cape Kayakliut. A group of islands is in the NW corner and a shoal area with a least depth of ½ fathom extends about 2.8 miles ENE from the S point of the entrance. Depths shoal gradually from 17 fathoms inshore from a line between the N and S points to 5 fathoms at a point 0.4 mile from the center of the sand and gravel beach which heads the bay. The area close-to and between the islands is shoal and foul, and the area between the largest island and the mainland to the N and W is mostly bare at lower low water. A large stream enters the bay at the W end of the sand and boulder beach at the head.

(97) The wreck of a large vessel is against the shore W of the islands at the S point of the bay.

(98) To enter Imuya Bay from the N, follow the trend of the shoreline from the N point around the islands, keeping the islands at least 0.4 mile on the starboard hand, and thence midway between the islands and the S shore to the head of the bay. Indifferent anchorage can be had for small craft in 5 fathoms, hard, fine sand bottom, 0.4 mile from the beach at the head of the bay.

(99) In entering the bay from the S, care should be taken to avoid the shoal area extending about 2.8 miles ENE from the S point of the bay.

(100) **Kilokak Rocks,** two rocky islets, are about 2 miles offshore and just SE of Imuya Bay; the 30-foot NW rock is the higher. The area W of these rocks is clear for 1 mile toward the shore. Depths of 15 fathoms or more can be carried to within 100 yards of the N, W, and S sides of the higher rock. A shoal area extends 0.1 mile SE of the smaller islet.

(101) A rock, that uncovers about 6 feet, is 1.3 miles NW of Kilokak Rocks. This rock marks the SE end of a foul area that extends inshore to a group of reefs and islets near the shoreline.

(102) **Agripina Bay,** 12.5 miles SE of Cape Kayaklut, is a deep indentation with a generally low but bold rocky shoreline indented with numerous small bights and clefts. The N and S points forming the entrance are marked by groups of small steep rocky islands; a larger group of very prominent islands and rocks, near the S central part of the bay, roughly divides the outer and inner parts of the bay. A large shoal area, with a least depth of 3 fathoms, is about 0.5 mile N of the E end of the largest island.

(103) Anchorage for large vessels can be had in 16 to 18 fathoms in the W end of the outer bay about 0.3 mile N of the islands and 0.3 mile from the W shore. This area is protected from all but NE to SE weather. One of the best small-boat anchorages along this section of the coast is in the bight at the head of the inner bay, midway between the E and W shores, in 5 to 11 fathoms, sticky, mud bottom. No swell makes into the bight even in heavy weather, and there are no williwaws even in strong winds. NW of the bold rocky hill which forms the W side of the bight, is an extensive gravel flat bare at low water except for the shallow delta channels of a large stream that enters the bay at this point.

(104) The only danger in the inner bay is a reef near the W side. The outermost part of this reef is about 350 yards off the W shore and about 400 yards S of the anchorage. The area between this reef and the prominent point about 800 yards S of the anchorage has several submerged rocks.

(105) The coastline from Agripina Bay to Port Wrangell is very broken, with many indentations and small inshore islands. The area is rocky and foul within 400 yards of the beach. Outside the small islands, some pinnacle rocks exist. Kelp extends 500 yards SE from the point 0.5 mile SSW of Agripina Bay.

(106) Offshore are numerous rocks and islands.

(107) **Ashiiak Island** is high and rocky with a rounded central dome. The W side has sheer cliffs to the waterline and the water is deep close inshore. The E side of the island appears foul, with small islets extending 0.3 mile offshore and with one submerged rock, that breaks in heavy weather, about 0.7 mile offshore. A small rocky islet about 10 feet high is 400 yards W of the island. A rock, that uncovers about 8 feet, is 0.9 mile SW of Ashiiak Island. Another rock, that uncovers, is about 150 yards to the E. In a moderate swell these rocks break at high water.

(108) **Port Wrangell,** 7 miles SW of Agripina Bay, is a deep, narrow indentation in the coastline. The outer bay, open to the SE and E, has depths in midchannel ranging from 130 fathoms at the entrance to 14 fathoms at the inner end. The shoreline is steep and rocky.

(109) The inner bay has depths from 10 fathoms near the entrance to 5 fathoms at the head. The shoreline rises steeply all around the bay and there are often williwaws on strong NW winds. The ground swell does not make into the inner bay.

(110) About 500 yards inside the inner bay on the E shore is a small stream, dry during extremely dry weather, where small craft can come close alongshore and take water aboard with 200 feet of hose at about 30-foot head.

(111) E of Port Wrangell is a group of three large islands. **David Island,** the most N and largest of the group, is high and bold with steep rocky sides marked by numerous caves and clefts. Two small, rocky islets are close inshore on the N side.

(112) **Lone Rock,** 1 mile NE of David Island, is about 100 feet high, of a distinct brick red color, and with vertical or slightly overhanging cliffs on the W end that rise to a flat grassy top.

(113) **Poltava Island,** 0.8 mile SE of David Island, has the same general appearance as David Island but is smaller and lower. The passage between David and Poltava Islands is not recommended without local knowledge. In December 1987, a 5-fathom spot was reported about midway between David and Poltava Islands in about 57°01′52″N., 156°28′52″W.

(114) **Navy Island,** the most S and smallest of the group, is 0.4 mile SE of Poltava Island. Several detached rocks or islets extend 600 yards W from the main island. The passage between Poltava and Navy Islands is not recommended without local knowledge. Thick kelp and foul ground are between Navy Island and a low rock 400 yards to the NE.

(115) **Cape Providence,** 3 miles S of Port Wrangell, is fairly low with a steep rocky shoreline and many small indentations. A group of five rocky islets extends SE about 0.6 mile from the tip of the cape. Submerged rocks extend about 0.6 mile N and NE of the islets.

(116) **Chiginagak Bay,** between Cape Providence and Cape Kuyuyukak, is 6 miles long, 10 miles wide between the capes, and 2 miles wide at the inner end. The outer bay has scattered groups of rocks and small islands, and a group of four larger islands is along the W shore. In 1989, numerous uncharted shoals, covered rocks, and foul areas were reported to exist throughout the northern and eastern parts of Chiginagak Bay.

(117) Offshore from the bay and 5 miles S from Cape Providence is a prominent group of islets known as the **Aiugnak Columns.** The highest islet rises to about 102 feet. The areas immediately surrounding the columns are extremely complex, particularly the area NE of the highest islet. Vessels should give them a wide berth. A surface current of about 2 knots often sets to the NE in the vicinity of the columns.

(118) **Devils Finger** (56°52'10"N., 156°37'27"W.), about 2.5 miles SW of Aiugnak Columns, is a narrow rock pinnacle covered 1 fathom rising abruptly from general depths of 20 fathoms.

(119) A group of four major islands and numerous islets, about 3 miles NW of Aiugnak Columns, cover an area approximately 1 mile by 0.5 mile. The islands are about 50 feet high, generally flat, and covered with grass. Ledges and foul area extending as much as 0.3 mile offshore surround the Islands.

(120) An extensive foul area surrounding several islets is about 4 miles NNW of Aiugnak Columns. An isolated rock that uncovers about 7 feet is 0.7 mile NW of the center of this foul area.

(121) The inner part of Chiginagak Bay, about 2 miles square, is separated from the outer part by **Derickson Island,** 1.2 miles long and 0.3 mile wide, between a bold headland on the E and a low rocky point on the W. A smaller island is 1.1 miles due N from the 300-foot peak of Derickson Island. Large vessels enter the inner bay from Cape Providence, passing E of Derickson Island.

(122) In November 1988, a rock covered 1¼ fathoms was reported 1.2 miles SSW of the S end of Derickson Island.

(123) At the head of the bay is a flat sand and gravel beach that bares 200 to 400 yards offshore at low water. A large unnavigable stream enters the head of the bay on the W side over a broad sand delta, bare at low water. Two smaller streams enter the NE corner W of a prominent rocky headland distinguished by several small caves at the high-water line. A ledge showing considerable area at low water is just E of the delta. Several pinnacles on this ledge bare at high water.

(124) Anchorage for vessels of any size can be had in the inner bay. In moderate weather from any direction, or in heavy weather from the W, N, or E, the best anchorage is 0.2 to 0.5 mile SW of the rocky point E of the beach at the head of the bay. Depths are 8 to 11 fathoms, sand or mud bottom, good holding ground. Williwaws have been experienced in the bay on N winds. They generally blow out of the valley leading NW to **Mount Chiginagak**. In S weather, better shelter can be found 500 yards N of Derickson Island in 13 fathoms. In moderate S weather very little swell makes into the anchorages.

(125) **Cape Kuyuyukak** (56°54.0'N., 156°50.0'W.), between Chiginagak Bay and Nakalilok Bay, is bold and prominent with high grassy hills sloping steeply to sheer cliffs at the beach. Numerous rocks and islets are close inshore S of the cape, and a chain of reefs extends 2 miles E from the cape. S of the reef, a shoal area extends for 1.3 miles with numerous kelp patches.

(126) **Radial Island,** about 5 miles SSE of Cape Kuyuyukak, is a bare rock about 100 feet long, 50 feet wide, and 60 feet high. There are indications of shoal areas about 1 mile NW of the island.

(127) **Ugaiushak Island,** 6 miles S of Cape Kuyuyukak, is really a double island with a narrow, low boulder ridge connecting the two parts. The W part of the island is high, with a broken skyline and very tall, steep cliffs on the W and N sides. The E half is much lower, flat on top, with sheer cliffs to the shoreline on the N and W, and a gradual slope to a low and rugged shoreline on the E. A group of buildings is at the W end of the ridge.

(128) A narrow chain of reefs about 0.5 mile long is 1.4 miles S of Ugaiushak Island. The SE reef is marked by two pointed rocks about 60 feet high and the NW reef by a single point about 25 feet high.

(129) **Central Island,** midway between Ugaiushak Island and Nakalilok Bay, is a small but very prominent island with a single high peak shaped like a conical beehive. A small rocky islet is 200 yards S of the larger island.

(130) The southernmost of a second group of islands is 4 miles due W from Ugaiushak Island. On the N are 3 small rocky islets; in the center is an island 1.1 miles long and 0.2 mile wide, with grassy top and steep rocky shoreline; on the S is a large, high island, 0.6 mile long and 0.1 mile wide, with very high vertical cliffs to the waterline. Depths obtained around these islands were 15 to 18 fathoms, very smooth sand bottom, but the formation of the islands suggests hidden dangers. Shoaling to 4½ fathoms exists on the SW side of the northernmost islands.

(131) Five miles ESE of Cape Kunmik is **Hydra Island,** large and flat-topped, 0.5 mile long and 0.2 mile wide, and with a small, rocky islet 300 yards to the N. A shoal area 2 to 3 miles to the S of Hydra Island has a least depth of 5E fathoms. Shoaling occurs about 0.5 mile E of the island with a least depth of 5½ fathoms. Shoaling also occurs about 4 mile SW of Hydra Island with depths of 5¾ fathoms.

(132) **Nakalilok Bay** is divided into an E and W part by a low double-headed cape. The E part is 4 miles long, 3 miles wide at the entrance, and 1.5 miles wide at the head that terminates in a low sandy beach. The bay is generally deep except for a small shoal area marked by kelp, 1.5 miles E of the double-headed cape, and for a shoal area that extends 0.4 mile E from the same cape. The W shore is a boulder and ledge beach backed by steep cliffs. The E shore is boulder strewn near the entrance, with gravel toward the head, and is backed by very steep hills. A very prominent waterfall is 2 miles from the head of the bay on the E side. This section of the bay affords good shelter for small craft except in heavy S weather. The anchorage is in 7 to 9 fathoms, sand bottom, 600 yards offshore from the E end of the sand beach at the head of the bay. Large craft can anchor in 10 to 15 fathoms about 0.5 mile offshore.

(133) The W part of Nakalilok Bay has a long stretch of sand beach, shaped like a flat crescent, that is between the double-headed cape and the N point of Yantarni Bay. Very smooth and flat, the beach is backed by low grassy dunes on the W half. The bottom off this beach is of fine sand and is unusually smooth and flat, with no indications of submerged reefs. Depths vary from 5 fathoms 0.4 mile offshore, to 18 fathoms 1.6 miles offshore.

(134) **Yantarni Bay,** on the E side of Cape Kunmik, is about 2.5 miles wide at the entrance and 4 miles long. The E side of the bay is a low cape with a very flat top and vertical cliffs of an unusual red-yellow color dropping sheer to the high-water line. A narrow reef extends 400 yards S. The head of the bay has depths of less than 1 fathom, and is not recommended for anchorage.

(135) **Cape Kunmik** (56°46.5'N., 157°10.0'W.), high and bold, is one of the most prominent capes along this section of the coast. A prominent waterfall, 40 feet high, is on the S end of the cape. The highlands are rounding in contour, covered with grass and alder patches on the lower slopes and prominently marked by deep gullies. The shoreline is formed by vertical cliffs 20 to 400 feet high and deeply indented with small bights and clefts. The beach is generally foul and boulder strewn, with submerged rocks, reefs and small rock islets extending 200 to 900 yards offshore. There are no known dangers farther offshore other than the visible islets.

(136) The southernmost tip of the cape is a small semidetached rocky island with very steep sides terminating in a wedge-shaped rock about 70 feet high. About 600 yards NE of this point and close inshore is a detached islet of very

striking appearance. As viewed from the S and E, it resembles a cathedral, with a single central spire about 200 feet high on the S face, and a lower rounding dome on the N. In sunlight this formation stands out prominently against the black cliffs behind.

(137) Six hundred yards off the SE side of the cape is a small islet, 70 feet high, with vertical black rock sides and a smooth turtleback top of grass. A low reef is 200 yards SE, and submerged rock is 500 yards E of the islet. The area between the islet and the cape is foul and thick with kelp. A submerged rock, covered 1 foot, is about 3.8 miles S of the cape in about 56°42.6'N., 157°08.5'W.

(138) **Amber Bay,** large and open, is just W of Cape Kunmik. The outer part of the bay has moderate depths and regular bottom except for ledges and reefs alongshore, and the inner half is shallow, with numerous reefs and kelp patches. Being exposed, the bay is not recommended for anchorage, but emergency anchorage for small craft can be obtained in 3½ to 6 fathoms, sand and shell bottom, under the NE shore just NW of a long reef awash at high water. The reef is 3.2 miles NW of the prominent beak-shaped cliff that marks the S tip of Cape Kunmik. The bight inshore from the reef is foul with rocks, bare at various stages of the tide. There is a reef that uncovers 1½ fathoms on the NW shore in about 56°49.7'N., 157°26.9'W.

(139) **Eagle Island** and **Garden Island,** separating the entrances to Amber and Aniakchak Bays, are grass-covered, table-topped formations, with sheer cliffs on all sides. Eagle Island is nearly round and Garden Island is crescent-shaped. A large breaker is just SE of the line between Eagle and Garden Islands. From the N point of Garden Island is a sand and gravel spit extending toward **Cape Ayutka,** which divides Amber and Aniakchak Bays. S and W of the cape is an extensive foul area marked by kelp. The passage between Garden Island and Cape Ayutka should be avoided until it has been surveyed. At the S end of Garden Island are two prominent pinnacles, the outermost is needle shaped. Good anchorage for small craft can be obtained close under the shore on the W side of Garden Island in 7 to 10 fathoms, sandy bottom. Shoaling to 7½ fathoms exists 4 miles SE of Garden Island in about 56°42.2'N., 157°12.4'W. Shoaling to 1½ fathoms exists between Garden Island and Cape Ayutka in about 56°44.9'N., 157°24.0'W.

(140) **Aniakchak Bay,** wide and open, is entered between Garden Island on the N and Kumlik Island on the S. Reconnaissance examination indicated moderate and regular depths to the steep sand and gravel beach at its head. Along its N shore, for about 1.5 miles W of Cape Ayutka, foul area marked by kelp, extends 200 to 800 yards offshore. Two rocks awash are SW of Cape Ayutka, 0.8 and 1.7 miles, respectively. In the NW corner of the bay is a small island, 82 feet high, with vertical cliffs along its E side. Immediately NW of this island, in the restricted area between the island and the mouth of a river, cannery tenders and barges moor to piling in favorable weather, but a SE swell piles up in this anchorage.

(141) Along the S side of the entrance to the bay (see chart 16566) and about 1.2 miles NNW of Kumlik Island is a prominent flat-topped pinnacle rock, 85 feet high. SE of this rock 0.4 mile is a breaker marked by kelp, and about 400 yards off the N point of Kumlik Island are two small rocks, close together, 3 feet high. Between the breaker and the small rocks is a deep channel. SW of the pinnacle rock about 0.4 mile, is another breaker, marked by kelp; and W of the pinnacle about 0.4 mile is a 3-fathom spot marked by kelp. A prominent headland, locally known as **Elephant Head Point,** is 1.3 miles NW of the pinnacle. Rock ledges extend N and E about 400 yards from Elephant Head Point. Leading to Aniakchak Bay from the S is a channel between Kumlik Island on the E and Cape Kumlik on the W, thence between the prominent pinnacle rock on the E and Elephant Head Point on the W. This channel is used by cannery tenders operating out of Chignik, but is not recommended for general use without local knowledge.

(142) About 1.2 miles NW of Elephant Head Point is a low, rock-cliff point with a rock awash at high water about 300 yards to NE. In the slight bight just W of Elephant Head Point temporary anchorage can be obtained in 8 fathoms.

(143) Vessels can select anchorage in 12 to 20 fathoms in the SW, W, or NW parts of the bay about 0.6 to 1.5 miles from the sand and gravel beach. The bay is protected from the SW through W to N. E and SE swells pile up heavily in this bay.

(144) **Sutwik Island,** about 7 miles off the Alaska Peninsula and about 90 miles SW from Kodiak Island, is 12 miles long and 4 miles wide. The S side of the island, low and marshy in places, is very foul for 1 mile from the beach. The N side has steep shores and is foul along an 8-mile stretch of shore W from Foggy Cape. This stretch should be given a berth of not less than 2 miles in passing. Shoaling to 2¾ fathoms exists up to about 3.5 miles NW of Sutwik Island.

(145) NW of Sutwik Island is a deep channel that leads between visible rocks, one near shore and the other about 2 miles off. Small-vessel anchorage, protected from S to SW winds, can be had in the small bay on the N side of Sutwik Island about 9 miles from Foggy Cape.

(146) An anchorage, 3.5 miles from the NW tip of the island, is in a cove just E of a very prominent rock about 75 feet high and 600 yards off the shoreline. This rock has a square blocklike appearance, and is the largest rock off the N coast. Anchor in 5 fathoms, smooth sand bottom, with a kelp patch around rocks bare at low water bearing 225°, 300 yards, and a similar patch bearing 135°, 300 yards. This anchorage furnishes good shelter in SE to W weather, but is poor in E weather.

(147) An excellent anchorage for small craft in E or NE weather can be found in a small bight 1 mile off the NW tip of the island. The N side of this bight is a narrow point with steep rocky sides and a flat grassy top. Two hundred yards SW of this point is an islet of very striking appearance, because of its flat base and cylindrical rock, about 70 feet high and 150 feet broad. Reefs and kelp extend from the rock to the shoreline.

(148) To enter the anchorage from the W, keep the rock 200 yards on the port hand, proceed until 300 yards from the beach, and anchor in 5 fathoms, hard sand bottom. Current and rips, encountered 0.3 to 0.5 mile offshore, do not make into the anchorage. A vessel of 140 tons rode out a 30- to 40-knot E wind in this anchorage without dragging and with no swell although seas were running high 0.5 mile offshore.

(149) **Foggy Cape,** the E end of Sutwik Island, is a prominent landmark for vessels passing along the coast. It rises to 418 feet, and is first raised as a detached island because of a low neck of land that separates it from the rest of Sutwik Island. No sounding has been done around the cape, but tide rips have been observed, and mariners are advised to give it a wide berth. Foggy Cape and the S side of Sutwik Island are often covered with fog when the N side is clear. Blankets of fog have been observed when the entire outline of the island was indicated without any part of it being actually visible.

(150) The current velocity is about 1.5 knots off Foggy Cape.

(151) A vessel drawing 10 feet reported striking a rock about 3 miles S of Foggy Cape. In 1943 and 1952 soundings were taken in the area, but the reported rock was not found. Vessels should stay clear of the area until the obstruction is definitely disproved.

(152) **Chart 16013.**–The **Semidi Islands** are about 90 miles SW of Kodiak Island, and about 23 miles SE of Foggy Cape.

(153) **Aghiyuk Island,** the N of the group, is long and narrow and rises vertically from the shoreline in high rocky cliffs, that are practically unscalable, especially along the W side of the island. In the S center of the island is a grassy plateau, with a prominent rockpile, the highest point on the island, rising to over 1,000 feet.

(154) On the E side of the island is a fair-sized bight, with a sandy beach that is clear except near its N end, where kelp-marked rocks extend offshore. E of the bight, about 1 mile offshore, is small sheer-sided **Aghik Island,** 528 feet high. Scattered ledges and rocks extend about 500 yards off the SE point of Aghik Island.

(155) Anchorage can be had 400 to 600 yards off the bight in 10 to 15 fathoms, sand bottom. It can be safely approached from the NE, passing Aghik Island about 600 yards off; or from the SE on a midchannel course between Aghik Island and Aghiyuk Island.

(156) A small group of rocks is 500 yards W of the SW point of Aghiyuk Island. The highest has an elevation of 20 feet.

(157) **Chowiet Island,** the S large island, is triangular in shape, and has sheer cliffs alongshore, especially on its W side. It reaches a height of 810 feet near its W side, slightly N of its center. The island has alder- and grass-covered ridges with many bedrock outcrops and cairn-shaped rockpiles. Some of the latter are very large, and in various odd forms.

(158) At the S end of Chowiet Island is a small bay formed by a chain of low rocks and two steep-sided islets extending SE; **Aliksemit Island** is the largest. The S shore of Chowiet Island is a Steller sea lion rookery site. There is a 3 mile vessel exclusionary buffer zone around this rookery which encompasses most of the island and islets off shore. (See **50 CFR 227.12,** chapter 2, for limits and regulations.) In emergency situations anchorage, with about 200 yards swinging radius, can be had in the N center of the bay in 20 fathoms, sand bottom. This bay is protected from SW through W to NW.

(159) A double bay is on the NW side of Chowiet Island which also offers emergency anchorage in the center of the E arm in 10 fathoms, sand bottom. This anchorage is most favorable for winds from the NE and around through E to SE, but a SW swell creates considerable surge. Additional and emergency anchorage can be had in the center of the W arm in 22 fathoms, sand bottom, and provides about 250 yards swinging radius and is favorable for winds out of the E and around through S to SW. This anchorage is less subject to surge with a SW swell than in the E arm.

(160) **Kateekuk Island,** 0.6 mile NW of Chowiet Island, is 0.8 mile long, 0.4 mile wide, and 509 feet high. Between this island and Chowiet Island to the S, and Aghiyuk Island to the N, are strong tidal currents, that cause very bad tide rips.

(161) **Anowik Island,** 591 feet high, and **Kiliktagit Island,** 404 feet high, are about 1.2 miles NE of the N end of Chowiet Island. Between these islands and Chowiet Island are strong currents that cause moderate tide rips; a heavy SE swell piles up excessively.

(162) **Suklik Island,** 345 feet high, is about 0.9 mile S of Kiliktagik Island and about 1.2 miles E of Chowiet Island. A low flat rock is about 150 yards off the NW end of the island, and numerous sheer pinnacles extend S about 0.5 mile.

(163) **South Island,** 2 miles SW of Chowiet Island, is a huge bare rock, 260 feet high, with vertical sides. Several high, sheer rock pinnacles are just W of it. The breaker charted about 5.5 miles WSW of Chowiet Island is reported to be much closer to the island.

(164) A few reconnaissance sounding lines indicate deep water adjacent to the islands and clear channels between them. Strong tidal currents and bad tide rips are found among the Semidi Islands, especially in the channels, between Aghiyuk and Kateekuk; and between the latter island and Chowiet.

(165) **Chart 16013.–Lighthouse Rocks** (55°47′N., 157°25′W.) are spread over an area 0.2 mile in diameter that is 27 miles SW of Chowiet Island and 57 miles W of Chirikof Island; the largest rock is 500 feet long and 90 feet high. Deep water surrounds these barren rocks and they can be safely approached to within 0.5 mile; there are large sea lion rookeries on the rocks. A S set is generally experienced between Lighthouse Rocks and Chirikof Island. A rock awash (reported) is charted 11 miles SE from Lighthouse Rocks.

(166) **Chart 16566.–Cape Kumlik** (56°38.0′N., 157°27.0′W.), the promontory on the Alaska Peninsula nearest to Sutwik Island, is foul with ledges and reefs along its S shore. Near the E end of the S shore and extending 0.5 to 1 mile S is a group of rocks and islets. The S islet, narrow and about 400 yards long, is 81 feet high; it is a valuable landmark for the approach to the channel between Cape Kumlik and Kumlik Island. From the SW point of Cape Kumlik, ledges and reefs, that break in a heavy swell, extend 2.8 miles SW and obstruct the NE side of the entrance to Kujulik Bay.

(167) **Kumlik Island,** 0.8 mile off the E end of Cape Kumlik, is 1,053 feet high. The shores are steep and rocky; reefs border its N, E, and S sides. About 3 miles E of the island (see chart 16013) is a lone high water rock. Midway between Kumlik and Sutwik Islands is a rock that bares at half tide, and about 1 mile to the E, are three rocks that bare 3 feet at high water. From the SE end of Kumlik Island on a bearing of 204°, and at distances of 2 and 3 miles, respectively, are a rock awash at low water and a rock 55 feet high. The latter is particularly valuable as a landmark for the passage E of Kumlik Island.

(168) **Kujulik Bay,** entered about 14 miles W of Sutwik Island, is a large open bay that affords good shelter in NW winds. Reefs and rocks fringe the shores of the bay and the entrance is flanked by reefs on each side. The W arm of the bay is shoal for 8 miles from the head. The best protection is in the N part of the bay.

(169) **Unavikshak Island,** off the entrance to Kujulik Bay, rises to 465 feet near its N side, and is used as a fox ranch. Numerous rocks and reefs fringe the shores. Two rocks, 25 feet high, are 1.5 miles S of the island. The W rock is conspicuously flat-topped. The passage between the rocks and the island is deep and free of obstructions. A smaller island, 153 feet high, is off the NE point of the island. Anchorage can be had on the NW side of the island in 15 fathoms, hard rocky bottom.

(170) **Cape Kumliun,** S of Kujulik Bay, is a broad bold headland rising to a 1,671-foot peak near the SE part of the cape. This peak is the most conspicuous object in the vicinity, but is often covered by clouds. The cape is foul with reefs and rocks extending 1 mile offshore at its E point.

Some of these dangers do not break even at low water and may not be marked by kelp.

(171) **Chignik Bay,** about 50 miles W of the Semidi Islands, can be entered from either N or S of Nakchamik Island. The S part of the bay is irregular but deep. Important salmon fisheries are in Chignik Bay.

(172) **Nakchamik Island** is an irregular-shaped island in midentrance to Chignik Bay. The conical peak, 1,450 feet high, in the S central part of the island is a distinctive landmark and prominent from all directions except through an arc of about 90° around the S part of the island, where other mountains obscure it.

(173) The bight on the E side can be used as an anchorage. Enter the middle of the bight and anchor in 12 fathoms, sand bottom. The N end of the island is steep-to, and no anchorage is afforded. The W point is fringed with reefs extending about 300 yards offshore. There are no off-lying dangers.

(174) **Kak Island,** 1.3 miles S of Nakchamik Island, is 400 feet high, bold, and generally reddish or grayish in color, with grassy patches on the gentler slopes. The S bluffs are of marked columnar structure. The island has deep water on all sides and can be approached close-to.

(175) **Atkulik Island,** 3 miles SE of Nakchamik Island, is about 0.8 mile long and 0.6 mile wide, and 725 feet high with precipitous shores on its S side. It has no anchorages. Two detached rocks, one about 25 feet high and the other about 35 feet high, are at the NE and SE ends, respectively, of Atkulik Island. A small rock awash is close off the W side.

(176) **Castle Cape,** on the S side of the entrance to Chignik Bay, is narrow and precipitous; stratification is a conspicuous feature of many shades of light-colored rocks varied by bands of black. The cape has been worn into many curious castellated pinnacles and buttresses, hence its name.

(177) A pair of towering eminences near the end of Castle Cape reach 1,200 feet and form a most distinctive feature. Between the towers are needle peaks of lesser elevation.

(178) **Castle Bay** is deep, with mud or clay bottom, and presents no known outlying dangers. Small boats can anchor along the S shore of the bay about 4 miles W from Castle Cape, where the bottom and shore slope gradually to a sand and gravel beach. The remaining shore rises almost vertically from the water. Grass and some scattering alders are the only vegetation.

(179) **Anchorage Bay** is W of the fourth ridge from Castle Bay, the ridges forming a succession of headlands on the S shore of Chignik Bay. This ridge terminates in vertical bluffs about 200 feet high, and rises to a rounded hill, 1,050 feet high, that is covered with grass and alders. The ridge W of Anchorage Bay is irregular in form, with bluffs at the water. Off the W point are **Eagle Rock,** a large grass-covered rock, 100 feet high, connected with the shore at low water, and a lower rock, 30 feet high, 100 yards farther out. A shingle spit extends SW from the E shore.

(180) **Chignik Spit Light** (56°18.6'N., 158°22.9'W.), 35 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the end of the spit.

(181) Anchorage Bay is easily recognized, and when nearly abreast of it the smokestacks of the cannery show over the shingle spit. In entering, give the spit a fair berth. In thick weather care should be taken to avoid entering Mud Bay by mistake. By following the S shore of Chignik Bay little difficulty should be experienced.

(182) Anchorage is good throughout most of Anchorage Bay, but dragging can be expected during the heavy winds and williwaws prevalent here. If the anchor is on the bottom long some difficulty may be experienced in weighing. Care should be used in anchoring at high tide, for the flats make out for a distance and drop off sharply. An anchorage for small craft is on the E side of the bay near the sandspit, with soft mud bottom; however, this anchorage should be used with caution because of the possible existence of an old wreck (uncharted) that is likely to foul an anchor.

(183) **Chignik** is a fishing settlement at the head of Anchorage Bay. The cannery at the village has been abandoned and the wharf is in bad condition. The mail steamer from Seward makes regular calls.

(184) Peter Pan Seafoods Company has a wharf about 0.2 mile W of the village. The wharf has a 63-foot face with a reported depth of 26 feet alongside. An opening in the center of the wharf has a lift for small craft. The cannery of the Alaska Packers Association, 0.7 mile W of the village, has two wharves. The W one has a 62-foot face with depths of 18 feet alongside, while the E wharf, about 90 feet distant, has a 50-foot face with depths of 21 feet alongside. Vessels of over 16-foot draft should approach the wharf bow-on and maneuver alongside. On both sides of the wharves is a line of dolphins. There are depths of 8 fathoms 50 feet off the dolphins.

(185) Radiotelephone and radiotelegraph communications are maintained.

(186) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(187) The Alaska Peninsula is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(188) Vessels using Southwest Alaska Pilots Association pilots and en route to Chignik can meet the pilot boat about 1 mile N of Chignik Spit Light (56°18.6'N., 158°22.9'W.).

(189) The pilot boat can be contacted by calling "CHIGNIK PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(190) **Mud Bay,** shallow and of no commercial importance, is filled with eel grass that interferes with the operation of launches. The only anchorage is in the entrance.

(191) **Negro Head,** between Mud Bay and Chignik Lagoon, is a high, round-topped vertical bluff.

(192) **Chignik Lagoon,** at the SW end of Chignik Bay, is shallow but a channel with depths of 7 to 42 feet follows off the E shore to an inactive cannery at **Chignik Lagoon,** 2.3 miles above the entrance sandspit.

(193) A cannery on the W shore of Chignik Lagoon, 4 miles above the entrance sandspit, maintains radiotelephone and radiotelegraph communications.

(194) The best anchorage is off the E shore cannery wharf, near the small-boat mooring dolphins. Beyond the wharf, which is dry at low water, the lagoon shoals, and only launches use the channels to the head. Chignik Lagoon has an important run of red salmon. Vessels of 14-foot draft enter the lagoon at all stages of the tide. A frequently used portage connects Chignik Lagoon to the head of Kuiukta Bay.

(195) A reef, 3 miles 040° from Negro Head, is covered 4½ fathoms and breaks in heavy weather. This is the only outlying danger in Chignik Bay found during the survey of 1924.

(196) **Anguvik Island,** about 8 miles NNE of Anchorage Bay, is bordered by a reef extending about 1 mile to the E and 0.3 mile to the W, that breaks at all stages of the tide. The island is flat topped, 50 feet high, covered with grass, and has precipitous sides. The coast NE of the island is foul for about 0.6 mile offshore, and should be avoided.

(197) **Hook Bay,** W of Cape Kumliun, is deep, except near the head where the slope of the beach is very gradual, with the 10-fathom curve 0.3 mile off the high water mark. The

area behind the spit is shoal. Fair anchorage may be obtained for small craft just W of the outer end of the spit in 3 fathoms. Large vessels can find no protection from SE weather. If anchoring near the head of the bay, avoid dragging onto the shoals that rise abruptly.

(198) **Weasel Mountain,** 2,410 feet high, is 1 mile S of Hook Bay and is the most prominent mountain in this vicinity.

(199) A group of bare rocks is about 1 mile S of the S coast of Cape Kumliun; the highest is 39 feet. They are connected by reefs, but otherwise are apparently steep-to. The rocks are grass covered and there is but little kelp bordering them. Between the rocks and the cape to the N is a clear passage but it is of no importance and is rarely used.

(200) **Katmai Reef,** 3.3 miles 009° from the N point of Nakchamik Island, is narrow and about 600 yards long in a NE-SW direction. A small rock on the reef bares at extreme low tide. There are usually breakers, even with a smooth sea, but the breaks may occur at long intervals. A light growth of kelp is on the reef. There is deep water between this reef and the detached rocks about 3 miles to the NE, in the direction of Unavikshak Island, but the passage is not recommended.

(201) To enter Chignik Bay from the N, stay at least 8 miles SE of Foggy Cape (see chart 16013) to avoid the position of the reported rock S of the cape, then change course to pass 1 mile N of Nakchamik Island and enter Anchorage Bay in midchannel. From the S, stay 1 mile outside Castle Cape and the shore to Anchorage Bay.

(202) **Chart 16013.**–The Alaska Peninsula coast from Castle Cape to Mitrofania Bay is characterized by steep rock-cliff shoreline, high jagged ridges, sharp peaks, steep slopes of bare rock, alder brush or grass, and numerous rockslides. It has many waterfalls, striking cliffs of contrasting colors, and intermittent stretches of boulder and shale beach, the latter resulting from broken cliffs and large rockslides. Close alongshore are numerous pinnacle rocks, most frequently off capes and points.

(203) The water is generally very deep in all of the bays and arms throughout this area. No known dangers are more than 500 yards offshore.

(204) **Not all of this area has been surveyed, particularly in the bays and coves. Most of the Coast Pilot notes are from preliminary information obtained by a survey party working on control in 1945.**

(205) **Chart 16566.–Chankliut Island,** as it opens out from Castle Cape, appears as three separate islands tangent to each other. The parts are connected by low necks of land; the E and central ones appear generally flat while the W part is conical. The slopes are grassy. Six pinnacle rocks are off the W point of the island and a small rock 10 feet high is 250 yards off this point.

(206) In the E cove on the N side of the island, small craft can find anchorage by steering **180°** toward the lowest part of the neck of land and anchoring in 5½ to 10 fathoms, sandy bottom. Surge from current and swell is felt in this anchorage.

(207) The channel between Chankliut Island and the mainland has been surveyed and found free from dangers. It is subject to moderate tidal current rips, especially in NE weather.

(208) **Nikolai Cove** and a small unnamed cove, on the mainland 1.5 and 6 miles, respectively, SW of Castle Cape, afford temporary restricted anchorages for small craft with winds from SW through W to N, but are subject to strong williwaws and are exposed to any swell. Necessity Cove, farther W, is considered a better anchorage.

(209) **Necessity Cove,** 9 miles SW of Castle Cape, is reported to be a safer anchorage in NW weather than Warner Bay or Ross Cove, but is exposed to swell. The conspicuous cape on the S side of Necessity Cove has a rock-cliff shoreline and high rugged peaks. Approaching from E a prominent light-colored rock cliff is visible along the E shore of the cape. A rock awash is 600 yards off the E shore of the cape and about 1 mile S of the entrance to the cove. Small vessels anchor in Necessity Cove close to shore in 7 fathoms; although subject to strong williwaws the cove affords good anchorage with winds from SW through W to N.

(210) **Charts 16566, 16013.–Warner Bay,** 11 miles SW of Castle Cape, extends N for 4 miles; it is too deep for anchorage except behind the narrow shingle spit on its W shore, 2.5 miles above the entrance. The entrance to the bay is between a small, grass-topped, pinnacle-tipped islet, just off the W side of the cape separating it from Necessity Cove, and a broken rocky point on the W side, that separates the entrances to Warner Bay and Ross Cove. Anchorage in the small cove behind the sandspit is close under the shore in 20 to 22 fathoms. It is protected from sea and swell, but the space is too restricted and the water too deep for safe anchorage during violent williwaws which occur with a strong NW wind. The anchorage in Warner Bay can be reached by steering midchannel courses.

(211) **Ross Cove** is a small, deep, triangular-shaped bay on the W side and at the head of the short arm just W of the entrance to Warner Bay. The entrance to the cove, between the N end of a narrow shingle spit and the N shore of the short arm, is only 150 yards wide and cannot be identified until nearly at the head of the short arm. A bar at the entrance has a least known depth of 11 fathoms. The cove, which can only be used by small craft, is 23 fathoms deep at its center, but anchorage in 16 to 20 fathoms can be had close under the shore. From the head of the cove a long deep valley extends toward 3,697-foot-high **Virgin Peak.** The depth of water, restricted area, and violent williwaws make it a dangerous place during NW weather, but during SE or SW winds it is very quiet. The short arm leading to the cove and entrance into the cove may be traversed by steering midchannel courses.

(212) **Chart 16013.–Devils Bay,** 15 miles SSW of Castle Cape, has a wide deep entrance about midway between Warner Bay and Seal Cape. The N side of the entrance is marked by a high, detached pinnacle rock, close to the point of a narrow peninsula that has precipitous rocky cliffs and high rugged peaks. About 1.5 miles inside the entrance, the bay divides into two main parts, one extends NW 2 miles, with three small arms at its head, the other, in the form of a hook, extends SW 1.5 miles, then SE for about 1 mile.

(213) The main portion and center arm of the N part of the bay are too deep for anchoring. The NE and W arms of the N part of the bay were not investigated. In the hook-shaped S part of the bay is a small bight at the head of the first arm, that trends S. Anchorage, with restricted swinging room, can be had 400 to 600 yards from the head of the small bight in 16 to 20 fathoms, mud bottom.

(214) During periods of SW and NW weather, no williwaws were experienced in this anchorage, and during fresh NE weather only moderate williwaws were encountered. No sea or swell entered the anchorage during this storm, although the seas and swell were heavy outside. The anchorage was not tried during SE weather.

(215) The SE arm of the hook-shaped S part of the bay was found too deep for anchorage. At the head of this arm are large sections of flat shale spits, formed by rockslides from sheer cliffs that rise from the shoreline to a high rock-faced ridge with many towering pinnacle tips. The pinnacle tips and the sheer wall of this ridge present a very striking formation upon entering this arm of the bay.

(216) **Seal Cape** (56°00.0'N., 158°25.0'W.) and Cape Ikti are twin headlands on the Alaska Peninsula, 2.5 miles apart, each having high rugged peaks, jagged ridges, and sheer rock cliff shorelines. Seal Cape, 13 miles SW of Chankliut Island, is the most off-lying tangent as seen from the channel between Chankliut Island and Castle Cape. From the same direction the summit of a 2,074-foot-high narrow ridge, about 0.6 mile inside the tangent of the cape, appears as a very sharp peak. A breaker is 0.2 mile off the S end of Seal Cape.

(217) **Cape Ikti,** W of Seal Cape, marks the E side of the entrance to Kuiukta Bay. Numerous knife-edged pinnacles are very close alongshore near the end of Cape Ikti. A prominent high peak, 2,281 feet, is about 2 miles from the point of the cape.

(218) The open bay between Seal Cape and Cape Itki is generally deep and marked by extensive kelp in its NE portion. Anchoring depths for small craft can be found close under the shore in the NW part of the bay, however, it is wide open to all swell and sea and not recommended.

(219) **Kuiukta Bay** extends 14 miles inland and has 11 arms or bays of various sizes and shapes, 6 on the E side and 5 on the W side. Its shores, especially for the first 9 miles, are extremely precipitous, and have striking bare cliffs of great height, in contrasting shades of gray, red, brown, and black. The rocks appear to be well metamorphosed. A prominent band of black rock, resembling a lava flow, is on the E shore 4.8 miles NW from Cape Ikti, or just N from the prominent point marking the N side of the entrance to the first arm on the E side of the bay. A very prominent triangular-shaped high vertical cliff, dark brown in color, with irregular streaks of light color rock across its face, is directly ahead about 6.5 miles upon entering the bay from the SE.

(220) Kuiukta Bay entrance, 5 miles wide, is between Cape Ikti on the E and the sharp E point of an unnamed double headland on the W. This double headland marks the N side of the entrance to Mitrofania Bay. From midchannel at the entrance, Kuiukta Bay trends NNW for 4.5 miles where it narrows to a width of 2 miles, thence NW for another 4.5 miles at an average width of 2 miles, and thence NE at an average width of 1 mile, interspersed by a few small islets, for about 5 miles to the head of the bay, where arms spread out to the E and W. The bay is a natural funnel for winds and is known as being one of the windiest bays in Alaska. The water off the entrance and in the lower part of the bay is subject to tide rips, especially during NW weather.

(221) The water is generally deep close to shore throughout Kuiukta Bay and with few known exceptions in the arms leading from it.

(222) The entrance to the first arm on the E side of Kuiukta Bay, 4 miles NW from Cape Ikti, is 1 mile wide between a rounding, undercut, dark rock cliff point on the SE and a prominent gray cliff point with two large off-lying gray pinnacles on the NW. About 1 mile inside the entrance, the deep channel is constricted to a width of 500 to 600 yards between the N shore and the end of a steep-to boulder-gravel spit that extends from the S shore. The average width of the bay inside the spit is 0.5 mile; and the general depths are 40 to 50 fathoms, with deep water close alongshore, which is fringed by a very narrow strip of boulder gravel or shale. The bay is landlocked and no sea or swell enters it. Anchorage for a small vessel, with restricted swinging room, may be had within 0.5 mile of the head of the bay in 16 to 20 fathoms, muddy bottom. This anchorage was found to be very quiet when fresh NW winds prevailed outside in Kuiukta Bay. During the storm with fresh NE winds, moderate williwaws were experienced, but the survey vessel did not drag anchor. An all-season stream from a low waterfall is on the S shore inside the boulder-gravel spit.

(223) The second arm on the E side of Kuiukta Bay, about 6 miles from Cape Ikti, is a small narrow finger that extends 1.5 miles E between extremely high steep slopes. It is too narrow and the water too deep, 30 to 40 fathoms, for any suitable anchorage. A number of waterfalls enter this bay.

(224) The third arm on the E side of Kuiukta Bay, about 9 miles from Cape Ikti, has not been investigated. It is very narrow and extends SE about 1.3 miles. On the N side of the entrance to this arm is a small bight just SE of a small grass-topped islet. A restricted anchorage in 15 fathoms, sticky bottom, may be had for small craft at the entrance to this bight, about abeam of the SW end of the small islet.

(225) The fourth arm (see chart 16566) on the E side of Kuiukta Bay, about 1.7 miles from the head of the bay, extends SE about 1.5 miles. It has not been examined. The N side of the entrance to this arm is marked by a grass-topped U-shaped islet, with steep, rock-cliff shoreline.

(226) The fifth arm (see chart 16566) on the E side of Kuiukta Bay, about 0.7 mile from the head of the bay, extends E about 0.9 mile between sheer rock cliffs. It has not been examined.

(227) The sixth arm (see chart 16566) on the E side and at the head of Kuiukta Bay, extends E for about 2.3 miles. A small islet is about 1.4 miles E from the S entrance point.

(228) The first arm on the W side of Kuiukta Bay indents the cape opposite the abandoned Indian village of **Mitrofania.** It is separated from the small lagoon on which the village was by a narrow boulder-gravel spit. The arm, 1.8 miles long, extends W between sheer rock cliffs to its head at the steep-to boulder-gravel beach. Anchorage on the centerline of the arm about 0.6 mile from its head may be had in 18 fathoms, sandy bottom, but any swell piles up in this bay, as evidenced by large amounts of driftwood high up the boulder-gravel beach, and in NW weather williwaws are very strong. Anchorage here is not recommended except in favorable weather.

(229) The second arm on the W side of Kuiukta Bay, about 4.5 miles N of the point marking the W entrance to Kuiukta Bay, extends SW about 1.5 miles, and is restricted at its deep entrance to a width of 400 yards by a hook-shaped boulder-gravel spit that extends from the SE shore of the arm. Within the hook itself the water is very shallow; and SW of the hook for a short distance along the SE shore the water is shallow. Otherwise the arm, including the narrow entrance, is very deep. There is no anchorage in the bay, except for very small craft on the shoal bank close to the SE shore, just SW but not within the boulder-gravel hook.

(230) **Foot Bay** is the third arm on the W side and about 6 miles N of the W entrance to Kuiukta Bay. Foot Bay is about 1 mile wide and extends W about 2 miles. It is deep throughout, except close up in the NE corner where the bottom rises abruptly from 25 to 2 fathoms or less in the vicinity of the mouth of a fair-sized river entering the bay. The only available anchorage is in the SW corner of the bay, about 300 yards from the shore, in 20 fathoms, muddy bottom. This anchorage is off a small sand beach and a low valley that extends to the NE arm of Mitrofania Bay. The anchorage is swept by strong squalls in bad weather.

(231) **Windy Bay** is the fourth arm on the W side and is about 8 miles N of the W entrance to Kuiukta Bay. The S

side of the entrance to Windy Bay is marked by a sharp, dark-colored pinnacle close to a dark-colored, high rock cliff point. From the entrance, about 1.3 miles wide, the bay trends NW for 1.5 miles, narrowing to 0.6 mile in width, where there is a small shallow bight extending 0.5 mile SW; and where the bay changes direction at a right angle to the NE to enter the N part of the bay, through a deep passage about 600 yards wide between low steep-to gravel spits on either shore. After entering the N part of the bay it widens to about 0.8 mile and trends in a N direction for about 1 mile, thence WNW, in a narrowing arm for about 2 miles. Anchorage, about 0.8 mile N of the gravel spit marking the W side of the entrance to the N arm, can be had about on the centerline of the bay in 15 to 20 fathoms, sticky bottom. Almost continuous fresh winds and williwaws, accompanied by fog and mist, were experienced here during a 36-hour period of W and NW winds.

(232) The small bight on the S side of Windy Bay shoals rapidly a short distance inside its entrance. A temporary anchorage, with restricted swinging room, can be obtained at the entrance in 15 fathoms, muddy bottom.

(233) The fifth and last arm (see chart 16566) on the W side and at the head of Kuiukta Bay extends W by N 2.8 miles from a small but high grass-covered islet to a low valley at the bay's head, where an easy portage leads to Chignik Lagoon. Good anchorage, 0.5 to 1 mile W of the small but high grass-topped islet marking the S side of the entrance to the arm, can be had in 19 to 15 fathoms, muddy bottom. This anchorage is exposed in NW weather to winds funneling through the low valley from Chignik Lagoon.

(234) **Routes.**–Passage into Kuiukta Bay from its entrance to Windy Bay may be made with safety by clearing either shore 0.5 mile, and the arms leading off this part of the bay may be entered safely on midchannel courses. The narrower N part of the bay should be entered on about midchannel courses between various islands and the opposite shore as follows:

(235) From a point in about midchannel, about 1 mile 040° from the pinnacle point marking the S entrance to Windy Bay, steer **040°** with the pinnacle point astern. On this course pass W of the low grass-covered island just off the E shore about opposite the N side of the entrance to Windy Bay; thence about 3 miles farther pass E of the next island, which has a sugarloaf top. From abeam of the sugarloaf-topped island steer **020°** for about 1.8 miles passing W of a U-shaped island.

(236) About 0.8 mile above the sugarloaf-topped island the water shoals abruptly from 45 fathoms to 7½ fathoms, then deepens to 30 fathoms or more. Pending a detailed survey, caution should be used when navigating this area. Directly after passing the U-shaped island, round on the port hand and on midchannel courses two closely spaced islands, the N one of which is the higher and is the last island at the head of Kuiukta Bay. Anchor in the W arm about 0.5 mile to 1 mile W by S of the last island in 19 to 15 fathoms, mud bottom.

(237) **Charts 16011, 16013.–Mitrofania Bay,** large and open, is bordered on the S by Mitrofania Island, on the W by Long Beach, and on the N by high, rugged capes of the mainland. The bay is deep and free of dangers, except for the area SW of the Brother Islands.

(238) The E side of the entrance to Mitrofania Bay is marked by an unnamed double headland, which is connected to the mainland by a low narrow strip of gravel beach just E of the abandoned Indian village of Mitrofania. Close inshore off the S tangent of the E headland is a towering brown pinnacle rock. Between the double headlands is a small arm with a short section of steep-to gravel beach at its head, and many huge pinnacle rocks in its NW part. This arm is exposed and not recommended for anchorage. At the E entrance to this arm is a prominent gray pinnacle rock about 200 yards off the shore.

(239) About 200 yards off the W point of the W headland is a rock that uncovers about 3 feet. Between this point and the S end of a high rugged cape 1.5 miles NW, is the entrance to a large unnamed bay with three small arms. The E arm affords an anchorage, with restricted swinging room, in its W part in 18 to 20 fathoms, muddy bottom; but the inner part entered through a very narrow passage, is a shallow lagoon. The site of the abandoned village of Mitrofania is at the NW corner of the lagoon. This site is not visible from the anchorage in the outer portion of the arm.

(240) The NE arm of the unnamed bay affords an anchorage, with restricted swinging room, in its SE part, just inside of a low gravel point, in 15 to 20 fathoms, muddy bottom.

(241) In the entrance to the NW arm, about 0.8 to 1.2 miles from the head of the arm, good anchorage, with 300 to 600 yards swinging radius in 15 to 20 fathoms, can be obtained. This anchorage was used by the survey vessel during a period of stormy weather, when a heavy swell was breaking high on the gravel beach at the head of the small first arm leading off Kuiukta Bay, opposite abandoned Mitrofania village, but effects of the swell were barely noticeable in the anchorage.

(242) **Ivan Bay,** an arm leading off the NW corner of Mitrofania Bay, is between rock-cliff shoreline and high rugged peaks on either side, and has a steep-to sand beach at its head, with a low, narrow river valley extending N. There are two small lakes, one on the E side and the other on the W side of the valley, just inshore of the low gravel beach. The water in Ivan Bay is deep and there is no anchorage.

(243) **Long Beach,** about 3 miles of steep-to black sand, forms the head or W shore of Mitrofania Bay. The sand beach is flanked on the N end by a vertical cliff, 600 to 800 feet high, made conspicuous by many strata of different colored rocks, and on its S end by a precipitous double headland, covered with a dense growth of alder bushes, and terminating at the S end in a long narrow point. An isolated rock is on Long Beach, about 300 yards back from the shoreline and near the base of the higher and N mountain of the double headland. This isolated rock, nearly rectangular in shape with vertical sides, is 60 feet high, and its slightly rounded top is covered with grass, ferns and small bushes. Seen from a distance it has the appearance of a huge native sod house. Extending back from Long Beach to the foothills of **Veniaminof Crater** is a broad river valley, in which are many ponds of fresh or brackish water. A large river empties into Mitrofania Bay about through the center of Long Beach. From a distance the double headland at the S end of Long Beach appears as an island located well offshore from the mainland.

(244) **Mitrofania Island,** about 5 miles wide between its N and S tangents, and about 6.5 miles wide between its E and W tangents, is somewhat crescent shaped, has a cluster of four rippled gray ridges, with steep jagged peaks of nearly the same height, and a rock cliff shoreline. The highest peak, a little E of the center of the island, appears fan shaped from the NE and is 2,011 feet high. The island is reported to be visible in excess of 30 miles when approached from the SW from a point S of Kupreanof Point (55°34.0'N., 159°35.5'W.); see chart 16540.

(245) Within the crescent on the S side of the island is a large open bay. The bay has a considerable anchorage area in depths of 15 to 20 fathoms along its NW shore, where

cliffs of white and reddish hues rise vertically to a ridge of numerous pinnacle tops. In the SW part is a bight, formed by a sharp hook of the island to the E, with anchoring depths of 10 to 20 fathoms, sandy bottom. This bight is well protected from wind and sea from the SW through NW to N or NE, but is affected by any heavy swell. A small arm, with very restricted anchorage in 15 to 18 fathoms, sandy bottom, extends E about 0.4 mile from the NE part of the large open bay.

(246) In March 1975, the Coast Guard Cutter CONFIDENCE anchored in the NW part of the crescent-shaped bay on the S side of the island. The ship entered from the S on a course of **000°** until midpoint between the SE and SW entrance points (crescent points) of the bay, then changed course to **315°** and headed directly for the cluster of four rippled gray ridges on the island until within 1,600 yards of them, and anchored in about 18 fathoms, sandy bottom with good holding qualities, on the following additional ranges: snubbed peninsula on NE side of crescent (55°50.7'N., 158°47.2'W.), 2,400 yards; and snubbed peninsula on the NW side of crescent (55°49.8'N., 158°51.0'W.), 2,100 yards.

(247) The ship reported that the bottom contour during the entire entering transit remained flat, about 35 fathoms, then shoaled when about 3,000 yards from the cluster of four rippled ridges. The only danger noted was a rock awash about 200 to 300 yards S of the SE crescent tip. The ship experienced strong NW winds, however, the anchorage provided excellent protection, free of williwaws. Only slight winds, occasionally gusting to 20 knots, were encountered from a funneling wind over the lower center part of the island. Negative currents were noted in the area. The report further stated that the SE and SW corners of the crescent proved to be good radar targets, and that perhaps this bay provides the best protected anchorage in the area S of the Alaska Peninsula from winds WSW through N to ENE. The bay is easily accessible, however, because of its wide entrance, protection is not afforded from winds from the SW through the SE.

(248) On the N side of Mitrofania Island, a very small bay, open to the W, has anchorage for small craft in 15 to 20 fathoms, sandy bottom. A sandy beach is at its head. The bay is well protected from weather out of the N around through E to S. Sea and swell from the SW are reduced by the low sand and gravel spit that extends off the point about 3 miles W of the bay.

(249) **Spitz Island,** 1,073 feet high and 1.2 miles S of the SW tangent of Mitrofania Island, has sheer rock cliff sides and is conspicuous from the E and W. The island is reported to be a good radar target, and that it is less prominent from the SW than from the NE because of its blending with the background of larger Mitrofania Island to the N. A line of rocks extends S for 0.7 mile from the island. The most S rock is long, narrow, irregular, and about 40 feet high.

(250) **Brother Islands,** two in number and about 1 mile apart, are on a NNW line in the W central part of Mitrofania Bay and across the N part of the opening between Mitrofania Island and the double headland at the S end of Long Beach.

(251) The E Brother Island, 1.5 miles N of the N point of Mitrofania Island, is wedge-shaped with point to S, 0.3 mile on its longer E side and 0.2 mile on its N side. The island, 395 feet high, presents a flat profile, and from its summit drops sheer to the water's edge along the E side, where the high rock cliffs are undercut with caves inhabited by thousands of birds. A large rock, that uncovers 1 foot, is about 0.6 mile SSW from the S point of the island; and about on the same line 0.8 mile beyond the rock is the N end of a kelp-marked shoal area, that is 0.3 mile long and has a least known depth of 4 fathoms. This shoal has not been thoroughly surveyed and there may be less water over it. Between this shoal and the nearest point of Mitrofania Island, 0.7 mile to the E, is a deepwater channel that passes the shore of Mitrofania Island 300 to 500 yards off on a course of **234°** with the end of the low, grass-covered gravel spit forming the NW point of Mitrofania Island about dead ahead; and holding this course until about 0.5 mile from the gravel spit, thence changing course to the W and rounding the steep-to spit, then about 300 to 500 yards off.

(252) The W Brother Island, about 1.5 miles E of the S shore of Long Beach, is nearly round, 3.5 miles in diameter, with flat top and sheer cliff sides. A large rock, 22 feet high, and rock that uncovers 1 foot, are 0.4 mile SSW and 0.6 mile S, respectively, from the center of the island. Between the W Brother Island and the mainland the water is deep and clear of any known dangers. Both Brother Islands have about the same elevation.

(253) **Charts 16556, 16540.**–The character of the shoreline between Mitrofania Bay and Ivanof Bay differs from that to the E in that it has several stretches of steep-to sand beaches, interrupted by low rocky headlands or high rocky capes. Long Beach, described previously, is the first of several beaches. The second stretch of sand beach, about 2.5 miles long, marks the head of a large open bay between the sharp pointed headland at the S end of Long Beach on the E and Coal Cape on the W. The low valley N of this beach joins that extending inland from Long Beach. Just inshore from about the center of this sand beach are two detached mountains on the valley plain. Thesetwo mountains appear as islands from a distance offshore. The S one, known locally as **Red Bluff Mountain,** 1,041 feet high, has reddish jagged pinnacle tips and is very prominent.

(254) Small craft can find temporary anchorage in 2 to 10 fathoms, sand bottom, about 1.1 miles SW of Red Bluff Mountain. Water may be obtained from a stream that empties into the NW part of the open bay.

(255) Coal Cape and Coal Point, about 10 miles apart, are two separate and distinct features of the Alaska Peninsula. Coal Cape is about 4.5 miles NW of Mitrofania Island (see chart 16013), and Coal Point is about 2.5 miles N of Paul Island.

(256) **Coal Cape** (55°53.5'N., 159°00.0'W.) is a prominent rock-cliff headland that rises to 1,818 feet and whose skyline is extremely broken and serrated. About 2 miles from its S tip the cape is about 2 miles wide and from its rock-cliff shoreline, long, low, sand beaches extend to the E and W. Fair-sized rivers break through the beaches on either side and close to the base of **Coal Cape Mountain Range.** The ridge that continues inland from the cape is a spur from Veniaminof Volcano. This spur is flanked both E and W by extensive river valleys that extend inland from the long sand beaches.

(257) **Perryville,** an Indian village, about 5 miles NW of Coal Cape, was established to provide for people who were driven away from the vicinity of Mount Katmai Volcano by the eruption of 1912. It consists of a number of wooden houses, including a small store and school, standing on the flat beach about 2.5 miles W of the foot of Coal Cape Mountain Range. There is no wharf and the water is too deep for anchoring off the steep-to beach in front of the village. Temporary anchorage for small craft can be found in 6 to 10 fathoms, 0.3 mile SE of the W of two conspicuous rock ledges just E of the village; a small 6½-fathom shoal, 0.6 mile SE of the same ledge, is the controlling depth for the area, but there are depths of 12 to 15 fathoms between this shoal and the beach. Radiotelegraph service is maintained.

(258) **Three Star Point,** a low alder- and grass-topped rocky headland about 1.5 miles SW of Perryville, separates two long curving stretches of sand beaches at a point about midway between Coal Cape and Coal Point Ranges. A prominent line of pinnacle rocks extends E about 400 yards from Three Star Point and a prominent pinnacle rock is about 200 yards S of the point. A series of low hills extending inland from Three Star Point divides the broad valley between the spurs leading to Coal Cape and Coal Point.

(259) **Chiachi Island,** the largest of the **Chiachi Islands,** lies with its most N point about 1 mile SE of Three Star Point and its S tangent about on line with the S tangents of Coal Cape, 5 miles to the NE, and Paul Island, 7 miles to the SW. The island is about 3 miles in extent from its sharp N point to its rounding S side and about the same distance from its most E point to its sharp W point. It has several rugged peaks of about the same elevation. A somewhat prominent one in the SW part of the island is 1,450 feet high. Pinusuk Island, Shapka Island, and Petrel Island also comprise Chiachi Islands.

(260) **Chiachi Bay,** in the E end of Chiachi Island, is about 0.6 mile in both width and depth. Anchorage is available for small vessels in 10 to 17 fathoms, mud bottom, protected from winds out of the SW through W to N, but any moderate swell, even from the SW, surges into the bay.

(261) **Pinusuk Island,** 0.9 mile long E to W, is 700 yards off the point on the N side of the entrance to Chiachi Bay; a high wedge-shaped ridge, rising to about 800 feet, has its point to the E and makes the island easy to identify from that direction. A towering pinnacle rock, 79 feet high, is 400 yards off the E end of Pinusuk Island. A rock island, 0.6 mile long and about 800 feet high, has its W end 350 yards off the point on the S side of the entrance to Chiachi Bay.

(262) Two more islands are off the NE shore of Chiachi Island. The N one, **Shapka Island,** is a sugarloaf 622 feet high, about 0.8 mile NE of the N point of Chiachi Island; the other, **Petrel Island,** is a small flat rock mass, about 400 yards off the midpoint of the NE shore of Chiachi Island.

(263) **Coal Point,** 5 miles SW of Three Star Point, is broad and irregular, has rock cliffs along the shores and a high sharp ridge that extends inland; two needle-shaped rocks are on the cliff slope on the SW point. A reef, marked by kelp at its outer end, extends 0.4 mile from the SE point. A rock, covered 1¾ fathoms, is 0.25 mile SSE of the southernmost tip of the point, and a rock, covered ½ fathom, is 1.1 miles E by N of the same tip.

(264) **Humpback Bay,** W of Coal Point and between Egg Island and the mainland, has a relatively flat bottom and depths of about 21 fathoms in its central part. Anchorage can be had in 7 to 10 fathoms, sand bottom, in the NE part of the bay, about 0.5 mile NW of a lone grass-topped pinnacle rock 22 feet high, and about 0.5 mile offshore from the sand beach marking this part of the bay. Caution is advised, however, as swells pile up in the bay through the entrance between Egg Island and Coal Point. For about 1 mile along the NW side of the bay the shore is rocky, with several detached rocks close alongshore. In the W part of the bay about 1.5 miles NW of Egg Island, is a short stretch of sand beach, from which a portage leads to Ivanof Bay.

(265) **Egg Island,** about 1 mile long and 0.5 mile wide, has vertical cliffs on its E side and steep grass-covered slopes on its W side. In the E central part of the island are several round-top summits of about equal height that rise to 500 feet.

(266) A low sandspit extends well offshore from about midway along the W shore of Egg Island, and a rock, 5 feet high, is about 125 yards off the N end. From the reef at the S end of the island a narrow underwater ridge of sand and gravel extends to the N shore of Paul Island; on a course of **233°,** with the tangent of Alexander Point ahead, the least depth is 5¾ fathoms over the ridge, which drops off abruptly both to the NE and SW.

(267) A deepwater passage can be made through Humpback Bay by steering midchannel courses around Egg Island, taking care to avoid the 3¾-fathom shoal NW of the island, thence midchannel between Paul Island and the pinnacle off the jutting point on the E side of Alexander Point.

(268) **Alexander Point,** opposite the W point of Paul Island, is sheer and rocky and marks the end of the high cape bordering the E side of Ivanof Bay. The first definite peak on the cape, about 1 mile N of Alexander Point, is 1,572 feet high. On the E side of the cape, about 1 mile N of Alexander Point, is a jutting rocky point that is heavily covered with grass and alder, and just off the end of this jutting point is a large pinnacle.

(269) **Paul Island,** somewhat hook shaped and for its entire length, has high sharp ridges and peaks that reach an elevation of 1,558 feet in its N part. For a short distance along the NW side of the island is a low grass-covered sandspit, and inside of the hook of the island, which forms the N shore of Kupreanof Harbor, the beach is low sand and gravel. In this region is a small saltwater pond at the foot of the steep grass- and alder-covered slopes.

(270) In 55°46.9'N., along the E side of Paul Island, is a semicircular 0.3-mile-wide cove that is danger free except for the rocky point and reef that form the SE side. Small boats can anchor in 3 to 5 fathoms, sand bottom, 200 to 400 yards off the sand beach. Water can be obtained from any of the several streams in the vicinity. Along practically all the rest of the Paul Island shores are sheer rock cliffs.

(271) **Jacob Island,** shaped like a leg of mutton with its point to the S, is about 4 miles long. The highest point, about 1 mile from its N end, is 1,647 feet high. From the highest point a sharp ridge, that drops almost vertically to the E shore, extends S to **Noon Point,** meeting the sea in a narrow overhanging precipice. N of the highest point alder-covered slopes broaden out to form the S side of Kupreanof Harbor. The coast of Jacob Island is foul with kelp and numerous rocks.

(272) **Kupreanof Harbor,** enclosed by Paul and Jacob Islands, is circular in shape, 1.1 miles across, and free from dangers. It is sheltered from all directions and is the most accessible safe harbor in a wide region. Williwaws have been experienced here with NE and E gales, but the muddy bottom provides good holding ground.

(273) The W entrance to Kupreanof Harbor is 0.7 mile wide and danger free. To enter, steer **090°** through the middle and change course to **058°** when the point on the N side is abeam; when the S entrance is about to open, anchor in the N central part of the harbor in 10 to 11 fathoms, mud bottom, with the tangents of the point at the S entrance in range and bearing 151°.

(274) The curving S entrance is 0.5 mile wide and has a channel controlling depth of 4 fathoms NE of the middle. Vessels should approach from the SW on a course of **020°,** passing 0.75 mile NW of the S tip of Paul Island and 0.25 mile SE of the easternmost point of Jacob Island; when abeam of the latter, steer **000°** for 0.25 mile, thence **317°** for 1.2 miles to anchorage. The 317° course will carry a vessel in the best water NE of midpassage and about 0.15 mile off the shore of Paul Island.

(275) The current movement within the harbor is irregular in direction and velocity. Current velocities of one knot have been observed.

(276) Fox farms and attendant buildings are on shore in Kupreanof Harbor on Paul Island and Jacob Island.

(277) **Ivanof Bay,** between Alexander Point and Kupreanof Peninsula, is from 1 to 3 miles wide and about 7 miles long in a N-S direction. Bluffs and high ridges parallel both shores from the entrance to the N part of the bay where low valleys lead off from both the E and W shores. When SW of Alexander Point and proceeding up the bay, **Road Island,** a round-topped, steep-sided island 421 feet high, is seen in the channel 4 miles ahead. Two miles above Alexander Point a grassy headland and a grass-topped, taper-pointed islet 115 feet high are on the E shore. The W shoreline here is precipitous and rugged, the bluffs rising from 1,000 to 2,500 feet above the shoreline. W and N of Road Island is an area of sandspits, tideflats, and lowland. Several steep-sided, grass-topped islets are connected to the sandspits at low water. W of northern Ivanof Bay is a large lagoon and beyond are marshy flats across which **Granville Portage** leads to Stepovak Bay. The N shore of Ivanof Bay is hilly. To the NE of the bay a low valley and flats extend into the interior.

(278) A cannery wharf, with a least depth of 22 feet alongside, and marine ways are midway along the N shore of Ivanof Bay. The buildings of a fox farm are along the cove in the NW shore of Road Island; a dilapidated wharf in the cove is usable only by small boats on the higher half of the tide. Radiotelegraph service is maintained.

(279) Vessels can anchor in 15 fathoms, sticky mud bottom, 0.3 mile SSE of the cannery wharf. To be avoided are the mudflats that rise abruptly from depths of 10 fathoms on the E side, and the ledge that makes out from the northernmost point on the same side.

(280) A ledge with places that uncover 1 to 3 feet is 0.4 mile SE of the NE point of Road Island; a rock, that uncovers 2 feet, is 0.9 mile E by N of the same island point and 0.3 mile from the E shore of the bay. A pinnacle rock, covered 1 fathom, is about 150 yards SW of the cannery wharf.

(281) When SE weather prevails along the coast, the wind often blows in the N part of Ivanof Bay from the NE, coming down through the valley on that side of the bay. The N part of Ivanof Bay is well protected from S swells.

(282) A pilot for Ivanof Bay occasionally may be secured from Kupreanof Harbor or from Squaw Harbor, Unga Island.

(283) Depths of 12 to 15 fathoms can be carried through the channel W of Road Island. From a position 1.4 miles W of Alexander Point, steer **337°** until the S end of Road Island is 450 yards on the starboard beam; thence **353°** for 0.9 mile to a position where the N end of the island is 600 yards on the starboard beam; and then **014°** for the cannery wharf, taking care to avoid the covered rock 150 yards off the SW corner.

(284) The channel E of Road Island has a controlling depth of 18 fathoms but rocks off both shores make navigation dangerous for strangers; passage should be made at low tide when the rocks are bare and can be seen. From a position 1.4 miles W of Alexander Point, steer **336°** until the small grass-topped islet 2 miles NW of Alexander Point is 0.6 mile on the starboard beam; thence **000°** until the N end of Road Island is 0.5 mile on the port beam; thence **334°** until the highest islet on the W side of the upper bay is 1 mile on the port beam; and thence **014°** for the cannery wharf.

(285) **Routes, Castle Cape to Kupreanof Point (Alongshore).**–From a point 1.5 miles SE of Castle Cape (see chart 16011), steer **220°** for 5.4 miles. When abeam of the W end of Chankliut Island, 1 mile, steer **216°** for 12.8 miles to clear Seal Cape by 1 mile. A breaker is 0.2 mile off the S end of Seal Cape. In thick weather it is recommended that the course be shaped to pass Seal Cape 1.5 miles off.

(286) When the E tangent of Seal Cape and the point at the S entrance to Devils Bay are on range, bearing 000°, steer **249°** for 9.1 miles with the N tangent of Mitrofania Island ahead. This course passes Cape Ikti about 1 mile off.

(287) When the prominent rocky points marking the entrance to the first arm on the W side of Kuiukta Bay close, bearing 013°, steer **282°** for 6.9 miles with N slope of mountain on flats W of Long Beach ahead. This course passes N of the W Brother Island at a distance of 1 mile.

(288) When 0.5 mile beyond the range of the W tangents of the W Brother Island and Mitrofania Island, bearing 194°, steer **201°** for 3 miles. This course passes about 0.6 mile off the W Brother Island and about 0.6 mile off the long pointed headland at the S end of Long Beach.

(289) When Red Bluff Mountain opens on the Long Beach headland, bearing 305°, steer **246°** to a position 0.8 mile S of Coal Cape; thence **270°** to a position 0.3 mile S of Shapka Island; thence **292°** to a position 0.3 mile N of the N tip of Chiachi Island; and thence **240°** for 6.2 miles to a position 0.8 mile N of the most N tip of Paul Island. Then steer **233°**, with Point Alexander ahead and the prominent, low headland of Three Star Point astern, for 2.8 miles, using the marked passage, described earlier, between Egg Island and Paul Island.

(290) When the W tangent of Paul Island comes on range, bearing 165°, with the highest point of Jacob Island, steer **201°** for 16 miles with the center of Egg Island astern. This course passes about midway between Paul Island and the jutting point on the E side of Alexander Point; about 0.8 mile off the W coast of Jacob Island; midway between Noon Point and Leader Island; 1.8 miles E of Fox Cape; and 2 miles E of Kupreanof Point.

(291) The E shore of **Kupreanof Peninsula** from Ivanof Bay to Kupreanof Point is bold and precipitous, broken only by a broad sand beach, 1.5 miles long, 9 miles N of Kupreanof Point, and by a small sandy cove 4.5 miles N of Kupreanof Point.

(292) **Leader Island,** between Kupreanof Peninsula and Jacob Island, is a turtleback-shaped, rocky, islet 131 feet high. It may be passed in depths of 23 to 37 fathoms on the W side and 32 to more than 50 fathoms on the E side. A 17-fathom bank is 1 mile N of the island.

(293) **Hag Peak,** a black dome-shaped mountain, the seaward face of which consists of rows of tilted basalt columns, is at the S side of the entrance to the long sandy beach cove and 3 miles WSW of Leader Island. The peak is a distinctive landmark.

(294) **Fox Cape,** 4 miles SSW of Leader Island, appears as a pyramidal-shaped headland with several off-lying islets. The largest of these islets has a sloping flat top and sides with a number of deeply carved caves.

(295) S of Fox Cape the shoreline is bold and reef fringed. A group of three pinnacles, 25 feet high, are 1.5 miles S of the cape.

(296) **Kupreanof Point** (55°34.0'N., 159°35.5'W.), the SE end of Kupreanof Peninsula, appears as a row of rugged monoliths, graduated downward from the high point of the 862-foot cape. Several reefs fringe the base of the cliffs at the SE end of the point. A reef, that breaks in a moderate-to-heavy swell, is 700 yards NE by N of the outer end of Kupreanof Point.

(297) The S shore of Kupreanof Peninsula between Kupreanof Point and Bluff Point is bold and rugged, broken only by a sand beach-bordered cove about midway between the points.

(298) **Stepovak Bay,** NE of the Shumagin Islands, is large and open with numerous small bays and coves indenting the E and W shore. They are between steep ridges on both sides. At the heads of each of these smaller bays are stretches of sand beach behind which are lagoons and grassy flatlands.

(299) Kupreanof Peninsula on the E side of the bay is mountainous. The higher peaks are rocky, barren, and scarred from erosion. The lower slopes are grass covered with patches of alder. The draws and lines of drainage on the lower slopes have dense growths of alder.

(300) The N shore of Stepovak Bay is a long stretch of wide sandy beach, behind which are grass-covered sand dunes. Beyond the dunes a belt of flat tundra extends into Ivanof Bay.

(301) The W shore of Stepovak Bay is mountainous, on a more rugged and massive scale than is the terrain of Kupreanof Peninsula. Snow and ice fields fill the upper plateaus. A small volcanic vent in the high country above Ramsey Bay often sends out a cloud of vapor. The steep terrain surrounding the fluted shafts of Mount Stepo (55°43.0'N., 160°11.0'W.) is rich in beauty and grandeur.

(302) Stepovak Bay is much traveled by fishing craft during the salmon season, and gill nets are laid out from many of the rocky points. Brown bear, wolverines, and foxes track the shores, and there are trappers' cabins in several of the tributary bays.

(303) In the central part of Stepovak Bay, the bottom is regular, with depths ranging from 40 fathoms in the N part to 90 fathoms in the S part. Near the E shore the depths vary from 20 to 40 fathoms. N of Pad Island the bottom is rough, and there are several submerged pinnacles. On the W side of the bay, reefs and submerged shelves make off from many of the headlands. Some of these reefs bare for a few hundred yards offshore, then continue as submerged shelves with depths of 10 to 20 fathoms extending several miles off these points.

(304) The bottom in most of the bays is a sticky dark-green mud, in depths of 15 to 20 fathoms.

(305) Kupreanof Peninsula partly protects this bay from the SE swell common along this coast during the summer. The bays and coves on the W side of Stepovak Bay are more exposed to the SE swell. These bays are also subject to violent winds and downdrafts during NW weather. For this reason the bays on the E shore offer more protected anchorages than do those on the W shore.

(306) **Bluff Point,** the southernmost feature on the E shore of Stepovak Bay, is a sharp narrow promontory about 700 feet high. It bristles with a descending series of projecting nobs and points.

(307) **Boulder Bay,** N of Bluff Point, the southernmost bay on the E side of Stepovak Bay, offers good anchorage but is somewhat exposed to S swells. The bottom is very even, sloping gradually from 20 fathoms at the entrance to 15 fathoms near the anchorage. The bottom is a black gritty mud. The anchoring depth and swinging room make Boulder Bay suitable for medium-draft vessels.

(308) **Cub Point,** on the N side of Boulder Bay, is a broad-topped, rounding headland about 900 feet high. It has almost perpendicular faces that are strongly marked with inclined bands of light and dark stratified rock. A patch of white rock halfway up the outer face of Cub Point makes an identifying landmark.

(309) **Fox Bay,** on the N side of Cub Point, is the largest tributary on the E side of Stepovak Bay. Vessels of any size can find protected anchorage in Fox Bay except during very strong W winds. An islet, 90 feet high, in the SE part of the bay is a good leading mark for vessels entering. The entering course is **090°** for the islet; when 1 mile from the islet, and with a low gravel point that begins near the inner end of a grass-topped bluff abeam to starboard, change course to **065°** and proceed to anchorage in 15 to 18 fathoms, or less if desired, in the large cove at the head of the bay.

(310) The cove on the SE side of Fox Bay is the most protected anchorage for small craft in Stepovak Bay. Enter Fox Bay as in the preceding paragraph and when 1 mile from the islet change course from **090°** and steer **108°** for 0.9 mile to a position where the islet is 0.3 mile on the port beam; thence **135°** for 0.6 mile to anchorage in 8 to 9 fathoms, sticky mud bottom. Water can be obtained from a waterfall on the SE side of the cove.

(311) The N part of Fox Bay should be avoided by strangers. A reef, 750 yards long, 300 yards wide, and awash at lower low water, is 1 mile SSE of the headland on the N side of the entrance.

(312) **Dome Point,** the N entrance headland of Fox Bay, is precipitous with a somewhat level grass top. A large yellow scar on the eroded face identifies this headland.

(313) **Island Bay,** N of Fox Bay, is large and open. Its shores are indented by several coves. An islet, 26 feet high, is in the inner part of the bay and makes a good leading mark for vessels entering the bay. In entering Island Bay vessels should keep at least 0.5 mile offshore. An extensive submerged ledge makes off from the cove 0.8 mile WSW of the islet. This must be avoided when approaching the anchorage.

(314) Anchorage WSW of the 32-foot islet is in 17 to 20 fathoms, mud bottom. Fishing craft sometimes anchor E of the islet in 3 to 6 fathoms, blue mud bottom. A submerged ledge makes off from the E end of the islet, and a shoal, covered 4 feet, is near the bay's N shore NW of the islet.

(315) **Stonehouse Cove** is a small cove 1 mile inside the N entrance point of Island Bay. A long reef extending halfway across the entrance breaks the sea in this cove which has a very smooth, white sand bottom that bares at extreme low tides. The cove is used by fishermen to careen their craft.

(316) **Pad Island,** off the N approach to Island Bay, is low, flat, grass covered, and about 0.5 mile long and 0.2 mile wide. A narrow channel separates the island from the main shore. Kelp patches and foul ground extend N from Pad Island. A pinnacle, covered ¾ fathom, is 0.9 mile S of the island and another pinnacle, covered 1½ fathoms, is 0.4 mile NNE of the island. A large shoal with a least depth of 4¾ fathoms is 1.3 miles N of Pad Island.

(317) The shore from Pad Island N consists of rugged cliffs. Two striking rock formations are 1.5 miles N of Pad Island. One is a chimneylike column, 120 feet high, projecting from the cliff slopes. The other is a spikelike rock, 400 feet high, projecting above the cliff line. This spike is noticeable from a distance.

(318) The small cove in the NE corner of Stepovak Bay is rimmed with rocks and reefs except at its head where there is a sandspit and a lagoon. Depths are 4 to 8 fathoms, mud bottom at the entrance and decrease gradually toward the head.

(319) Along the N shore of Stepovak Bay is **Stepanof Flats,** a 5-mile stretch of broad sand beach. Behind the beach are grass-covered sand dunes and beyond are extensive flats of tundra. Two streams flow out of these flats, often bringing silt that discolors the sea for large areas around their mouths.

(320) **Gull Rock,** just offshore from Stepanof Flats and about midway along the N shore of Stepovak Bay, are two bare rocks joined by reefs; the S rock is about 19 feet high and the N one about 4 feet high. From S they appear light colored against the dark background of the hills. The water is shallow between the rocks and the shore.

(321) **Louies Corner** is at the W end of Stepanof Flats. Hills and a rocky headland are W of Louies Corner. Behind Louies Corner is a detached cone-shaped hill, 746 feet high, that shows distinctly from the S end of the bay. An

anchorage with 17 to 20 fathoms, mud bottom, and exposed to S weather, is 1.3 miles W of Gull Rock.

(322) **Ramsey Bay,** at the N end of the W shore of Stepovak Bay, is fairly open and exposed, and in the central part of the bay the depths are too great for anchoring. A broad sand beach stretches for several miles around the N and NW shores of Ramsey Bay. At the E end of this beach is **Bales Landing.** Small vessels can anchor in 5 to 10 fathoms, green mud bottom, 0.3 mile S of the landing; the anchorage is exposed to S weather.

(323) W of Bales Landing two streams form deltas off the sand beach. On these deltas, sandbars and sandflats bare at low water for more than 0.5 mile offshore from the high-water line.

(324) From Ramsey Bay S to Dent Point, the shore is steep and rocky. At the Ramsey Bay end of this stretch is a rocky headland; reef and rocks, that uncover 1 to 4 feet, extend 0.2 mile SE from the headland.

(325) **Dent Point,** between Ramsey Bay and Grub Gulch, is broad and rounding, backed by steep cliffs, and fringed with reefs. Two conspicuous rocks, 19 and 36 feet high, are joined at low water with the southernmost tip of the point. A rock, covered 2 feet, is 0.3 mile offshore, 1.1 miles NE of the same tip. Vessels should keep at least 0.5 mile off this shore.

(326) **Charts 16553, 16540.–Grub Gulch** (55°48′N., 159°57′W.) is marked by two grass-covered islets and several low, bare rocks and reefs. The bottom near the entrance is very broken, but a channel with 12 fathoms or more can be carried to the head of the bay by favoring the W shore well away from the vicinity of the islets. The anchorage at the head of Grub Gulch is deep, 20 to 23 fathoms, mud bottom; swinging room is limited. At the NE end of the beach at the head of the bay, the mouth of a stream is surrounded by sandflats that bare at low tide. A vessel should favor the SW end of the beach when anchoring.

(327) The outer part of Grub Gulch is not suitable for anchorage because the average depth is about 45 fathoms, and there is little or no swinging room in the shoaler depths near shore.

(328) **Red Hill,** a sharp, steep, red-hued mountain, 2,343 feet high, is on the point between Grub Gulch and Clark Bay. A reef extends 0.3 mile SSE from the outer end of the point to a conspicuous pinnacle rock 20 feet high.

(329) **Clark Bay** is a large open bight backed by two valleys. A grass-covered islet is near the E shore of the bay. It is reported that small fishing craft anchor NW of this islet in 6 or 7 fathoms, finding some lee from SE storms.

(330) Near the W end of the E bight of Clark Bay are two pinnacle rocks. The bottom is foul between these pinnacles and the W shore. The W bight of Clark Bay is called **Little Norway.** Anchorage off the sand beach is in 15 fathoms, mud bottom. During NE storms the winds draw down across this bight with terrific force.

(331) The W shore of Clark Bay consists of a rocky bluff line. A conspicuous waterfall is about 1 mile N of the entrance to the bay. An odd-shaped, slender, pinnacle rock is about 0.2 mile S of the waterfall.

(332) **Waterfall Point** is a broad, rounding headland and ridge separating Clark Bay and Orzinski Bay. A waterfall, visible for many miles, marks the S tip of this point. This waterfall, viewed in profile, appears to spout its stream clear of the bluff line. Reefs and rock ledges make off Waterfall Point for 0.5 mile, and a 3¾-fathom shoal area is 1 mile E of the point; clear the point by at least 1.5 miles.

(333) **Orzinski Bay** has steep slopes along most of its shores, but there are grassflats and a lagoon at the head. It is shoaler than the adjacent bays but seems to have better protection at times from NW storms. A shoal with depths of 7 feet or less extends 0.5 mile off the N shore. The bay must be navigated with caution; the best water is found by favoring the N side of the entrance, then heading for the middle of the bight in the S shore and strongly favoring the S shore to the head. The bottom rises rather abruptly but anchorage is possible in 10 to 20 fathoms, mud bottom, about 0.2 mile from the head; the anchorage has good holding ground but is exposed to SE weather.

(334) An alternate anchorage that offers some protection from SE weather is found off the midbight in the S shore, 0.8 mile WNW of the E end of Elephant Point. Anchor in 13 fathoms, mud bottom. Two abandoned buildings are at the head of Orzinski Bay. One is near the mouth of the stream and the other is farther upstream at the base of a hillside.

(335) **Elephant Point,** on the S side of the entrance to Orzinski Bay, is a sharp-ridged promontory, 655 feet high, bound by sheer cliffs having striking bands of stratified rock. The cliffs at the outer extremity of Elephant Point are deeply undercut. A ledge that uncovers, extends for 0.5 mile ENE to SE from the point. Shoal indications extend 1.5 miles ESE of the point; vessels should clear the point by at least 1.5 miles.

(336) **American Bay** is open and exposed in its outer part, but narrows into a long fiord which is fairly well protected from the outside swell. This inner bay is surrounded by tremendously high peaks of a striking and rugged appearance. In the outer bay a pinnacle, covered 4¼ fathoms, is 0.6 mile SW of Elephant Point, and another pinnacle, covered 4¾ fathoms, is 0.3 mile SW of the rocky point 2 miles along the N shore from Elephant Point. A sandspit projects from the NE shore and a gravel spit from the SW shore 2.5 and 3.5 miles from the entrance.

(337) The valley at the head of American Bay shows considerable evidence of glacial deposit. There are shoals and low-water sandflats off the mouth of the stream that flows from the valley. Depths in the inner bay are 12 to 30 fathoms, and the bottom rises steeply except off the flats at the head. Anchorage is possible for small craft in 8 to 10 fathoms, mud bottom, near the head of the bay; other anchorage is not recommended because of the depths and limited swinging room.

(338) **Blunt Point,** on the S side of the entrance to American Bay, is a broad cape with grass-covered slopes above a shoreline of eroded bluffs. Reefs make off Blunt Point and vessels should stay well clear of it.

(339) **Wind Bound Bay** is a small cove 1 mile W of Blunt Point. Inside the cove is a small valley surrounded by high mountains. It is reported that small fishing craft anchor off the mouth of the creek in 3 fathoms.

(340) **Chichagof Bay** (55°39.0′N., 160°15.0′W.), 3 miles W of Blunt Point, is used as an anchorage by small fishing craft. A reef extends off the N side of the bay and a 2¾-fathom shoal is 0.3 mile off the N entrance point. A reef fringes the bold headland separating Chichagof Bay and West Cove to the S. A shoal area with depths increasing to 4½ fathoms extends 0.5 mile SE from the headland; the outer extremity is marked by kelp. Depths decrease from 10 fathoms at the entrance to 5 fathoms 0.4 mile from the beach at the head of the bay. The anchorage in the upper part of the bay is sheltered except from the SE; the bottom is hard sand.

(341) **West Cove** is small and fringed on both sides with covered rock ledges. A ledge extending almost 0.5 mile SE from the SW point of the cove has pinnacles that bare at various stages of the tide; a 3¾ fathom shoal is 0.7 mile SE of the point.

(342) **Dorenoi Bay,** 7.5 miles SW of Blunt Point, is open and exposed to the E and SE, and subject to strong winds through low ground to the NW. Both sides of the bay are mountainous, and rock ledges border the shores. At the head of the bay is a long stretch of sand beach. The bottom near the entrance is extremely broken; depths vary from 20 to over 70 fathoms. Approaching in midchannel, a good anchorage in 30 to 10 fathoms, good holding ground, is at the head of the bay.

(343) **Renshaw Point,** at the base of a rugged mountain, marks the S entrance of Dorenoi Bay. The deeply eroded orange-buff cliffs are conspicuous for many miles. Black rocks and reefs make off the point.

(344) **San Diego Bay,** the open bight N of a string of islets and rocks between Guillemot Island and the mainland, is marked on its N side by a low yellow cliff. San Diego Bay is much used during the salmon fishing season as an anchorage and as a fish transfer point. The approach N of Guillemot Island is deep and clear. Smaller vessels may carry 4 fathoms through the passage between the W end of the island and a conspicuous pinnacle rock that is midway of the distance to the mainland shore.

(345) **Guillemot Island,** about 1.6 miles long, 0.3 mile wide, and 623 feet high, has bold precipitous cliffs on the N side and low bluffs on the S side. Above the low bluffs the grass-covered ground slopes evenly upward to the top of the cliffs on the N side. A neck of land extends off the S side of the island to a rocky, round, and steep-sided headland. On the E shore, between this round headland and the cliffs to the N, is a bight with a sandy beach.

(346) Off the SW end of the island is a flat and sandspit. A fisherman's cabin is on this flat. Smaller craft often anchor on the S side of the island in the bight E of the sandspit, in 1 to 5 fathoms. NW and NE weather causes strong winds to sweep down the grassy slopes, so this anchorage should be used with caution.

(347) The water is fairly deep off the N and S sides of the island, but a ledge covered 6½ fathoms is 1.1 miles E of its E end.

(348) S of Guillemot Island the coast is bold and precipitous, except for two stretches of low sand beach bordering valleys that break through from the interior. Rocks and reefs fringe the bases of the cliffs. A pinnacle, 40 feet high, is off a point 3 miles SW of Guillemot Island.

(349) **Lumber Bay,** known locally as **Rough Beach,** is on the E face of Swedania Point, 2 miles NE of its SW end, and consists of a shallow bight at the entrance of a valley; the beach is a dike of cobbles thrown up by the sea, and is capped by a great windrow of driftwood.

(350) **Swedania Point** is the seaward end of a ridge 1,309 feet high; at the extremity are rugged cliffs, and on the SW side is a gravel spit at the foot of the cliffs. The profile and end slope are striking and unusual, resembling in magnified outline the end of an artificial earthwork or bunker, back of which the mountain rises steeply. Strong williwaws blow on the lee side off the E face. One mile E of Swedania Point a group of rocks, bare at low water, extend S.

(351) **Balboa Bay,** known locally as **Portage Bay,** offers good shelter on the E side about 5 miles from Swedania Point in a small bight with a low gravel point S of it at the mouth of a large ravine containing a stream. The midchannel into the N arm is deep. When the coal mine at Herendeen Bay, on the other side of the Alaska Peninsula, was in operation, supplies were landed here and carried across the trail by pack train, a distance of about 15 miles. The highest point on the trail, less than 600 feet, is near the S side of the peninsula. This portage is still used frequently.

(352) On the W shore of Balboa Bay, a reef extends 600 yards off the entrance point and then fringes the shore to the N at a distance of 200 to 600 yards offshore. Outside the reef the water deepens rapidly to the middle of the bay.

(353) **Albatross Anchorage,** near the head of the N arm of Balboa Bay, is a secure harbor with depths of 8 to 2 fathoms. During strong N winds, Albatross Anchorage is subject to strong wind-funneling from the mountain passes. During this period Lefthand Bay is the preferred anchorage. **Reef Point** is on the E side of the entrance to the harbor; a reef extends almost 0.1 mile off the point. The best anchorage is in midchannel, 0.6 mile N of Reef Point, and W of **Ballast Island,** in 5 to 8 fathoms. Small craft may anchor in the bight on the W side opposite Ballast Island in 8 to 12 feet and secure better protection; avoid a ledge that uncovers about 4 feet in the N part of the bight.

(354) **Lefthand Bay,** known locally as **Left Arm,** on the W side of Balboa Bay, is well protected and a good anchorage, mud bottom, for any size vessel. Shoals extend about 500 yards off the N and S shores at the entrance, and about 200 to 300 yards off the shores inside the bay. Midchannel depths are 30 fathoms at the entrance, shoaling gradually toward the sand beach at the head of the bay. **Kagayan Flats,** between Lefthand Bay and Beaver Bay, are low and marshy.

(355) **Cape Aliaksin** separates Balboa Bay and Beaver Bay and has no distinctive form; it is of a rounded outline and a low rounded profile. Lowland extends for some distance from the shore all around the cape. The summit, 2,073 feet high, is broad and flat. There is shoal water near shore all around and a rock awash about 0.3 mile off the SW side. A reef extends SE 600 yards off the cape. The cape is difficult to identify from W.

(356) **Chart 16540.–Shumagin Islands,** comprising 15 sizable islands and many islets and rocks, extend for a distance of 60 miles from the coast of the Alaska Peninsula from which the group is separated by Unga Strait.

(357) The inside passage along the Alaska Peninsula in the vicinity of the Shumagin Islands is through Gorman, Korovin, and Unga Straits, and N of Jude Island.

(358) In general, the Shumagin Islands are bold and mountainous, and the shores are broken in many places by inlets that afford good anchorages. The shores are rockbound close-to. Fishing stations and camps are scattered throughout the group, and good fishing banks are off the islands. Fox and cattle raising are carried on to some extent.

(359) **Caution.**–Many areas adjacent to the Shumagin Islands are unsurveyed and may present unknown hazards to navigation.

(360) **Weather.**–The prevailing winds in summer are SW. This wind brings in a sea fog which lasts as long as the wind prevails, and usually covers Unga and Popof Islands, the SW section of Nagai Island, the SW shores of Big and Little Koniuji Islands and Simeonof Island. In Popof Strait and Humboldt Harbor, the lay of the land thins the fog to mist through which the shores are visible and often these waters are in a clear pocket when the fog around is heavy. The SW wind also produces a moderate swell and choppy sea on the SW side of the islands. While this condition prevails on the SW side of the group, it is generally clear on the opposite side, with light breezes, smooth sea, and no swell. A landfall for the Shumagins, in summer, should therefore be made to NE, and the most unmistakable point is Castle Rock. A N breeze dries and clears the islands to crystal clearness.

(361) **Charts 16553, 16540.–Unga Strait** separates the Shumagin Islands from the Alaska Peninsula and has a narrowest width of 2.9 miles between the N end of Unga Island and Cape Aliaksin and depths of 16 fathoms or more. Either shore of the strait should be cleared by at least 1 mile. The current generally sets W. (See Tidal Current Tables for predictions.)

(362) **Unga Spit Light** (55°24.4'N., 160°43.5'W.), 40 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the N end of Unga Island.

(363) **Chart 16540.–Simeonof Island,** the most E of the Shumagin Islands, is about 5 miles long and 3.5 miles wide. It is composed of two clusters of hills, the SE and higher ones being about 1,436 feet. These hills are separated by a low plateau that is nearly cut in two by a very irregularly shaped inlet known as Simeonof Harbor.

(364) The coast of the island is fringed with reefs and shoals. Those on the S and SE sides are variously reported to extend from 3 to 7 miles offshore; those on the E side, 3 miles; and those off the other shores, 0.5 mile. A rock, on which the sea breaks at low water, has been reported halfway between Simeonof and Chernabura Islands.

(365) **Simeonof Harbor** makes in from the W side of the island. A reef extends about 0.5 mile W from the N point of the entrance to the harbor. Off the S point of the entrance is a low, flat, rocky island fringed with reefs. Thick kelp beds are parallel to the reefs on either side of the harbor entrance. The harbor is protected from all winds, the entrance is tortuous, with reefs on either side; the shores are rocky and the water very shoal. The inner anchorage is in 2½ fathoms, with not over 2 fathoms at the lowest tide; the bottom is smooth gravel. Anchorage, exposed to W winds, may be had in the outer part of the harbor in about 4 fathoms, about 0.5 mile inside the entrance.

(366) **Twelve Fathom Strait** separates Simeonof and Little Koniuji Islands and is 2.2 miles wide and has depths of 10 to 20 fathoms except for a 6-fathom shoal area near the middle. A few kelp patches are on the Simeonof Island side.

(367) In 1991, a dangerous submerged rock with an unknown depth was reported in about 54°57'24"N., 159°21'30"W.

(368) **Little Koniuji Island** is very irregular in shape, consisting of three parts, 1,200 to over 1,600 feet high, connected by raised sand beaches. The S end terminates in a high rocky pointed cape, with a reef marked by a breaker extending about 0.3 mile SW from it. The E coast is indented by two coves, and there is a large harbor on the W side.

(369) **Sandy Cove,** on the E side of Little Koniuji Island, is about 1 mile wide at the entrance and 1.5 miles long. On its W shore are prominent granite cliffs. The cove affords good anchorage in its S bight in about 10 fathoms, sheltered from all but SE weather. Excellent anchorage was reported 1.1 miles 155° from **Entrance Point** in sand bottom; this anchorage affords good protection against weather from the SW.

(370) **Atkins Island,** about 1.5 miles long and about 0.6 mile wide, is connected to the NE headland of Little Koniuji Island by a shoal. The island rises to 800 feet at its SE end.

(371) Atkins Island is a Steller sea lion rookery site. There is a 3-mile vessel exclusionary buffer zone around the entire island. (See **50 CFR 227.12,** chapter 2, for limits and regulations.)

(372) **Northwest Harbor,** a bight in the N side of Little Koniuji Island, S of Herendeen Island, may be entered from either side. It affords fair anchorage and protection from all but NE winds in 5 to 10 fathoms. The harbor is about 0.5 mile wide. An abandoned fishing station is here.

(373) **Herendeen Island** is triangular shaped, about 0.9 mile long and 0.5 mile wide. An islet is off the W end.

(374) **Northeast Harbor,** the large bay in the W side of Little Koniuji Island, has two bights and is about 4.5 miles long. The SE bight of the harbor is somewhat open to W winds and the holding ground is rocky and poor. The extreme SE end of the harbor is more protected and is a favorite refuge for fishermen, though the bottom, being alternately patches of rock and sand, is not good holding ground. At the head of a small well-protected boat harbor are several houses.

(375) **Chernabura Island,** the most S of the Shumagins, is high and mountainous, and has few breaks in its profile, the highest part being at the E end. A rocky islet, apparently connected with the main island by a bar, is off its N end. On the E side are three small bays; the middle one is reported to afford anchorage in W winds.

(376) The S shore of Chernabura Island is a Steller sea lion rookery site. There is a 3-mile vessel exclusionary buffer zone around this rookery which encompasses all but the NW portion of the island. (See **50 CFR 227.12),** chapter 2, for limits and regulations.)

(377) **Bird Island,** about 4 miles W of Chernabura Island, is more irregular than that island, but several of its peaks are nearly as high. Passing well S, Bird Island appears as four principal peaks connected by low valleys. Almost its entire SE side is a series of cliffs. A rock is a short distance off its S end.

(378) An anchorage is reported in the bight on the E side of Bird Island, just inside **Point Welcome,** in 5 to 12 fathoms. The wreck of a schooner is at the head of the bight. Temporary anchorage, exposed to all but winds from the SE quadrant, may be had in the bight in the NW side of the island in about 12 fathoms, sand bottom, SW of the reef making out about 1 mile in a NW direction off the NW point of the island. Rocks are 0.5 mile offshore in a W direction from the S point of this bight, and a shoal about 1 mile in a NW direction off the SW point of the island. Submerged rocks are found about 0.5 mile off the N shore of the large bight on the E side of the island.

(379) **Otter Strait,** between Bird and Chernabura Islands, is said to have depths between 20 to 35 fathoms, sandy bottom.

(380) **Big Koniuji Island,** the N and largest of the E group of the Shumagin Islands, is about 13 miles long and about 7.5 miles wide at its widest or S end. The island is rugged and very mountainous, with a well-defined central ridge and spurs projecting toward the points. The coast is broken by many inlets and the points are rockbound close inshore. The highest peaks are frequently mist covered. **Cape Thompson,** its N point, is comparatively low, and its SW end terminates in a long narrow point with a high connecting ridge that resembles an island from some points of view.

(381) **Flying Eagle Harbor,** on the E side of the island, 6 miles S of Cape Thompson, offers well-protected anchorage for small vessels, especially in S gales, in 7 to 10 fathoms.

(382) **Hall Island,** about 0.9 mile long and 0.2 mile wide, is about 1 mile off the E shore of Big Koniuji Island. Two bare rocks are close to the SE face of the E end of the island, and a reef extends about 0.3 mile SW from the SW point.

(383) **Murre Rocks** are a group of three islets about 0.6 mile NW from Hall Island. A rocky ledge extends about 0.3 mile SW from the S islet.

(384) **Yukon Harbor** is SW of Hall Island. A rocky ledge covered with kelp is close around the E entrance point, and rocks are close to the W point. Anchorage, protected from

W weather, may be had in the center of the harbor in about 7 fathoms, but the holding ground is poor.

(385) **Koniuji Strait,** between Big and Little Koniuji Islands, is about 1.5 miles wide, and has reported depths of 16 to 28 fathoms.

(386) **Charts 16556, 16540.**–Four prominent bights are on the W side of Big Koniuji Island. They are open and easy of access and their shores are clear, except close-to. Anchorage in 24 to 26 fathoms may be had near the head of the bight 146° from Peninsula Island which is 3.5 miles NNE from Spectacle Island. In approaching the anchorage it is necessary to keep N of midchannel to avoid a shoal extending 300 yards off the S shore about 0.5 mile from the head of the bight.

(387) The other bights do not offer anchorage because of the great depth of water. Anchorage for very small craft may be found in any of these bights, close inshore, and in the numerous indentations and small coves. The winds draw through the divides into the bights, and the williwaws are very strong.

(388) Two bays indent the S coast of Big Koniuji Island; the reported depth in the W one is too great for anchorage, but in the easterly large bay, vessels have anchored in 16 fathoms, poor holding ground of hard bottom, with protection from N and W winds.

(389) A 3-fathom shoal extends from the S end of Big Koniuji Island.

(390) **Castle Rock,** about 1.5 miles NNE of Cape Thompson, the N point of Big Koniuji Island, is rugged and serrated, and its highest peak is 825 feet. It makes an excellent landmark. A 3-fathom shoal extends about 0.8 mile off its S end.

(391) The bottom between Big Koniuji Island and Castle Rock is said to be even, averaging 28 fathoms.

(392) **East Nagai Strait** separates Nagai Island and Big Koniuji Island of the Shumagin group, and has an average width of 6 miles and a minimum width of 1.6 miles. Peninsula, Spectacle, Bendel, and Turner Islands are in a general NNE-SSW direction in this passage, and the waters between this chain of islands and Nagai Island on one side and Big Koniuji Island on the other are deep and clear, and midchannel courses may be safely steered.

(393) **Peninsula Island,** 3.5 miles NNE from Spectacle Island and the most N island in East Nagai Strait, is 1.5 miles long and 0.8 mile wide. It has a central peak 1,145 feet high. The shore is rugged, steep, and rockbound. A long boulder spit extends off the SE end. The NE end should not be approached closer than 0.3 mile and the SE end no closer than 0.5 mile. Exposed anchorage may be found on the tail of the shoal extending off the SE point in 5½ to 12 fathoms, 0.5 mile from the narrow point.

(394) **Spectacle Island,** 2.5 miles long and 1.5 miles wide at its S part, is rockbound and has steep cliffs on the N, E, and S sides. The N part is distinguished by two peaks over 900 feet high and the S part reaches 1,252 feet. In general, the island may be approached within 0.2 mile.

(395) Anchorages, under favorable conditions, for small craft are in the large bight on the E side of Spectacle Island in 6 to 9 fathoms, in the bight on the W side in 4 to 5 fathoms, and in the small cove in the S side in 3 fathoms. The bights on the E and W sides are open and easy of access. The entrance to the small cove on the S side is about 70 yards across with foul ground on either side to a point about 0.1 mile inside the entrance.

(396) The passage between Peninsula and Spectacle Islands is about 3.5 miles wide and is deep and free from dangers.

(397) **Bendel Island,** SW of Spectacle Island, is separated from it by a passage 0.6 mile wide. It is about 2 miles in diameter and 1,250 feet high. The E end terminates in a narrow neck. There are high bluffs on the S side and sloping valleys on the others. The coastline is rocky, with kelp, and the depths around the island are irregular. A flat extends off the SW side for about 1 mile with depths of 4¼ to 10 fathoms and with several shoaler spots. Depths of 7 to 8 fathoms are also found off the NW and SE sides. Exposed anchorages for small boats may be found in the bights and on the flats.

(398) The passage between Spectacle and Bendel Islands is 0.6 mile wide, and a midchannel course leads through 21 to 11 fathoms.

(399) **Turner Island,** 1,207 feet high, is separated from Bendel Island by a passage from 0.8 to 1.5 miles wide. The island is 2.8 miles long and about 0.9 mile wide. Its shore is rockbound and the SE coast is very foul for about 0.5 mile offshore. There is a low flat on the NW end with a 400-foot knoll on the point. The bluffs on the N, SE, and S sides are 400 to 800 feet high.

(400) The passage between Bendel and Turner Islands is deep at both entrances and shoals gradually to 4¼ fathoms in its narrowest part, about midchannel off the SW point of Bendel Island. Dense kelp grows on this shoal and small craft find difficulty in passing through. This passage is not recommended for large vessels.

(401) The **Twins,** about 4 miles S of Turner Island, consist of three small islands with precipitous and bare sides; the highest, 410 feet, is also the largest of the group. Three small islets and another small islet are off the SW side and SE end, respectively, of the largest island, and a small islet and a larger islet are off the SE side and SW side, respectively, of the most S island. Several rocks awash extend SE from near the NW end of the most W island to near the NW end of the S island.

(402) **Near Island,** in the S approach to East Nagai Strait near Nagai Island, is about 1.4 miles long and 1,289 feet high, with precipitous, rocky sides. The island is easily recognized by a regular serration that cuts its crest into five little peaks. There are rocks close to the shore.

(403) **Charts 16540, 16553, 16556.–Nagai Island,** in the center of the Shumagin group, is about 29 miles long, 9 miles wide, and near the center reaches an elevation of 1,837 feet in a group of confused ridges. Its coast is irregular and indented by numerous inlets, several of which extend nearly through the island and have low, narrow isthmuses at the head. The island is mountainous and its shores are rockbound.

(404) **Cape Wedge,** the N end of the island, is a pointed headland with a rounded, sloping hill, 762 feet high. The N end of the cape terminates in a double point, 262 and 316 feet high and a rocky bluff 150 feet high between. Its shores are rocky and forbidding, and dangers are within 0.3 mile of the shore. Clear the cape by at least 1 mile.

(405) **Mountain Point,** the S end of Nagai Island, is narrow, about 500 feet high, and surrounded by rocks at a distance of about 0.5 mile. A covered rock is about 1 mile SSW off the point.

(406) **Pirate Shake** is a local name for the low, 65-yard-wide neck of Nagai Island, 4 miles SSW of Cape Wedge. The cove on the E side of the neck is a good anchorage but is exposed to winds from about ENE to ESE. The outer points at the entrance are surrounded by reefs, and a rock, 8 feet high, is in the middle of the entrance. The better entrance is N of the rock, heading for an islet, 40 feet high, on the N side of the cove, on a **286°** course. Pass 300 to 500

yards S of the islet, and anchor in the middle of the cove WSW of the islet in about 7 fathoms, soft bottom in places. Anchorage can also be selected in the entrance of the cove just NE of the islet in 7 to 8 fathoms, bottom generally rocky, taking care, however, to avoid the reef that extends about 0.2 mile from the NE shore of the cove. The flat islet, 40 feet high on the N side of the cove, and a rock, 25 feet high, off the outer point on the S side of the cove are good marks for the entrance.

(407) **Northeast Bight,** on the E side of Nagai Island, about 6 miles S of Cape Wedge, is 1.3 miles wide, open, deep, and free from dangers except close to shore. The main body of the bight is too deep for anchorage, but a vessel may anchor in the two coves at the head in about 20 fathoms.

(408) **Chart 16540.–Mist Harbor,** a landlocked basin about 1 mile long and 0.4 mile wide, is on the E side of Nagai Island, 10 miles S of Cape Wedge, and NW from Bendel Island. The depths in the middle of the basin are 27 to 35 fathoms, but small craft can find secure anchorage in the cove on the S side of the W end of the harbor, in 6 to 7 fathoms. The S side of the harbor is formed by a long spit; the 200-yard-wide entrance is around the W end of the spit and necessitates a sharp turn in entering. A midchannel course should be followed through the entrance, and also when entering the cove at the W end of the harbor to the anchorage. A flat fills the E end of the harbor; otherwise there are no dangers away from the shores.

(409) A fishing camp is usually on the cove at the W end of Mist Harbor and small temporary wharves may be found. Water may be had from small streams on the NE side of the harbor. Strong williwaws draw down from the high mountains at times. A low neck of land, about 150 yards wide, separates the W end of the harbor from the head of Northeast Bight.

(410) **East Bight** on the E coast of Nagai Island, 3 miles SW of the entrance to Mist Harbor, is about 3.2 miles long and 2 miles wide. It is deep, open to the SE, and the shores are clear except close-to. Anchorage for moderate-sized vessels may be found on the shelf on the NE side in 15 to 20 fathoms, about 1 mile inside the N entrance point and about 0.4 mile offshore.

(411) The two W arms do not afford good anchorage because of the depth, about 29 fathoms. A 7-fathom spot, surrounded by deep water, is in the N of the two arms, 650 yards off the W shore and about 0.9 mile from the head of the arm.

(412) The entrance to the more S of the W arms is restricted to about 450 yards by a shoal that extends 900 yards N off its S entrance point. In entering, favor the N shore at a distance of 0.1 to 0.2 mile. Small boats may find protected anchorage behind the hook at the S entrance point in 9 to 15 fathoms. After passing well through the entrance to the arm, head **180°** to pass about 100 yards W of the W end of the hook spit. When abreast of the end of the hook, round into the cove and select anchorage in about its center.

(413) **Larsen Bay,** on the E side of Nagai Island opposite Turner Island, affords good anchorage in 4 to 10 fathoms, sandy bottom. The bight is open and easy of access but is exposed to E winds. The W shore is low and is distinguished by white sand dunes. A bold headland, about 100 feet high, projects from the S side. There are several open bights on the E coast of the island between Larsen Bay and Mountain Point.

(414) **John Island,** off the W side of Nagai Island about 7 miles N of Mountain Point, is 580 feet high. S of John Island, Nagai Island consists of two clusters of rocky hills, 1,611 and 1,130 feet high, joined by a low isthmus.

(415) The isthmus is called **Saddlers Mistake** because of a vessel attempting at night to pass between the adjacent high parts of the island.

(416) **Charts 16553, 16540.–Falmouth Harbor,** on the W side of Nagai Island, about 6 miles N of John Island, affords a secure, though limited, anchorage for a small vessel in the basin behind the spit at its head in 7 to 8 fathoms, sandy bottom. The entrance to the basin is not over 300 yards wide, has a depth of 6 fathoms, and has no known dangers. The basin is 0.3 mile wide, and its N side is a broad sandflat that drops suddenly to 4 fathoms.

(417) A reef extends 0.3 mile SW from the S entrance point of Falmouth Harbor; and a rock, bare at low water and marked by a breaker and kelp, is 0.8 mile from that point in the same direction.

(418) The S shore of the harbor is low, rising steeply to the interior hills. **Cape Horn,** a low point, with a rock close off it, is about halfway up the bay on this shore.

(419) The N entrance point rises some 500 feet in a perpendicular cliff. The shore is rocky and bold. A rock, 5 feet high, is 0.3 mile offshore and 1.2 miles NW from this point.

(420) **Wooly Head,** on the W side of Nagai Island between Falmouth and Eagle Harbors, is a promontory, 1,200 feet high; there are rocks 0.2 mile from shore all around its face, some of them awash and others forming towers and pinnacles 50 feet high. A vessel may pass 0.4 mile off in 20 fathoms. Violent williwaws are frequent here.

(421) **Eagle Harbor,** 13.5 miles SSW of Cape Wedge, about 1.2 to 1.5 miles wide, has depths of 15 to 23 fathoms, with no outlying dangers except near the spits that are 1.5 miles from the head of the harbor. In passing between the spits, favor the one on the SW shore. Good anchorage is anywhere in the head of the harbor above the spits in 14 to 18 fathoms, soft bottom. Small craft can anchor in the lagoon behind the N spit in 6 fathoms.

(422) A fishing station with a large warehouse and boat wharf is on the S side of Eagle Harbor 1.3 miles inside the entrance, and a small abandoned fish station and boat wharf are on the N shore 1.8 miles inside the entrance.

(423) **Sanborn Harbor** is on the W side of Nagai Island about 10 miles from Cape Wedge. The pinnacle rock 103 feet high off **East Head,** the N entrance point, and two waterfalls on the W face of the S entrance point, are conspicuous landmarks. The harbor is 5 miles long and has good anchorage at its head. To secure good shelter, a vessel should pass between **Macks Head** and **Granite Point,** and then anchor as desired, avoiding only the shoal upper half of the NE arm. There are no outlying dangers in Sanborn Harbor.

(424) A fishing station is in a small exposed bay on the N side of Sanborn Harbor, 2.3 miles SE of East Head; it has a warehouse and a boat-wharf, dry at low water.

(425) **Caton Cove** is on the N side of Sanborn Harbor, 3.5 miles SE of East Head; there is shelter in **The Kitchen** for light craft back of the sandspit. The channel, close to the spit, until through the narrowest part of the entrance, has a least width of 100 feet and a least depth of 10 feet.

(426) **Porpoise Harbor,** about 3 miles NE of Sanborn Harbor, affords no useful anchorage because of its great depth.

(427) The bight about 2.5 miles NE of Porpoise Harbor has temporary anchorage in 8 to 15 fathoms, giving the shore a berth of over 300 yards. **Porpoise Rocks** are a small cluster 10 feet high, with deep water close-to, 0.8 mile from the N shore in the approach to the bay.

(428) The narrow bight W of Pirate Shake, described previously, affords anchorage for small craft about 0.3 mile inside the entrance and about on the middle line of the cove in 4 to

6 fathoms, rocky bottom. The bight is exposed to W winds and its E half is foul and shoal to the head.

(429) **West Nagai Strait,** between Nagai and Andronica Islands of the Shumagin group, is 3.3 miles wide at its narrowest point between Porpoise Rocks and The Haystacks, with depths from 25 to 40 fathoms and no outlying dangers. A vessel should pass E and S of The Haystacks and on these sides may approach as close as 0.3 mile in 25 fathoms.

(430) The currents in West Nagai Strait set with the wind and reach a velocity of 1.5 to 2 knots in strong winds. Under ordinary conditions the prevailing set of the current is said to be SW in this vicinity.

(431) **The Haystacks** are a formidable appearing group of four islets 265 to 293 feet high, with a broken chain of rocks running through them. Broken ground, on which the least depth found is 9 fathoms, is 1.3 miles SW from the SW bare rocks. A rock called **The Whaleback,** 1 mile W of The Haystacks, is 22 feet high, and 300 yards SSW of it is a covered rock. Temporary anchorage in 20 fathoms or less can be had in the bight E of The Haystacks. A landing can be made on the boulder beach.

(432) The soundings indicate clear passage between Andronica and The Haystacks, between The Whaleback and The Haystacks, and between the N Haystack and the rest of the group, but none of these passages are recommended.

(433) **Andronica Island,** one of the Shumagin group, is W from the N end of Nagai Island. The island, 2 miles wide, 3 miles long, and 1,175 feet high, is bordered by rocks to a distance of 0.2 mile from the shore; vessels should give the shore of the island a berth of 0.5 mile. A flat islet, 22 feet high, extends 0.4 mile off the SE point toward The Haystacks.

(434) **Andronica Island Light** (55°20.8'N., 160°03.6'W.), 115 feet above the water, is shown from a square frame on the NE point of the island. E of the point is a prominent, conical-shaped rock, 280 feet high, that is useful during low visibility in identifying the N point of the island to assure passage through the desired strait. The light is obscured by the rock.

(435) A rock that uncovers 5 feet, 0.4 mile W of the N point and 0.4 mile offshore, is the farthest outlying danger in the approach to Gorman Strait.

(436) A bare rock, 5 feet high, is 0.2 mile off the W point of Andronica Island.

(437) Temporary anchorage may be found 0.5 mile from shore in the bight on the NE side of Andronica, off the sand beach near the N point, in 20 fathoms. Small vessels can anchor closer to shore in this bight, and also in the bight on the SW side of the island; landing can usually be made in one of these bights.

(438) **Gorman Strait** between Andronica and Korovin Islands, is clear if the shores are given a berth of 0.5 mile. Deepest draft vessels should also use caution passing the 7¼-fathom shoal 0.9 mile SE of Cape Devine.

(439) The currents in Gorman Strait set with the wind and reach a velocity of 1.5 to 2 knots in strong winds. Under ordinary conditions the prevailing set of the current is said to be SW in this vicinity.

(440) **Korovin Island** in the N-central part of the Shumagin group, has two summits, separated by low land and marsh extending from Korovin Bay to Grosvold Bay. The E part of this island rises to 1,209 feet, and the W part to 1,808 feet near its S end.

(441) **Cape Devine,** marking the NW side of Gorman Strait, is a gray headland, 885 feet high, joined to the remainder of Korovin Island by a low neck. The shore is fringed with rocks, and a rock awash at low water is 400 yards off the S side of the cape. A pinnacle rock, 65 feet high, is 1.5 miles N of Cape Devine, and a 5¼-fathom shoal is 0.4 mile NE of the pinnacle, off the E side of Korovin Island. A 10-fathom bank extends 0.8 mile S from the cape.

(442) **Korovin Bay,** the W bight on the S side of Korovin Island, affords fair shelter in N weather, but the holding ground is poor. Anchorage may also be had for smaller vessels in the E bight. Both bights are free of danger except for numerous reefs near shore.

(443) **Scotland Point,** the NE end of Korovin Island, is distinguished by the large pyramid-shaped rock 100 yards off the point. A 10-fathom shoal is 1.8 miles NW of the point.

(444) **Grosvold Bay,** 2 miles W of Scotland Point, may be used as an anchorage for small craft. The entrance is foul on both sides but safe in the middle; inside the bay, foul ground is along the shores. The 623-foot peak of the bold rocky headland on the W side of the entrance to the bay and a waterfall W of the headland are prominent.

(445) The bay between Scotland Point and Grosvold Bay is not recommended for anchorage.

(446) **Henderson Island,** 0.2 mile off the W end of Korovin Island, is small and 58 feet high. From W it is hard to distinguish from Korovin Island until close-to. Rocks extend 0.1 mile off the W end of Henderson Island and shoals, covered 8 fathoms and less, extend up to 1 mile around the island, except on the E side where a reef extends to Korovin Island.

(447) **Korovin Strait,** between Korovin and Popof Islands, has a least width of 2 miles and is free of dangers. The bottom is rough with depths of 25 to over 100 fathoms.

(448) **Karpa Island,** 4 miles NE from Korovin Island, is 0.7 mile wide, 1.3 miles long, and 1,373 feet high. The island is grass covered with a smooth profile; a remarkable cliff, 900 feet high, is at the NE point. The island may be ascended only from the SW point; 70 yards off this point is a pinnacle rock, 50 feet high. A reef extends 140 yards off the SE point and a narrow kelp field is along the S and SE sides of the island; otherwise there are no outlying dangers.

(449) **Popof Island,** close E of Unga Island in the Shumagin group, is irregular and rough in shape, with many hills over 1,000 feet high. The highest point, 1,520 feet, is a short distance NE of the center of the island. The shores are generally rocky and steep and have many ledges, covered with kelp, extending 200 to 300 yards offshore.

(450) The N and E shores of Popof Island have no outlying dangers, but the shore should be given a berth of about 0.5 mile. The water is deep and clear between Andronica and Popof Islands. Temporary anchorage may be found 0.3 mile off the N shore of Popof Island anywhere W of Pirate Cove in 10 to 20 fathoms.

(451) **Pirate Cove,** 4.5 miles ENE of East Head, was formerly an important codfishing station but has been abandoned for many years.

(452) **Pirate Cove Light** (55°21.8'N., 160°21.6'W.), 85 feet above the water, is shown from a square frame with a red and white diamond-shaped daymark on the bluff at the N side of the entrance to the cove.

(453) **High Island,** 0.4 mile off the NE part of Popof Island, is 0.2 mile in extent and 310 feet high, with its greatest height near its N end. It is grass covered, but has reddish cliffs showing W and grassy slopes on the other side. There are 30 fathoms and more 200 yards from it all around, and the passage between it and Popof Island is clear. The island can be passed fairly close-to, and is a useful mark for making Gorman Strait in thick weather.

(454) **Fox Hole,** on the E side of the N end of Popof Island, is about 1.2 miles long in a SSW direction. It affords well-sheltered anchorage for small vessels in all weather except E and NE. Depths range from 15 fathoms at the entrance to 5¼ fathoms near the edge of the flat which extends 0.3 mile

from the head. The harbor has a clear width of about 400 yards; foul ground extends over 100 yards in places from the shores, and a reef extends about 250 yards N from the point on the S side of the entrance of the narrow part of the harbor. The N point of the entrance is a sheer cliff about 150 feet high. The only directions necessary are to keep in midharbor.

(455) **Popof Head,** 970 feet high and connected to the SE part of Popof Island by an isthmus, is a high precipitous headland with a steep talus. Depths of 20 fathoms are within 200 yards of the head, but vessels should give this headland a berth of 0.5 mile, although in fog it might be approached more closely.

(456) Two large bights, with sand beaches, the W one known as **Red Cove** and the E as **Simeon Bight,** are on the S side of Popof Island. Both of the bights furnish anchorage in N weather, in 8 to 10 fathoms, sandy bottom. Landing with keel boats is difficult because of considerable surf and shoal water near the shore. The point separating the bights is a narrow, rocky projection, fringed with foul ground for 300 yards; rocks awash at low water are 600 yards from shore and 0.4 and 0.7 mile W of the point.

(457) **Popof Strait,** between Popof and Unga Islands of the Shumagin group, is constricted in the N part by rocky ledges, but fans out in the S part into a deep and wide passage.

(458) **Egg Island,** in the middle of the S part of Popof Strait, is small, 165 feet high, and grassy on top. **Little Egg Island,** close W, is 25 feet high and grass topped. There are some detached rocks about the islands; vessels should not approach closer than 0.3 mile.

(459) **Sand Point,** at the W end of Popof Island, is a flat 0.4-mile-long sandspit that marks a turning point to the narrow N part of Popof Strait. Its S shore is fringed close-to by rocky ledges and its N shore has sandy bottom. A shoal shelves off about 150 yards W from the point and then drops off abruptly to deep water; clear the point by 0.3 mile.

(460) **Range Island,** in the N part of Popof Strait, is small and 30 feet high. Foul ground surrounds the island; vessels should not pass between it and Popof Island. **Popof Strait Entrance Light 1** (55°21.4'N., 160°30.3'W.), 50 feet above the water, is shown from a skeleton tower with a square green daymark on the N end of Range Island.

(461) **East Head,** on the E side of the N entrance to Popof Strait, has foul ground and kelp for 0.3 mile off its W side extending SW to Range Island. The radio towers 0.3 mile S of the point are prominent from E.

(462) **West Head,** a projecting point of Unga Island on the W side of the N entrance to Popof Strait, is a 40-foot-high black cliff; 0.5 mile S of it are cliffs 300 feet high. The land W of the head is higher but is broken by numerous valleys. A depth of 10 fathoms is 300 yards off West Head, but as Popof Strait is approached a rocky shoal of 3¼ fathoms is 0.4 mile offshore.

(463) A depth of 6 fathoms can be taken through the narrow channel, marked by lights and buoys, in the N part of Popof Strait, thence depths of 20 to over 80 fathoms through the open passage E of Egg Island in the S part.

(464) In addition to the dangerous reefs in the N part of Popof Strait, marked by buoys, the following dangers must be avoided: a 5-fathom rocky shoal 4 miles SSE of Egg Island and 0.5 mile off the Unga Island shore; a 1¼-fathom pinnacle rock 3 miles SE of Egg Island; a 5¾-fathom spot 0.5 mile 013° from Sand Point Light 7; **Caton Shoal,** 0.6 mile N of Sand Point, with a 3-fathom spot; **Unga Reef,** 0.8 mile N of Sand Point, with 1¾-fathom spots; and reefs covered 2¾ and 3¼ fathoms on both sides of the N entrance to Popof Strait.

(465) The current velocity is about 0.5 knot in the N part of Popof Strait and sets N on the flood and S on the ebb. (See Tidal Current Tables for predictions.)

(466) **Humboldt Harbor,** on the E side of Popof Strait 1.3 miles NE of Sand Point, is an excellent shelter with good holding ground. Sometimes a second anchor is needed to prevent dragging during strong SW winds. Vessels can anchor in about 10 fathoms 0.3 mile offshore with Sand Point Light 7 bearing 220° and Popof Strait Entrance Light 1 bearing 005°.

(467) A small-boat basin, protected by breakwaters, is in Humboldt Harbor. The S breakwater is marked by two lights; the N breakwater is marked at the S end by a daybeacon. In August 1991, the controlling depths were 18 feet in the N half and 14 feet in the S half of the entrance channel. Depths of about 15 feet were generally available in the basin except for severe shoaling along the W and NW edges. The basin provides moorage for 230 craft. The **harbormaster** assigns berths. The harbormaster's office monitors VHF-FM channel 6.

(468) **Sand Point,** on the N side of Humboldt Harbor, is a fishing port. The westernmost wharf at the village is owned by the Aleutian Cold Storage Company. The wharf has a 180-foot face and depths of 24 feet alongside. A machine shop at the plant can make minor repairs to small craft.

(469) The oil wharf, the easternmost and smaller of the two wharves, has a 60-foot face and depths of 15 feet alongside.

(470) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(471) **Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(472) Gasoline, kerosene, lubricating oil, diesel oil, and water are available in sufficient quantity to supply fishing craft operating in the area and local needs. A general store handles fresh and dry stores, and marine supplies.

(473) A small steamer from Seward makes regular calls on mail contract, and a vessel from Kodiak makes regular calls at Sand Point. Nonscheduled vessels from Seattle call occasionally during the fishing seasons. Mail and passenger service by air usually is available weekly from May to September. Radiotelephone and radiotelegraph service is maintained.

(474) A municipal airport and a wharf of the Sand Point Cannery owned by the New England Fish Company are on the N side of the spit at Sand Point, 1.2 miles SW of Sand Point village.

(475) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(476) The Alaska Peninsula is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(477) Vessels using Southwest Alaska Pilots Association pilots and en route to ports in Popof Strait can meet the pilot boat about 2.5 miles S of Popof Head (55°14.7'N., 160°20.0'W.).

(478) The pilot boat can be contacted by calling "SQUAW HARBOR PILOT BOAT" or "HUMBOLDT HARBOR PILOT BOAT" or "SAND POINT HARBOR PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(479) **Charts 16540, 16553, 16551.–Unga Island,** the largest and most important of the Shumagin group, has several large indentations, among which are Baralof Bay and Delarof Harbor on the E side and Zachary Bay on the N. It is

quite mountainous, especially the E half. The W half is comparatively low, that part W of Zachary Bay having somewhat rolling topography. The highest mountains are just SE of Zachary Bay, a 2,270-foot peak being the highest. In general, the shoreline is rocky and precipitous. The S and W coasts are particularly foul. Near the W end of the N shore is a 3-mile-long sand beach with sand dunes immediately behind.

(480) The E coast of Unga Island should be cleared by 1 mile to avoid the several offshore dangers, particularly the 5-fathom shoal 0.5 mile offshore and the 1-fathom rock 0.4 mile offshore between Baralof Bay and Delarof Harbor.

(481) N of Baralof Bay the shore is mostly foul. A few settlers live along the coast. A fishing station is in the bight W of **Hardscratch Point,** 3.3 miles S of Sand Point.

(482) **Baralof Bay,** 5 miles S of Sand Point, is a good anchorage except in heavy E weather. **Baralof Bay Light** (55°14.5'N., 160°32.1'W.), 60 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the N entrance point.

(483) Favor the N side in entering Baralof Bay and anchor in the middle in 16 to 18 fathoms, sticky bottom. Small vessels can anchor nearer the head in not less than 6 fathoms; fair holding ground. A small rocky area, covered 3 fathoms and surrounded by sandy bottom, is in the middle 0.5 mile from the head of the bay. A sandy shoal extends 0.3 mile off the S side of the bay entrance.

(484) A salmon cannery is at **Squaw Harbor,** on the N side of Baralof Bay 0.5 mile inside the entrance. The cannery does not open up until nearly abreast of it. The cannery wharf has a 190-foot face with a depth of 27 feet alongside; water is available during the summer. The cannery has a small machine shop, and stores diesel oil, fuel oil, and gasoline for its own use. An oil wharf, on the NW side of the cannery wharf, has a least depth of about 3 feet along its face.

(485) Small amounts of fuel oil and gasoline can usually be obtained from the general store in emergencies. Vessels of the Pacific American Fisheries sailing from Bellingham, Washington, make regular calls. Radiotelephone and radiotelegraph service is maintained.

(486) The codfishing station has a wharf across Baralof Bay from the cannery. A trail leads overland to Unga.

(487) **Kelly Rock,** 3 miles SE of Baralof Bay, is a small, flat-topped, grassy islet 65 feet high 200 yards offshore; kelp grows between the rock and the shore.

(488) **Delarof Harbor,** 9 miles S of Sand Point, is only sheltered during NW weather and the holding ground is poor. The harbor is not recommended as an anchorage. Depths decrease from 15 fathoms in the entrance to 5 fathoms about 300 yards from the inner harbor entrance; it is not safe to anchor in less than about 6 fathoms.

(489) Rocks and islets obstruct the entrance to Delarof Harbor. **Halfway Rock,** 0.2 mile offshore on the N side, is 70 feet high. **Cross Island,** 0.8 mile W of Halfway Rock, is 265 feet high; a 1¾-fathom shoal extends over 100 yards SSE of the island. **Elephant Rock,** the S entrance point, is a narrow projecting rocky mass 155 feet high. The base of the rock has been hollowed out by sea action and from N resembles an elephant. A reef extends N for 300 yards from the point to a rock, 40 feet high. Dangerous **Blind Breaker,** 0.4 mile NE of Elephant Rock, uncovers at extreme low water; depths of 10 to 14 fathoms surround the rock. The W part of the outer harbor has depths of 3¼ fathoms and less.

(490) A 2¾-fathom, narrow, constricted passage, leads from the outer harbor to the shoal inner harbor that has depths of less than 1 fathom. A large reef on the S side of the entrance to the inner harbor uncovers at extreme low water. **Flagstaff Hill,** on the N side of the narrow passage, is a rounded 81-foot-high point surmounted by a flagpole. An island is close SW of the point.

(491) **Unga,** back of Flagstaff Hill, consists of a fishing station, several stores, a school, church, and several houses. It is the center of a codfishing industry. The anchorage off Unga is not recommended except under most favorable weather conditions.

(492) The wharf at Unga is suitable only for small craft at high tide; cargo is lightered ashore from the outer harbor. A ledge, that uncovers, extends 400 yards S from the wharf.

(493) The S coast of Unga Island should be approached with caution. There is no shelter or protection, and often a SE storm comes on suddenly, making it a bad lee shore. It is a poor landfall when approaching from seaward in unfavorable weather, and the currents cannot be foretold. Dangers along the S coast are within 0.5 mile of the shore.

(494) **Unga Cape,** the SE point of Unga Island, is a bare, gray, rugged cliff 855 feet high. A wall-like slab of rock 500 feet high, connected to the cape by a narrow bar, is just S of the cliff and perpendicular to it. At the foot of the cliff are ledges. A vessel may pass 0.5 mile off in 25 fathoms.

(495) **Sealion Rocks,** 3 miles SSE of Unga Cape, are 0.2 mile in extent, 130 feet high, flat topped and grassy. A breaker extends 0.4 mile NE of them. A vessel may pass 0.5 mile off in 26 to 32 fathoms but should give them a greater berth. Between Sealion Rocks and Unga Cape is a clear width of 2.5 miles, with depths from 20 to 30 fathoms and no outlying dangers.

(496) **Acheredin Bay,** a large open bight in the S shore of Unga Island, is 3 miles across and 2 miles in depth. Its shore is a sand and pebble beach, behind which is a lake 7 feet above high water. A vessel may approach to 0.6 mile off the sand beach in 8 fathoms. Anchorage is satisfactory only in N weather.

(497) **Acheredin Point,** the SW end of Unga Island, is a black mountain 1,402 feet high with an exceedingly rough surface and serrated profile. At the end of the point is a separate hill 500 feet high. The 20-fathom curve is within 0.3 mile of the S end of the point. There are numerous rocks and pinnacles around the point, particularly along the SE and E shores; the most prominent is 50 feet high and about 0.7 mile E of the point. A sharp pinnacle also forms the S tip of the point.

(498) **Sombrero Point** is the first prominent headland 5.5 miles N of Acheredin Point. The 1,071-foot peak on the headland resembles a sombrero from most directions to seaward. The waters fringing the point are mostly foul for 600 yards offshore.

(499) **Bay Point,** 12.2 miles N of Acheredin Point, is a rounded rocky headland 315 feet high; it is a good landmark all around and shows over the land in Unga Strait. The low sandy neck that joins the point to the mainland encloses a shallow lagoon that can be entered from N. The sea bottom is steep-to W of Bay Point; the 10-fathom curve is less than 200 yards from shore. Anchorage, with satisfactory protection from E weather, is available in 7 to 19 fathoms N and NW of Bay Point and 10 to 15 fathoms in the large open bight S of the point. Foul areas extend 0.5 to 0.8 mile off the W shore of Unga Island N of Bay Point.

(500) The 16-mile-wide area between Unga Island and Wosnesenski Island is full of broken ground and islets. **Kennoys Island,** 10 miles W by N of Acheredin Point, consists of several small islets. **Jude Island,** 13 miles NW of Acheredin Point, is 150 feet high and less than 0.3 mile across. It is rounded, grassy on top, and rocky at the shore. **Omega Island,** 5 miles W by S of Jude Island, is 90 feet high.

(501) Pinnacle rocks, covered 3 to 8 fathoms, extend as much as 3.5 miles off Sombrero Point. A rock, covered 2 feet that breaks in moderate swell, is 2.3 miles ENE of Jude Island; a ridge with several 3- to 10-fathoms spots extends about 2 miles NNE and SSW of the rock. The area W of a line between Kennoys Island and Jude Island to Wosnesenski Island has many rocks covered 1 to 10 fathoms. A rock awash is 1.4 miles W of Omega Island.

(502) **Unga Spit Light** (55°24.4'N., 160°43.5'W.), 40 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark at the N end of Unga Island. Depths of 10 fathoms or more are 0.3 mile N of the spit, but depths of less than 10 fathoms extend over 1.5 miles E and W of the spit. Temporary anchorage can be had W of Unga Spit during favorable weather.

(503) **Gull Island,** 3 miles E of Unga Spit, is a flat-topped, grassy islet 37 feet high and 80 yards across with deep water within 200 yards.

(504) **Zachary Bay,** on the N side of Unga Island, is open and easily entered. Anchorage is available in the outer part of the bay in 10 to 20 fathoms, sticky bottom, but the area is exposed to N and NE winds.

(505) Dangers extend off both shores at the entrance to Zachary Bay. A kelp-marked ledge that uncovers, extends 0.6 mile NE from the W side. **Weedy Shoals,** two small reefs 0.2 mile off the E shore halfway from the entrance to **North Head,** show well at low water. The lower part of the bay is constricted by shoals extending from both sides; the head of the bay is shoal.

(506) A better anchorage in Zachary Bay is 0.5 to 1 mile SW of **Round Island** in 6 to 12 fathoms, sticky bottom. The narrow channel to the anchorage passes 500 yards W of North Head and 200 yards W of Round Island.

(507) **Coal Harbor** indents the E shore of Zachary Bay and is the best anchorage for small vessels. Anchor in about 6 fathoms 0.5 mile SE of Round Island, sticky bottom. Enter in midchannel N of Round Island, then follow the shore at a distance of 300 yards. Avoid the sandspit, covered 1 foot, that extends 0.3 mile SE from Round Island. The head of the harbor is shoal.

(508) **Chart 16551.–Beaver Bay,** across Unga Strait from Unga Island and W of Cape Aliaksin, is open to the S but is free of offshore dangers. An exposed anchorage is in the upper part of the bay in 5 to 25 fathoms; there is little protection from the N winds that tend to draw down over the mountains and through the valleys into the bay with intensified force. Dangers are within 0.4 mile of the E shore and 1 mile of the W shore of the bay; the head of the bay shoals gradually.

(509) Foul ground with considerable kelp is within the 10-fathom curve that extends from 0.4 to 2.5 miles offshore between Beaver Bay and Pavlof Bay; relatively shallow water is along the shore. A shoal spot, covered 7¼ fathoms, is 2.5 miles SE by S of Seal Cape Light.

(510) **Seal Cape Light** (55°21.0'N., 161°15.1'W.), 75 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on a small island 3 miles E of **Seal Cape.** A hog-backed mountain is 0.8 mile NE of the light. A rock, covered 1½ fathoms, is 0.6 mile offshore 0.8 mile E of the light; a ledge and broken ground extend to the shore.

(511) **Seal Cape** has a flat-topped mound 100 feet high at the outer end, and is joined to the mainland by a low neck of land; it is difficult to recognize. **Moses Rock,** 3 miles W of Seal Cape Light, are two breakers 0.3 mile apart. A 10-fathom depth, irregular bottom, was found 1.2 miles S of Seal Cape; the area was not developed by further soundings.

(512) **Coal Bay,** W of Seal Cape, is a good shelter for small vessels in NE weather. However, only a small part of the bay has been surveyed; vessels should not enter without local knowledge.

(513) **Cape Tolstoi,** 8 miles W of Seal Cape Light at the E entrance to Pavlof Bay, is high and bold with eroded bluffs from 200 to 600 feet high. The cape is marked by two peaks that are separated by a deep, narrow valley. Two prominent pinnacle rocks abut the W face of the cape. The shore around the cape is foul, but depths of 10 fathoms or more are within 0.5 mile of the cape. A small, flat, 20-foot-high, rocky island along the outside coast, 1 mile E of the cape, connects with the mainland at low water by a reef awash.

(514) **Pavlof Bay,** on the SE coast of the Alaska Peninsula 25 miles W of Unga Island, is open but leads to Canoe Bay, a landlocked arm. Several cabins along the shores are occupied by fur trappers during the winter.

(515) Dangerous rocks and small islands are in the entrance to Pavlof Bay. The E shore is bold and strewn with rocks and reefs; the interior is mountainous. The N shore consists of reddish eroded bluffs 30 to 70 feet high giving way to a sand and ash beach near the entrance to Canoe Bay. The W shore is comparatively low with rolling grassland in the interior.

(516) NW winds sweep out of Pavlof Bay with great force in the early spring and fall. The prevailing winds in summer are SE to SW, and they draw up the bay with considerable force causing at times a heavy sea in the upper part of the bay. Fog is more prevalent in the entrance than in the upper part of the bay.

(517) In N weather, anchorage may be selected at any place in the N part of Pavlof Bay. The bottom consists of mud and ashes, and has good holding qualities. In SE weather, good protection may be had just NW of Cape Tolstoi in 15 fathoms, sticky mud bottom. In W weather, anchorage may be found near the W shore about 2 miles S of Ivan Island.

(518) **Flat Island,** in midentrance to Pavlof Bay, is 62 feet high, flat topped, and has precipitous shores. A detached reef that uncovers, extends 0.5 mile S of the island. Detached reefs extend 0.3 mile N and 0.2 mile W of it, but the E side is clear with deep water 0.3 mile off the island. Irregular bottom, covered 11 to over 20 fathoms, extends 3 miles S from Flat Island. Although volcanic ash bottom is indicated, the banks are probably of rock structure and may have less water over them; vessels are cautioned to avoid the area.

(519) **Black Rock,** 1.3 miles off the W entrance shore 4 miles SW of Flat Island, is 15 feet high and surrounded by deep water.

(520) **Lump Island,** 1 mile NNW of Flat Island, is 45 feet high, small, and rocky. A 20-foot-high detached rock is connected to the S side of the island by a reef that uncovers. A rock that uncovers is 300 yards N of Lump Island.

(521) A dangerous shoal, covered 7 feet, is 0.7 mile E of Lump Island. Kelp marking the shoal may be drawn under by strong tidal currents.

(522) **Black Point,** forming the W entrance to Pavlof Bay W of Lump Island, is low and indefinite; it is composed of black cinders and ashes.

(523) **Settlement Point,** 7.5 miles N of Cape Tolstoi, is a low narrow tableland. The 208-foot-high hill just back of the point is prominent. Shelter for small craft may be had on either side of the point in all except SW winds. A dangerous reef that uncovers about 4 feet is 0.2 mile S of the point. A 2¾-fathom patch is 1.2 miles N of the point.

(524) **Gull Island,** 4.5 miles W of Settlement Point, is a bird rookery; a reef extends 0.2 mile W of the island.

(525) A bank between Settlement Point and Gull Island has a least surveyed depth of 12 fathoms; because of the irregular bottom, there may be lesser depths.

(526) **Ivan Island,** 1.5 miles NW of Gull Island, is the largest in Pavlof Bay. It is 200 feet high and flat topped with vertical cliffs rising abruptly from the water. On the E side is a shallow basin for launches; about 6 feet can be carried through the two entrances at high water. Shoal water with scattered kelp is between Ivan Island and the mainland.

(527) **Round Island,** over 2 miles NE of Ivan Island, is 90 feet high, small, and round topped. Two 25-foot-high rocky islets are NE of the island.

(528) There is considerable foul ground with depths less than 1 fathom extending as much as 2 miles from the W shore of Pavlof Bay from Gull Island to and including the N side.

(529) **Canoe Bay** joins Pavlof Bay at the NE end by a 175-yard-wide channel between 50-foot-high rocky entrance points. The controlling depth is 23 feet between deep water in both bays, but care is necessary to avoid several shoal spots of less than 3 fathoms and a 1¼-fathom rock 0.7 mile E of the S entrance point. The current velocity is estimated at 5 to 7 knots in the entrance; slack water occurs at about the time of high and low water in Canoe Bay.

(530) A mountainous ridge that culminates in a remarkable volcano with an extinct circular-shaped crater borders the N side of Canoe Bay. **Cone Peak,** on the S side of Canoe Bay, is 1,280 feet high and prominent from Pavlof Bay.

(531) NW winds do not blow strongly in Canoe Bay, but it is reported that NE winds of winter sweep down the bay with great violence.

(532) Anchorage in Canoe Bay may be selected just inside the entrance in 4 to 10 fathoms, hard bottom, or in the E part in 23 fathoms, sticky bottom.

(533) **Chart 16549.**–On the S side of Alaska Peninsula from Pavlof Bay to Arch Point is a long, low, sandy beach. The ground back of the beach rises gradually to the three peaks of Pavlof Volcano.

(534) **Arch Point,** at the N entrance to Volcano Bay, is moderately low with cliffs about 100 feet high; it is joined by a low neck to the high land farther back. The cliffs are undercut in several places forming caves and arches. The rock is black near the water, changing to light brown above with grassy land back of it. Deep water extends to the S side of the point.

(535) A flat-bottom area makes out from the shore about 6 miles NE from Arch Point, affording good anchorage in 14 to 15 fathoms on the outer part of the flat area. The anchorage is useful for vessels waiting for the weather to clear before attempting the passage among the islands.

(536) **Arch Point Light 2** (55°12.4′N., 161°54.3′W.), 78 feet above the water, is shown from a skeleton tower with a red triangular daymark on the SE part of the point.

(537) An area of broken ground is between Arch Point and Dolgoi Island. A 1¾-fathom rock, 1.5 miles SE of the light, is marked by a lighted buoy. A 5¾-fathom spot is 0.8 mile NW of the rock and broken ground with a least found depth of 6¼ fathoms extends 0.5 mile ESE from the rock.

(538) **Local magnetic disturbance.**–Differences of as much as 10° from normal variation have been observed near Arch Point.

(539) **Volcano Bay** is free from rocks and shoals, except near the shores which should be given a berth of 0.4 mile. The shoaling is abrupt from about 30 fathoms to the flats at the N side of the bay. Good anchorage and shelter from all except SE winds may be had near its head in 10 fathoms, sticky bottom. Shelter for small craft from SE wind may be had in 2 fathoms behind the sandspit that makes out from the S side of the NW part of the bay. Water may be had here. Rocks and ledges extend 500 to 700 yards offshore between this spit and Bear Bay.

(540) **Bear Bay** is a small inlet that affords fair anchorage in the middle of its entrance. The inner part of the bay can be entered only by pulling boats.

(541) **Charts 16549, 16551.–Pavlof Islands,** consisting of seven, extend for over 15 miles from the Alaska Peninsula coast S of Pavlof Bay. Most of the water area inside the outer perimeter of Wosnesenski, Ukolnoi, Poperechnoi, and Dolgoi Islands has not been surveyed and should be avoided; many covered and uncovered rocks, ledges, and breakers are in the area.

(542) **Wosnesenski Island,** the easternmost of the Pavlof group, has a 1,200-foot, rocky, flat-topped peak near the E side. Most of the shore around the island is foul. Small vessels can anchor in the bight on the N shore or in the small bay with sand bottom on the NE side of the island. Dangerous rocks, covered less than 10 fathoms, extend 3 miles N of the island. A submerged rock, covered ¾ fathom, is 1.2 mile N of the NE end of the island.

(543) **Ukolnoi Island,** 5 miles W of Wosnesenski Island, is high and mountainous; it is steep and bold at the NW point. **Ukolnoi Island Light** (55°14.7′N., 161°39.5′W.), 35 feet above the water, is shown from a square frame with a red and white diamond-shaped daymark on the NW point of the island. The N shore should be cleared by more than 1 mile to avoid the broken ground off the island.

(544) **Poperechnoi Island,** 8 miles SW of Wosnesenski Island, has rugged cliffs 1,200 feet high along its NE shore and a 1,800-foot peak in the N part. Foul ground surrounds the island.

(545) **Dolgoi Island,** 9.7 miles across and grass covered, is divided into two mountain masses by Dolgoi Harbor and the lowland at its head. The greatest height at the E and W ends of the island are 1,450 and 1,510 feet, respectively. The shore is generally abrupt and high. The N point of the island is an overhanging cliff. The S part of the island is particularly bold, the cliffs being several hundred feet high. At the middle of the SE side is a headland with a cliff over 900 feet high.

(546) **Dolgoi Cape,** the S point of Dolgoi Island, is marked by several large detached rocks a few yards off the shoreline.

(547) The area from 5 miles SE of Poperechnoi Island to 5 miles SW of Dolgoi Cape is full of dangerous rocks and islets; extreme caution is necessary.

(548) **Dolgoi Harbor** is well protected and provides excellent shelter from violent williwaws; however, the bottom is volcanic ash with poor holding ground. Two islets are on the W side of the entrance and two larger islands are inside the harbor.

(549) To enter Dolgoi Harbor, steer **020°** for the highest point (500 feet) of the ridge at the head of the harbor showing W of the two islands in the harbor, and pass 200 yards or more E of the outer one of the two islets on the W side of the entrance. Pass W of the first island within the harbor, favoring, if anything, the side nearest this small island.

(550) The deeper passage then leads between the two islands in Dolgoi Harbor, taking care to give the N end of the S island a berth of over 150 yards, and the SE end of the N island a berth of over 300 yards; the best course through is about **109°**. Or, vessels can take the passage W of the upper island, which has a depth of about 4 fathoms, by keeping the island at a distance of about 200 yards. This channel obviates the turn between the two islands, which is somewhat difficult for long ships, especially during SE winds.

(551) Anchorage in Dolgoi Harbor can be selected anywhere above the islands in 7 to 10 fathoms, mud bottom. The best anchorage is reported to be 1.5 miles NNE of the N of the two large islands inside the harbor.

(552) Dolgoi Harbor is easily approached with the aid of the chart, passing on either side of Goloi Island. The principal outlying dangers in the approach are a rock covered 1 foot, marked by kelp, with a 5¼ fathom area nearby, 1 mile W of **Entrance Island,** and a cluster of rocks about 1.5 miles SSE of Entrance Island with a least depth of 1 foot.

(553) **Bluff Point** is a rocky headland forming the NW end of Dolgoi Island. It rises abruptly to 50 feet, with a gentle grassy slope to the E.

(554) **Goloi Island,** within the W limit of the Pavlof group, is 970 feet high and the sides are generally abrupt except at the two sandspits, one at the W end and the other at the middle of the NE side of the island. **Goloi Sandspit Light** (55°06.7'N., 161°55.4'W.), 17 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the point of the spit.

(555) A sandspit makes out from **Moss Cape** 1 mile NW of Goloi Sandspit Light; a lighted buoy marks the outer limit of the shoal extending SE from the cape. When on S courses approaching the passage between Moss Cape and Goloi Island, use care not to mistake a pinnacle rock, midway of the E shore of Inner Iliasik Island and skylined in the low center of the island, for the light on Goloi Island. Also, use care in passage to avoid foul ground making out from either side.

(556) **Iliasik Islands,** each about 2.7 miles long and 0.7 mile wide, are both high and have cliffs at the water. Viewed from W, they appear as three islands, as **Inner Iliasik Island** is nearly divided by a low neck of land into parts about 800 feet high. The high N end of **Outer Iliasik Island** is also separated by low ground from the rest of the island. Ledges and kelp extend about 200 yards from the E side and about 0.3 mile from the W side and SE end of Inner Iliasik. Outer Iliasik is surrounded by ledges and kelp to a distance of 0.3 mile in places; bare rocks and foul ground extend 0.5 mile WSW from the W end of the island.

(557) **Iliasik Islands Light** (55°02.3'N., 161°56.2'W.), 95 feet above the water, is shown from a square frame with a red and white diamond-shaped daymark on the S end of Inner Iliasik Island. A lighted buoy is 0.3 mile off the NW extremity of Outer Iliasik Island. A house is on the NW slope of the inner island.

(558) Caution should be used in making the passage between the Iliasik Islands because of reefs that make out from each island, constricting the navigable channel to a width of 0.6 mile. Growing kelp has been seen midway between the islands in the middle of the summer.

(559) From the N point of Inner Iliasik Island a reef extends to the mainland. Just E of the mainland end of the reef and close to the shore is a large boulder that is easily recognized. There is little depth on the reef near the island, and about 8 feet on the greater part of it. Near the mainland a depth of 11 to 12 feet can be taken across the reef by passing 100 to 300 yards off the large boulder on a course parallel to the shore. The passage is used by local fishing vessels of about 6 feet or less draft and is not recommended for any but light-draft vessels; the tendency is to cross too far from the large boulder.

(560) **Sarana Island,** 270 feet high, is a rocky island off the S point of Outer Iliasik Island. The island is fringed with reefs and should be avoided. The passage between it and the Outer Iliasik is foul. A reef, bare at low water, is 1 mile E of Sarana Island, and an extensive reef with occasional bare rocky islets extends to the S from the S point of Outer Iliasik Island.

(561) A rock, covered ¼ fathom, is about midway between the S end of Outer Iliasik Island and Deer Island. Vessels should keep well to the N of this rock, as the area to the S is foul.

(562) **Chart 16549 - Belkofski Point** is the first point on the Alaska Peninsula W of the Iliasik Islands. A reef extends 600 yards SW from the point, and the shore for 0.5 mile on either side is fringed by a reef that extends from 100 to 200 yards offshore. Because of the broken and uneven bottom here, the cape should be rounded not less than 0.8 mile.

(563) **Belkofski,** a native settlement on the E side of Belkofski Point, has a prominent church. Vessels anchor off the village in 10 fathoms and land supplies on the sand and boulder beach unless S weather makes the surf too heavy.

(564) The mail steamer from Seward makes regular stops. In the summer the village is nearly deserted because most of the natives work in nearby salmon canneries. Radiotelegraph communication is maintained.

(565) **Belkofski Bay** is deep and free from hidden dangers, except for reefs and ledges near the shore.

(566) **Local Magnetic Disturbance.**–Differences of as much as 5° from the normal variation have been observed on the E coast of Belkofski Bay.

(567) **Kitchen Anchorage,** on the E side of Belkofski Bay, is easy to reach and affords good shelter in all except NW winds. In strong S weather, the williwaws become frequent and violent. The bottom is soft volcanic mud and its holding quality is good. A large stream flows into the head of the harbor. From the N entrance point of Kitchen Anchorage, for 1 mile to the entrance to the outer portion of Captain Harbor, the shore is a steep-to cliff, and may be approached within 200 yards.

(568) **Captain Harbor** is the indentation at the extreme NE end of Belkofski Bay. It extends NE for about 2 miles with an average width of 0.4 mile, and is divided into an outer and inner anchorage by a shingle spit that extends from the W shore. The outer portion is narrowed to a width of 300 to 450 yards between the 3-fathom curves, and the anchorage is in 10 fathoms in the center with the E end of the shingle spit bearing 033° distant 600 yards. The holding ground is poor, of soft volcanic ash over a hard substratum. The N shore of the outer anchorage is a low cliff, with shoal water extending 300 yards offshore in places.

(569) The outer part of the harbor has general depths of 8 to 12 fathoms and 10 fathoms can be carried into it. At the entrance, a slight bar extends off the N side with a shoalest sounding of 7½ fathoms near the middle of the entrance. Depths of 4 to 8 fathoms prevail over most of the inner part and the 3-fathom curve carries practically to the head of the bay, affording good shelter for small boats.

(570) The W entrance is formed by two low sand-and-gravel islets, with flats extending 250 yards to the E and similar flats extending 400 to 600 yards off the 2-mile stretch of beach to the W.

(571) The entrance to the inner basin is about 350 yards wide, with 9 fathoms in midchannel. The inner anchorage, entirely landlocked, is a secure anchorage for small craft in 7 fathoms, mud bottom, with the end of the shingle spit bearing 185° distant about 600 yards. This is the best small-boat harbor along this section.

(572) To enter Captain Harbor, round the prominent point at the S entrance to Kitchen Anchorage at a distance of 0.5 mile, and steer **030°** to a point 250 yards off the SE entrance to Captain Harbor. Then steer **054°** and anchor. To enter the inner harbor, continue on the **054°** course until midway between the end of the shingle spit and the opposite shore;

round the spit and steer **003°** for a small stream. Anchor as indicated in previous paragraphs.

(573) **Indian Head** is a very noticeable promontory about 200 feet high, projecting 0.5 mile into Belkofski Bay on its W shore. It is distinguished by several pinnacles near the outer end; a reef extends 250 yards off the point.

(574) The bight N of Indian Head has even bottom, with the 3-fathom curve about 600 yards offshore. Vessels of any size will find excellent shelter from all except S winds in this bight. Anchorage can be had in 10 to 20 fathoms, sticky bottom. In severe N winds, anchorage can usually be found in some section free from the wind. The survey ship found this anchorage by far the best in this section except for S weather, and the Fox Island Anchorage, described later in this chapter, the best for S winds.

(575) **Slavna Point** is the high rocky point on the W side of the entrance to Belkofski Bay, 1.6 miles S of Indian Head. It is steep-to, with depths of 8 fathoms 200 yards off the point.

(576) **Bold Cape** (55°01.1'N., 162°15.4'W.), on the Alaska Peninsula opposite Deer Island, is a rugged headland faced with vertical cliffs, above which the mountain rises in steep rock-strewn slopes. Several prominent boulders stand a few yards offshore.

(577) **King Cove,** W of Bold Cape, reaches inland between high ridges that rise from the shore on either side of the cove. The outer bay is deep and free from dangers except those close to shore. Vessels may anchor in 16 fathoms 0.5 mile off the wharf and about midway between two shores. The anchorage is subject to violent williwaws that are apt to sweep across the bay from all points of the compass, but the holding ground is excellent.

(578) **Morgan Point Light** (55°02.5'N., 162°20.1'W.), 120 feet above the water, is shown from a square frame with a red and white diamond-shaped daymark on the W side of the entrance to King Cove. The shoal areas extending E from Morgan Point and from the W shore inside the cove are rocky and marked by kelp. Near the head and on both sides of the cove a line of piles or dolphins, some marked with private lights, mark the offshore limits of the shoal areas. The bar across the mouth of the cove, 0.5 mile inside Morgan Point, has depths of 11 and 12 fathoms, with sand bottom overlaying a harder stratum.

(579) Anchorage in the outer part of King Cove is in 13 to 15 fathoms, very good holding ground. Anchorage in the deeper upper part is in 16 to 21 fathoms, mud bottom mixed with volcanic ash.

(580) **King Cove** has a wharf and salmon cannery and a deep-water pier. The S and main side of the wharf consists of two faces with a small basin between them. Vessels of considerable size (4,800 gross tons) can moor across the two faces of the wharf. In going alongside either of the S faces of the wharf, vessels should make a starboard landing on the ebb and a port landing on the flood. The ebb sets out of the lagoon at the head in a SE direction with considerable strength, such that a portside landing with an ebb current is almost impossible, whereas a starboard landing should be made easily. It may be necessary to use a bower anchor for going alongside and hauling off with a S wind.

(581) Water is not always available for vessels as the supply is limited. Radiotelephone and radiotelegraph communications are maintained by the cannery.

(582) The cannery company maintains a slipway for hauling out their own boats; this is available during the cannery season for emergency repairs. Vessels up to about 100 feet in length can be hauled out. A good machine shop is operated in connection with the cannery, and carpenters are usually available. A small amount of gasoline is kept on hand and might be available in emergencies.

(583) During the fishing season, vessels of the Pacific American Fisheries, sailing from Bellingham, Washington, make regular calls, and the monthly mail steamer from Seward makes regular calls.

(584) To enter King Cove, steer for the wharf on a midchannel course. On the ebb, a strong current parallel with the shore sets E along the face of the wharf. This current is caused by the discharge of water from the lagoon.

(585) The deep-water pier is located about 250 yards S of the entrance to the smallboat harbor and is marked by private lights.

(586) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(587) The Alaska Peninsula is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(588) Vessels using Southwest Alaska Pilots Association pilots and en route to King Cove can meet the pilot boat about 1 mile SE of Morgan Point Light (55°02.5'N., 162°20.1'W.).

(589) The pilot boat can be contacted by calling "KING COVE PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(590) **King Cove Harbor,** a dredged basin formed by a rounding spit and a dike which extends from the W side at the head of King Cove, is entered from the cove through a dredged channel. In May-June 1992, the controlling depth in the entrance channel was 15 feet with 12 to 15 feet in the basin and alongside the piers. Greater depths were available with local knowledge. The entrance is marked by lights. The **harbormaster** controls the use of the grid and assigns berths. The harbormaster's office monitors VHF-FM channel 6 and channel 16.

(591) **King Cove Lagoon** is back of the long spit on which the cannery is located. It is entered through a narrow channel between this spit and King Cove Harbor. The lagoon extends NNE for about 2 miles with depths of 5 to 8 fathoms over most of the area. However, an extensive shoal separates the deep water in the N section from the entrance channel. A fixed bridge with a vertical clearance of 7 feet and a horizontal clearance of 15 feet crosses the entrance channel to the lagoon about 0.2 mile from the E end. The pilings of the bridge are protected by a stone riprap which extends across the channel and uncovers 2½ feet. It has been reported that only skiffs and very small boats pass under the bridge into the lagoon.

(592) Small craft can be beached on the sandspit that forms the N shore of the entrance to the lagoon. The beach slopes evenly and is smooth.

(593) Because of the extensive flats that block the entrance to the upper basin of the lagoon, the plane of low water in that part of the lagoon is about 2 feet higher than the corresponding plane in the cove, and there is a considerable lag in the times of high and low water.

(594) **Deer Island,** near the coast of the Alaska Peninsula W of the Pavlof Islands, is separated from the peninsula by Deer Passage. The passage is a part of the inside route along the Alaska Peninsula. The island has many high conical peaks of about the same height, making it difficult to identify most of them.

(595) **Stag Point,** at the N end of Deer Island, is a short sandspit, except for which the shore is rocky and steep. **Stag Point Light** (54°59.2'N., 162°18.0'W.), 23 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the point. Back of the point is a high sugarloaf peak. The point may be recognized by a steep, high, triangular-shaped bluff at the end of a shoulder of the peak that is conspicuous in the otherwise sloping

sides. **West Cape** is a ridge of bare rock that ends in sheer faces at the W extremity and at the two sides. **Fawn Point** is the S cape.

(596) Approaching Deer Island from W, Fox Island shows up low and irregular and is not very distinct until some time after passing Umga Island, distant 14 miles, unless the weather is exceptionally clear. West Cape off Deer Island shows as a flat-topped sugarloaf, appearing as a detached island, but later is recognized as a part of Deer Island, while at the same time Stag Point shows as a high sugarloaf beyond West Cape. S of West Cape are two barren craterlike peaks, that form an excellent landmark.

(597) **Fox Island Light** (54°57.4'N., 162°26.9'W.), 40 feet above the water, is shown from a small house with a red and white diamond-shaped daymark on the NW point of **Fox Island.** Just back of the light is a prominent knob that is separated from the rest of the island by a low neck of land. The SE part of the island is high and nearly flat topped.

(598) Fox Island Anchorage, on the E side of Fox Island, offers good anchorage in 10 to 16 fathoms, soft bottom, well sheltered from the wind and sea from NE to SW.

(599) The passage between Fox Island and Deer Island is clear except for a rock, covered 3 fathoms, about midway between Fox Island and West Cape. In leaving the anchorage through this passage, round the S end of Fox Island at a distance of 400 yards and lay a course W until the lighted whistle buoy about 2.5 miles S of Thin Point bears about 228°, and Fox Island Light about 068°.

(600) A rock, covered 3 fathoms and buoyed, is 1 mile W of West Cape. The SW side of Deer Island is very foul.

(601) E of Deer Island the flood current sets N and the ebb S. N of Fox Island the flood current sets NE and the ebb SW. The tidal currents here are weak.

(602) **Deer Passage,** between Deer Island and Alaska Peninsula, is well marked and a depth of 9 fathoms can be carried through by following the inside route described in chapter 3. Exercise caution to avoid the dangers on both sides of the passage.

(603) **Cold Bay,** indenting the Alaska Peninsula N of Deer Island, is large and can be entered by deep draft vessels. An aerolight is on the W side of the bay.

(604) Mariners should exercise extreme caution when transiting this area in winter as heavy icing may cause floating aids to lie on their sides, submerge, be extinguished or off station.

(605) The village of Cold Bay is on the W side of the bay, and is one of the larger communities along the Alaska Peninsula.

(606) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(607) The Alaska Peninsula is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(608) Vessels using Southwest Alaska Pilots Association pilots and en route to Cold Bay can meet the pilot boat about 3 miles S of Cold Bay Channel Lighted Buoy 1 (55°05.6'N., 162°31.8'W.).

(609) The pilot boat can be contacted by calling "COLD BAY PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(610) **Vodapoini Point,** at the E entrance to Cold Bay, is low and flat topped with high mountains behind it extending to Lenard Harbor; the shore to Cold Bay is rocky and bold.

(611) **Local Magnetic Disturbance.**–Difference of as much as 14° from the normal variation, has been observed near Vodapoini Point.

(612) Prominent **Bear Rock,** 300 yards offshore and 2 miles NW from Vodapoini Point, is 25 feet high, black, and jagged.

(613) **Kaslokan Point Light 2** (55°06.4'N., 162°31.5'W.), 15 feet above the water, is shown from a square frame with a red triangular daymark on Kaslokan Point on the E side of Cold Bay. **Kelp Point,** 0.7 mile N of the light, is low and rocky.

(614) A reef marked by heavy kelp extends almost across the entrance to Cold Bay near Kaslokan Point. A buoyed 10-fathom natural channel passes through this area near the E shore to deeper water in the bay. The foul area with depths of 2 to 5 fathoms W of the buoyed channel should be avoided. During large tides, the current velocity in the channel may reach 4 knots; with an adverse wind, tide rips make it dangerous for small boats.

(615) The N shore of Cold Bay has many boulders. The W shore consists of low bluffs and sand beaches strewn with boulders, backed by rolling tundra.

(616) **Lenard Harbor,** a small but well-protected harbor formed by an arm of Cold Bay, has anchorage in 16 to 22 fathoms, protected from all seas. The holding bottom is good, but during stormy weather the harbor is subject to the usual williwaws common in this section, and during SE weather the wind may funnel through with terrific force. An extensive reef, awash at ordinary high water, is 0.3 mile off the S shore of Lenard Harbor. This reef constricts the anchorage near its head to an effective width of about 0.4 mile. The water shoals abruptly to the mud flats at its head and to the reef. A fine stream of water flows into Lenard Harbor from its N shore.

(617) **Kinzarof Lagoon,** at the head of Cold Bay, is large and irregular in shape. Although it consists mostly of mudflats, it may be entered at high tide by small launches; with local knowledge such boats may be taken to the cabin on the N shore of the lagoon. Just inside the W entrance is a cabin and a small area of deep water.

(618) **Delta Point Light** (55°11.6'N., 162°38.5'W.), 48 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the spit on the W shore of Cold Bay. In SE weather good protection with excellent holding ground may be had behind Delta Point. In N weather, comfortable anchorage may be selected any place in the upper bay with mud bottom and good holding ground.

(619) **Weather.**–The climate at Cold Bay is basically maritime, because of its nearness to extensive open ocean areas; and temperature extremes, both seasonal and diurnal, are generally confined to fairly narrow limits. Differences between maximum and minimum temperatures for all individual months average less than 10°F. Although it is practically impossible for cold, continental airmasses to reach the Cold Bay area by moving overland along the somewhat narrow Alaskan Peninsula, air overlying the frozen ocean surface of the Bering Sea may take on continental characteristics and bring rather cold temperatures to the Cold Bay area. Although below zero readings have been recorded from December to March, inclusive, below zero readings are extremely rare.

(620) Winds reaching the station from the SW or E are quite light, rarely exceeding 15 m.p.h. The open bay area to the SSE provides not only direct access to winds from that specific direction, but tends to provide, also, a funneling effect upon all winds of consequence approaching the Cold Bay area from the SW to the SE to produce strong SSE winds. From WNW to the NE the land is relatively flat with considerable swamp and numerous small lakes. Winds from

N directions are little influenced by this relatively flat terrain.

(621) The high frequency of cyclonic storms crossing the Northern Pacific and the Bering Sea are the dominant factors in the weather at Cold Bay. These storms account for the high winds and the frequent occurrences of low ceilings and low visibilities encountered at this station. Average wind speeds of 20 m.p.h. for 24-hour periods are very common; and frequently speeds averaging 30 m.p.h. for a 24-hour period are observed. Average monthly wind speeds of 20 m.p.h. or more are recorded at Cold Bay. These winds generally result from the strong pressure gradient developing between the Pacific High and the cyclonic storms in the Northern Pacific and Bering Sea.

(622) Because of the moderating effects of the large, nearby ocean areas, it is difficult to define the seasonal periods at Cold Bay. The beginning of spring is late; the vegetation does not begin to grow until late May or early June. August is regarded as the midsummer period and autumn arrives in early October. The greatest frequency of fog usually comes in the summer, with the foggy period extending from the middle of July to the middle of September. During the winter months visibilities are frequently restricted because of the blowing snow.

(623) The shortest day of the year at Cold Bay has 7 hours and 7 minutes of possible sunshine; the longest day has 17 hours and 27 minutes of possible sunshine. The abundant cloudiness realized in the area greatly restricts the amount of sunshine actually received. Cloudiness averages about nine-tenths sky cover the year around. Precipitation is frequent, but not abundant. Measurable precipitation is realized on slightly more than 200 days per year, on the average.

(624) (See page T-6 for **Cold Bay Climatological Table.**)

(625) A T-head pier with a 775-foot face, 2 miles NW of Delta Point Light, has depths of 30 to 33 feet alongside. The pier is marked by private lights at its NW and SE ends. In 1969, only 364 feet of the SE section of the pier was usable; the remainder is in partial ruins and condemned. In 1972, the State of Alaska, Department of Public Works, Division of Aviation, advised that the Cold Bay pier may be used only during calm weather, and that vessels using the pier must be prepared to move away as quickly as possible in the event of adverse wind and/or sea conditions. This action is necessary for protection of personnel and to prevent oil pollution should the pier give away.

(626) Because of the possibility of further weakening of the pier resulting from additional ice damage and/or high wind loads, the entire pier is subject to immediate closure with little or no notice at the discretion of the Cold Bay Airport manager. The pier is also closed to all vehicular traffic until further notice.

(627) An airstrip at the abandoned airbase at Cold Bay is used by commercial aircraft; an aerolight is at the airstrip. Radiotelegraph and radiotelephone communications are maintained.

(628) **Chart 16535.–Thin Point** (54°57.4'N., 162°33.2'W.), forming the W entrance to Cold Bay, is a low, grassy, gently rolling point. The extremity is a yellow eroded bluff with reefs, bare at low water, extending from its SW and SE points. Shoal water, marked by a lighted whistle buoy at the outer end, extends 1.3 miles S from the point.

(629) **Telegraph Hill,** 370 feet high, is about 2.5 miles NW from Thin Point. It is a grassy, symmetrical, dome-shaped hill that stands out conspicuously as the only high ground near the point. It is a valuable landmark, for it is often visible when the higher hills are cloud-covered.

(630) **Frosty Peak** is the sharp rocky summit of a snow- and ice-covered mountainous mass between Cold Bay and Morzhovoi Bay. It is 5,784 feet high and prominent from seaward, although its snow capped summit is seldom visible through the low-hanging clouds.

(631) **Walrus Peaks,** the S of two, 10 miles W of Thin Point, is a ragged 2,927-foot summit that is prominent when clear. Other peaks blend into the general mountain mass.

(632) **Thinpoint Cove** is just W of Thin Point. The E part of the cove is foul and should be avoided. Numerous kelp-marked reefs extend into the cove for 2.3 miles W from Thin Point. The W half of the cove is clear except for reefs fringing the shore. At the head of the cove is a series of shallow lagoons that extend N for several miles, and are connected with Thinpoint Cove by a small stream. The lagoons can be entered by small launches at high tide. The cove affords excellent shelter for small craft in N weather, but care should be exercised in entering to avoid the reefs to the S and W of Thin Point.

(633) The coast from Thinpoint Cove to Morzhovoi Bay is rather rocky, with an occasional sand beach and grassy bluffs rising from the water. The shore is fairly steep-to, and the shore reef that extends 200 to 500 yards offshore is heavily marked by kelp.

(634) **Sandy Cove** is a small bay 8 miles W of Thin Point and 2.3 miles E of Cape Tachilni. The head of the cove, which is at the foot of a deep valley making through the mountains, is clear. The E entrance point is steep-to. A reef extends S about 0.5 mile from the W entrance point. Good shelter in N weather is afforded small craft.

(635) **Sozavarika Island** (see chart 16549), low and grassy, is 6 miles S from Thin Point and 3.5 miles SW from Deer Island. The island is composed of shells deposited on rock. Between this island and Deer Island are many rocks and reefs.

(636) **Umga Island,** about midway between Deer Island and Cape Pankof, is a small, grass-covered, rocky island about 250 feet high. It is surrounded by deep water. The route from Deer Passage to Cape Pankof passes N of Sozavarika and Umga Islands.

(637) **Rush Rock,** covered 6 feet, is 1.5 miles ENE from Umga Island, and nearly on range with the S side of Umga Island and Cape Pankof. This reef is of small extent and breaks only with a heavy swell.

(638) **Amagat Island,** off the entrance to Morzhovoi Bay, is high and bold, and shows as two parts; the SE part is 1,065 feet high and has a dome-shaped peak, while the other part is 660 feet high, broader and flat topped. The island is the nesting place for many birds. A fair anchorage may be had in 16 fathoms just NE of the island. A deepwater passage is between the island and Cape Tachilni.

(639) A shoal spot of small extent and covered 5¼ fathoms, is 1.7 miles SSW from Amagat Island. Deep-draft vessels should avoid this spot.

(640) **Kenmore Head,** forming the W entrance to Morzhovoi Bay, shows prominently from the usual coasting track. There is a small summit just W of the point which drops off with a vertical cliff to the water.

(641) **Cape Tachilni,** forming the E side of the entrance to Morzhovoi Bay, is an indefinite rounding point with grassy bluffs.

(642) **Egg Island,** 325 feet high, is a rocky precipitous island with a fairly definite summit. Shoal water, covered with kelp, extends from the island to the mainland. The S side of the island affords temporary anchorage for small vessels while waiting for the NW winds to moderate before crossing Morzhovoi Bay.

(643) **Morzhovoi Bay,** the last bay indenting the coast of the Alaska Peninsula, is about 15 miles E of Isanotski Strait. The broad, deep entrance has no known dangers except a rock with 12 feet over it, 400 yards E of Kenmore Head. The land bordering the entrance is very mountainous, giving way to rolling tundra at the head of the bay. The bay forms a natural draw for the wind that sweeps in and out with great violence.

(644) **Littlejohn Lagoon,** N of **Reynolds Head,** is marked by a grassy islet off its entrance. The lagoon offers excellent protection in all weather, but can be entered only by small craft. About 5 feet can be carried through the crooked channel leading through the entrance, but once inside, there are depths of 4 fathoms, sticky mud bottom. Mooring dolphins may be near the entrance. Littlejohn Lagoon is occasionally used as a refuge for piledrivers and tenders.

(645) **Big Lagoon,** the large irregular lagoon at the head of the bay, has no entrance channel and is full of mudflats.

(646) **Middle Lagoon** leads to a large lake that is a spawning place for a large run of salmon. A cabin is at the E entrance point. The lagoon has no channel, and with a S wind, breakers extend across the entrance. During the autumn, great flocks of wild geese frequent the lagoon. From Middle Lagoon it is about 7 miles by the easiest route to the Bering Sea shore.

(647) **Boiler Point,** on the SW side of Morzhovoi Bay, marks the end of the mountain ridge extending from the entrance. A good anchorage, protected from all except NE winds, mud bottom, is in the cove just NW of the point.

(648) In N weather good anchorage with mud bottom may be had at any place along the N shores. In SW weather the cove near Boiler Point offers good protection, while in E weather fair anchorage may be had off Littlejohn Lagoon. Indifferent anchorage may be had in the cove just NW of Kenmore Head.

(649) The shores from Kenmore Head to Kabuch Point are bold and mountainous, with deep water extending close-to. Ikatan Bay and Isanotski Strait separate Unimak Island from the Alaska Peninsula. Isanotski Strait, known locally as False Pass, is in general used for fishing boats and other craft of less than 10-foot draft when bound for Bering Sea points. Vessels up to 419 feet in length have entered the strait and docked at the False Pass cannery which is on the Unimak side, 3.5 miles within the entrance. The region is approached by steamers from the inside route along the Alaska Peninsula through Deer Passage, from seaward through the passage between Sanak Island and Hague Rock, and from the W through the passage between Cape Pankof and Sanak Island.

(650) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(651) The Alaska Peninsula is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(652) Vessels using Southwest Alaska Pilots Association pilots and en route to Isanotski Strait (False Pass) can meet the pilot boat about 1.5 miles NW of Ikatan Point (54°46.5'N., 163°11.0'W.).

(653) The pilot boat can be contacted by calling "FALSE PASS PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(654) **Ikatan Bay,** on the N side of the Ikatan Peninsula, is deep and free from dangers except for the area N of Sankin Island. An abandoned cannery at the SW corner of the bay has a wharf which is unsafe. The larger buildings have been demolished.

(655) **Ikatan Point,** the N end of Ikatan Peninsula, is bold and rocky. There is indifferent anchorage just W of the point, but vessels are apt to drag off into deep water.

(656) **Ikatan Bay Light 1** (54°46.6'N., 163°10.9'W.), 81 feet above the water, is shown from a square frame with a triangular red daymark on the N tip of Ikatan Point.

(657) **Sankin Island,** about 1 mile from the N shore of Ikatan Bay, is high and rocky. In the passage between the island and the mainland is a reef awash at low water. For several years, during the early part of the fishing season, two or three floating salmon canneries have operated from the anchorage just W of Sankin Island. After the middle of July, they usually move to the Bristol Bay region.

(658) The SW side of Ikatan Bay is separated from Otter Cove by a sandy isthmus 20 to 30 feet high; a shifting river enters the bay at the middle of this lowland and the flat off its mouth drops off abruptly to deep water. Several abandoned fish traps are along this shore. In September 1980, it was reported that the fish traps along the S and SW shores of Ikatan Bay had been removed but stumps may remain; caution is advised.

(659) **Isanotski Strait (False Pass),** between the end of the Alaskan Peninsula and Unimak Island, has its S entrance at the NW end of Ikatan Bay.

(660) **Isanotski Strait Light 4** (54°49.0'N., 163°21.6'W.), 15 feet above the water, is shown from a square frame with a red triangular daymark on the spit off high and rocky **Kabuch Point** at the E entrance to Isanotski Strait. A reef that uncovers makes off a short distance from the point. The W side of the entrance is a low sand beach.

(661) **Whirl Point,** on the Unimak side about 1 mile within the S entrance to Isanotski Strait, is bold and marked by a light. A reef that uncovers makes off a short distance from the point, then drops abruptly to deep water. At high water the end of this reef is made evident by the swirls of the current.

(662) A salmon cannery is on the Unimak Island side at **False Pass,** 3.5 miles N of the S entrance to Isanotski Strait. The wharf has a 225-foot face and a depth of about 26 feet alongside. A general store is maintained the year-round. A mail plane calls weekly. The cannery maintains radiotelephone communications; call sign, KIJ–23. Limited supplies of gasoline, distillate, and fuel oil are usually obtainable. A plentiful supply of excellent water is piped to the dock. There is also a small oil dock with shallow water along its face. The ebb current flowing S sets toward the low flat point just S of the cannery, and with such a current, care must be taken to avoid being set onto this point on leaving the wharf. Because of the strong currents and changeable eddies, this wharf must always be approached with caution. A discharge pipe from the cannery may tend to set vessels away from the wharf. With strong currents running a hundred feet out in the stream, it will often be slack water at the face of the wharf.

(663) **Isanotski Strait Light 8** 54°51.4'N., 163°23.4'W.), 21 feet above the water, is shown from a skeleton tower with a red triangular daymark on Island Rock just off Nichols Point.

(664) **Routes, Ikatan Bay to False Pass.**–In entering Isanotski Strait from Ikatan Bay the Unimak side should be favored to avoid the reef off Kabuch Point. Follow the Unimak shore until almost up to Whirl Point; this shore drops off abruptly and can be passed close-to. Off Whirl Point, the tidal current may attain a strength of 7 knots when a tidal current of 4 knots is predicted off the wharf of False Pass cannery. The reef making off Whirl Point, when

covered, is generally made evident by swirls of current. During the ebb current this reef deflects a violent current directly against the axis of the pass, tending to turn a northbound vessel toward the E shore of the strait. Careful steering is required to offset the effect of this current.

(665) After rounding the reef at Whirl Point stand directly for the cannery, taking care to avoid being set too near either shore; avoid the 3-foot ledge that extends SW from the point 0.4 mile S of **Nichols Point,** and **Island Rock** 0.2 mile WSW of Nichols Point. A range consisting of the end of the wharf and some mark on shore back of the wharf would be helpful along the reach from the turn at Whirl Point direct to the wharf. If unable to go alongside, a temporary anchorage may be had in the cove just N of the wharf.

(666) A vessel must be able to make 11 knots to be able to stem the maximum current. Large vessels should enter only at slack water.

(667) **Currents.**–(See the Tidal Current Tables for daily predictions at Isanotski Strait.)

(668) **Routes, False Pass to Bering Sea.**–A route, partially marked by buoys, can be taken from the cannery at False Pass through Bechevin Bay to the Bering Sea. From abreast the cannery, steer a course to the upper end of the buoyed channel through Bechevin Bay about 1.1 miles WSW of the N extremity of Traders Head, thence follow the buoyed channel through the bay and across the entrance bar to the Bering Sea.

(669) Mariners are advised that the approach to Bechevin Bay from the Bering Sea is marked by buoys but is very changeable. Vessels passing N through Isanotski Strait should call at the cannery at False Pass to obtain information concerning the Bering Sea approach to Bechevin Bay.

(670) Transiting in either direction requires extreme caution because of the presence of shoal bars at the edge of deep water between Chunak Point and Bechevin Bay Entrance Lighted Bell Buoy BB. The bars shift frequently. The passage requires local knowledge. Vessels familiar with the area transit with historically gathered Loran-C coordinates that are continually updated. Vessels with a draft greater than 14 feet should not attempt passage; vessels with a lesser draft should try to time transit at or near low water slack current. The safety factor represented by a rising tide is a requirement in this area.

(671) **Tides.**–The tides at False Pass are somewhat irregular and become diurnal at the time of the Moon's maximum declination. The diurnal range of the tide is 4.1 feet.

(672) **Ice.**–As a usual thing, the strait is open to navigation throughout the winter, but during the winter 1923-24 the pass was entirely blocked with ice and the mail steamer could not get beyond Sankin Island. At this time drift ice extended from Cape Pankof to Sanak Island, a very unusual condition.

(673) **Traders Cove** on the E side of Isanotski Strait, is a good anchorage. A small native village known as **Morzhovoi** has a church. The village is deserted during the summer when the inhabitants are employed in the canneries.

(674) It has been reported that during NE gales, the wind in the locality of Traders Cove is deflected to such an extent as to blow in an opposite direction.

(675) **Bechevin Bay,** which is an enlargement of the N end of Isanotski Strait, is shoal and full of sand and mudflats. The bay enters the Bering Sea between **Chunak Point** on the W, and **Cape Krenitzin** on the E. **Cape Krenitzin Light 7** (55°03.8'N., 163°25.3'W.), 30 feet above the water, is shown from a skeleton tower with a square green daymark on the W side of the cape. The approach to Bechevin Bay from the Bering Sea is marked by a lighted bell buoy and unlighted buoys; local knowledge is advised because of the constantly shifting shoals in this entrance.

(676) **Hotsprings Bay,** a large bight in the SE corner of Bechevin Bay, is a fair anchorage sometimes used by fishermen. A small reef, awash, is in the entrance, about 0.4 mile NE of the N end of Traders Head, but good water lies on either side of the reef. The bottom is generally black mud and moss.

(677) **St. Catherine Cove** is the W bight in the N end of the strait. In former years there was a channel leading into the cove affording anchorage for small schooners, but it has shoaled and the cove is nearly bare at low water.

(678) **Rocky Point,** about 4 miles SE of St. Catherine Cove, is marked by a light.

(679) About 2.7 miles NW from **Rocky Point** and 0.5 mile offshore is a reef bare at extreme low water. Several local boats have struck this reef.

(680) **Ikatan Peninsula,** the SE extremity of Unimak Island and S of the end of the Alaska Peninsula, is about 10 miles long and is composed of several mountain masses separated by low depressions. The wind blows through the low depressions of the land with great force. The S shore of the peninsula has rocks and breakers.

(681) **Cape Pankof,** the E end of Ikatan Peninsula, is a sheer rocky headland consisting of a single 1,243-foot peak dropping immediately to a bluff that forms the SE side of the cape.

(682) The slope of the top of the bluff descends gradually from the peak to the N, whereas to the S the descent is broken in the form of vast steps. From the S, the peak has a sharp outline and an abrupt rise from the sea.

(683) **Cape Pankof Light** (54°39.5'N., 163°03.7'W.), 82 feet above the water, is shown from a square frame with a red and white diamond-shaped daymark on rocks off the southernmost part of the bluff.

(684) Another prominent headland, 1,070 feet high, rises precipitously from the bluffs on the S shore of Ikatan Peninsula, 1.5 miles W of the S extremity of Cape Pankof. The mountain masses of the two headlands are separated by a low depression 0.8 mile W of the cape. The bluffs are rust and gray in color. The slopes are grass covered in the summer with frequent bare spots. On the higher bluffs is evidence of small rockslides.

(685) A shoal with a least depth of 7 fathoms has been reported 2.7 miles 022° from the light. A depth of 7½ fathoms is about 10 miles SW of Cape Pankof in 54°31.5'N., 163°14'W. This shoal, about 350 yards across, is surrounded by depths of 25 to 30 fathoms (see chart 16520).

(686) A submerged rock that breaks with a light swell during low stages of the tide, is about 1 mile W from Cape Pankof Light and about 300 yards offshore. Another offshore danger is off the E point of the entrance to West Anchor Cove.

(687) **Pankof Breaker,** a sharp pinnacle rock with 3/4 fathom over it, is a little over 2 miles 053° from the SE point of the entrance to East Anchor Cove. During the summer the rock seldom breaks. Depths of 12 to 14 fathoms are close to the rock. A buoy is 400 yards E of the breaker.

(688) **East Anchor Cove,** on the N side of Cape Pankof, is a good anchorage except for winds from the N to SE, through E. The cove is large and easily entered. Pankof Breaker is the only danger in the approach. An abandoned fishtrap is just inside the SE entrance point. Anchorage may be selected as desired in 7 to 10 fathoms.

(689) **Westdahl Rock,** covered 3 fathoms, is 7.9 miles 104° from Cape Pankof Light. It is a rocky patch of small extent.

(690) **Bird Island,** about 0.5 mile in extent, is the most prominent landmark between Capes Pankof and Aksit.

From the S, the island appears as a single elevated rocky mass, rounded but somewhat ragged in outline; the highest point, 775 feet, is a knob readily identified. Steep sides, fringing rocks, and breakers make a landing very difficult. The only practical landing place is on the N tip which has a steep beach of rather coarse gravel.

(691) A bar, consisting of a submerged reef, connects Bird Island with the W point of the entrance to Dora Harbor. The greatest depth is 5¼ fathoms, and passage is not recommended. This bar depth is on the line passing through the 1,760-foot peak 1.6 miles N of Cape Aksit and the summit on the W point of the entrance to West Anchor Cove. The line crosses the bar a little more than halfway from the point, on the N, to Bird Island. A submerged rock on the bar is a little less than halfway from the point to the island. The rock does not break in ordinary weather.

(692) **West Anchor Cove,** the largest indentation on the S side of Ikatan Peninsula, affords indifferent anchorage. Anchorage in East Anchor Cove is preferable. The anchorage for all but small craft is confined to the open part of West Anchor Cove, which is exposed to S and SW weather, always accompanied by heavy ocean swells. The bottom in West Anchor Cove is fine, dark, gray sand, which is good holding ground. The entrance is wide and clear, but rocky reefs extend from the points on either side. A narrow shelf of rocks extends along the shore at the E point of the entrance, the outer edge of which shows at half tide and probably breaks all the time. A rock covered 2½ fathoms is off this ledge, 0.5 mile SW from the point. This is the outermost danger in the approach from the E.

(693) A prominent flat rock, 4 feet high, is 0.5 mile off the round point on the E side of West Anchor Cove and about the same distance inside the entrance. This feature marks the W limit of the dangers on the E side of the cove and has been found useful for making the anchorage in thick weather. A detached shoal of 2¾ fathoms is in the middle of the inner part of the cove about 1.2 miles from the head. The shoal marks the upper limit of anchorage for all but small craft. Rocky ledges extend from the N and S shores but not over 300 yards. A prominent rock, 46 feet high, is close off the E shore, about 1.2 miles NE of the E entrance point.

(694) The bight between West Anchor Cove and Dora Harbor is small and exposed. Rocky reefs extend about 400 yards from the shore off the entrance points. A prominent rock, 32 feet high, is 330 yards off the W side of the headland at the E end of the bight. A prominent rounded rocky hill, 788 feet high, dominates the headland.

(695) **Dora Harbor,** on the S side of Ikatan Peninsula, provides the only good anchorage with protection from all winds and sea on the S side of Unimak Island, but the harbor is limited to small vessels. The entire shore is fringed with ledges, partly bare at low water, to a distance of about 300 yards. The reef extending 0.3 mile W from the E point of the entrance and the bar from the W point toward Bird Island afford protection from ordinary S and W swells at the outer anchorage, but a heavy swell from S is uncomfortable. The outer anchorage, however, is seldom used.

(696) Low tableland terminates in bluffs at the shores on both the E side of Dora Harbor and the middle point of the W side.

(697) The inner harbor of Dora Harbor is a slight expansion at the head with depths of 9 to 12 feet in the middle. A heavy swell from the S will cause this anchorage also to be uncomfortable.

(698) In entering Dora Harbor care should be taken to avoid a rock, that uncovers, about 0.3 mile 220° from the E point at the entrance. The rock is detached and 200 yards from the edge of the shore reef. In calm weather, when the rock is covered, a light swell may not cause a breaker. Favor the W side in the entrance to avoid the reef extending about 0.3 mile W from the point on the E side of the entrance, and then steer midharbor courses to the inner harbor, where anchorage with somewhat restricted swinging room is afforded vessels of 7 feet or less draft. Care must be taken to hold the midharbor course in entering the inner harbor in order to avoid reefs that make out 325 yards from the points on each side.

(699) **Otter Cove** is an open bight between Ikatan Peninsula and Cape Aksit. The shores on both sides are characterized by high bare rocky cliffs. The sand beach forming the head is bordered by a series of grass-covered dunes. Other dunes in the form of ridges are farther inland.

(700) Otter Cove is exposed to S winds and ocean swells, and always has a heavy surf. N winds blow with great violence over the low isthmus separating it from Ikatan Bay. The only safe boat landing is in the NE corner of the cove. Two rocks, close together that uncover 1 foot, are over 0.5 mile from the shore of Ikatan Peninsula and 3.5 miles NE from Bird Island.

(701) The story has been handed down among the natives that a channel once existed between Otter Cove and Ikatan Bay and that Russian vessels once sailed through.

(702) **Cape Aksit,** the W point of Otter Cove, is bold and rugged.

(703) Cape Lazaref and the S coast of Unimak Island are described in chapter 7.

(704) **Charts 16520, 16547.–Sanak Islands,** the southwesternmost group of islands along the Alaska Peninsula, cover an area 20 miles long and 10 miles wide. The group consists of two large islands, Sanak and Caton, and numerous small islands and rocks, all of which are bare of trees.

(705) **Sanak Peak,** part of the mountain mass at the NW end of Sanak Island, is 1,740 feet high and a prominent landfall. A 787-foot peak, 1.5 miles to the NW, is often visible when Sanak Peak is obscured by clouds. A ridge rises to more than 200 feet on the E side of the mountain mass, but most of the remaining land area in the group is low in comparison, being over 100 feet high on the N side, decreasing to less than 40 feet high among the S islands and rocks.

(706) Anchorage at Sanak Islands is suitable for small or moderate-sized vessels. Caton Harbor affords the only shelter from all winds.

(707) Dangers along the N side of Sanak Islands are within 0.5 mile of the shore, except **Crowley Rock,** 1.5 miles offshore 348° from Sanak Peak. This rock has several small pinnacles with a least depth of ½ fathom over them. The rock, not always marked by kelp, only breaks in a disturbed sea and occasionally shows a prominent slick.

(708) Foul ground of numerous reefs, islands, islets, shoals, and covered and uncovered rocks extends almost 6 miles S and over 12 miles W of Sanak Islands; heavy breakers extend a considerable distance offshore. **Aleks Rock,** 16.7 miles 241° from Sanak Peak, is covered 1½ fathoms and is the farthest outlying known rock SW of Sanak Islands. A 7½-fathom pinnacle is 4 miles N of the rock.

(709) The harbors on the S side of the Sanak Islands, except possibly Peterson Bay, should not be approached without local knowledge.

(710) **Caton Island,** at the E end of the Sanak group, is rolling and grass covered. Most of the beaches are composed of rocky ledges, or boulders and gravel. Steep and prominent bluffs are on the NW point. The low E side and the S side of the island are fringed with rocky ledges up to 1 mile offshore.

(711) **Whale Bay,** on the NE side of Caton Island, is extremely shoal.

(712) Temporary anchorage in S winds can be had W of Caton Island and S of **Lida Island.** Approaching the anchorage from E, stand in near the visible rocks off the E end of Lida Island, taking care to avoid the partially covered reef, nearly 0.5 mile E of Lida Island, that extends N from Caton Island. Anchor about 0.4 mile from Caton Island, and 0.3 to 0.5 mile S of Lida Island, in 6 to 7 fathoms, sandy bottom. Care should be taken not to approach the S side of the anchorage.

(713) If the anchorage S of Lida Island is approached from W, steer for the SW side of Caton Island on **144°,** passing about 0.5 mile S of Lida Island, and leaving a rock that uncovers, 0.5 mile N from Wanda Island, about 0.4 mile on the starboard hand, and anchor as directed above. The W end of Lida Island should not be approached closer than 0.5 mile.

(714) **Caton Harbor,** between Sanak Island on the E and Caton Island on the W, is large and affords anchorage in 2 to 3 fathoms, sandy bottom; it is protected on the S by **Elma Island** and on the N by the islands and reefs between Caton Island and Sanak Island. The harbor is protected from all swells, and schooners of considerable size have wintered here. These waters provide the best all-weather anchorage for small vessels in the Sanak Islands. Water in small quantities may be obtained.

(715) **Princess Rock,** off the W end of the islet in the center of Caton Harbor, is the most prominent feature in the vicinity. It is high and grassy on top; extensive reefs surround the rock.

(716) The best entrance to Caton Harbor is from the N through a narrow channel close to the W end of Caton Island. Proceed as directed for entering the anchorage S of Lida Island from W, and when well past the rock that uncovers, 0.5 mile N of **Wanda Island,** bring the S side of the rock that uncovers in range with Northeast Point astern, and stand in, keeping the range astern, course **125°,** until close to Caton Island. Then keep the bare rocks and kelp projecting from Caton Island close aboard on the port hand, but do not approach the kelp on the starboard hand; the least depth in the narrowest part of the passage is 3½ fathoms, shoaling inside to 3 fathoms. When past the rocks on the port hand, steer **193°** for about 0.5 mile, and anchor in about 3 fathoms with Princess Rock in line with Sanak Mountain, bearing 294°. This anchorage is about 0.5 mile from Caton Island, and the same distance from the nearest reef on the W side. Anchorage, with probably better shelter from NE gales, can be made off the sand beach on Caton Island, just inside the narrow entrance.

(717) To enter Caton Harbor from the S through **Devils Pass,** W from Elma Island, or through **Southeast Pass,** E of Elma Island, requires local knowledge to avoid the reefs and breakers. These passes should not be attempted by a stranger. Surveys indicate a controlling depth of 1¼ fathoms in the approach to Devils Pass with deeper water through the narrow part of the pass. Tide rips in Devils Pass are at times dangerous to small craft.

(718) **Sanak Island,** largest of the Sanak group, has rocks and reefs along its shores and is indented by several harbors that can be used by small vessels. The westernmost breakers of the rocks, which form a continuous barrier from the W side of the island, are 2 miles offshore, or 1 mile W from the northwesternmost bare rocks of the barrier. Cattle are raised on the island.

(719) **Finneys Bay,** at the NE end of Sanak Island, is obstructed by rocks; steep and prominent rocky bluffs are NW of the bay.

(720) **Northeast Harbor,** on the NE side of Sanak Island, affords temporary anchorage about 0.2 mile SSE from 100-foot-high **Northeast Point,** in 13 fathoms. **Eagle Rock,** near the middle of the harbor, is 58 feet high and surrounded by a ledge that uncovers and a reef that connects it with the head of the harbor. A reef that uncovers extends along the N side of the harbor; a 24-foot-high rock is 0.4 mile W of Northeast Point. Small vessels may anchor between Northeast Point and Eagle Rock, with Cherni Island, 13 miles NE, just open of Northeast Point, in 6 to 9 fathoms, sandy bottom. The harbor is exposed to E winds. Water can be obtained.

(721) **Johnson Bay,** 1.5 miles W of Northeast Point, has an inner harbor for small craft, where there is a fishing station. Vessels may anchor just inside the entrance to the bay, favoring the E side, in 9 fathoms, with protection from S and W winds. Rocks are close to the W entrance point.

(722) **Unimak Cove,** 2.5 miles W of Northeast Point, is an unimportant open bight.

(723) **Pavlof Harbor,** 4 miles W of Northeast Point, is reported to be a good shelter for small craft, but local knowledge is required to enter because of reefs at the entrance. **Pavlof Harbor** is a village at the head of Pavlof Harbor.

(724) **Murphys Cove,** 7 miles W of Northeast Point, is protected by a reef and affords shelter for boats of local fishermen.

(725) **Sanak Harbor,** at the NW end of Sanak Island, affords restricted anchorage for small vessels with protection from S and W weather, but is exposed to winds from NW to E, and a swell makes in with strong W winds. Temporary anchorage may be had about 0.2 mile NE of **Point Petrof,** in 10 fathoms. The diurnal range of tide is 6.6 feet.

(726) Approaching Sanak Harbor from N, steer for the 787-foot peak of Sanak Mountain on any course between **140° and 176°,** taking care to avoid Westdahl Rock. When off the entrance, steer **193°** for the middle of the entrance and anchor in midchannel in 3 to 4 fathoms. The covered rocks off the entrance points are marked by kelp. Take care to avoid the 2¾-fathom spot, 0.2 mile N of the E entrance point, and a rock, covered 7 feet, 200 yards off the E shore 300 yards inside the entrance.

(727) A bight on the E side of **Clifford Island** (54°23.0'N., 162°47.0'W.), on the S side of Sanak Island, affords anchorage for small craft in 2½ fathoms, rocky bottom. Local knowledge is necessary to reach the anchorage because of the numerous rocks and reefs on the S side of Sanak Island.

(728) **Peterson Bay,** on the SE side of Sanak Island, is well protected from all but SE winds, especially for small vessels of 12 feet or less draft that can anchor well inside the bay. It is reported that during NE winter gales a heavy swell makes into the bay. In the widest part of the bay near the head are depths of 2 to 2¼ fathoms. A 1¼-fathom spot is in midchannel about 0.5 mile inside the S entrance point. Another shoal of 1¾ fathoms, marked by heavy kelp, is about 350 yards off the S shore and about 0.2 mile inside the S entrance point. The diurnal range of tide is 6.2 feet.

(729) In approaching Peterson Bay from E, give the E and SE sides of Caton Island a berth of about 2 miles to clear the reefs and the breakers that extend more than 1 mile offshore, and steer **262°,** passing 1 mile S of **Umia Island** and **Telemitz Island.** When Telemitz Island is abeam, bring the tangent of the N side of Peterson Bay in line with the slight saddle between Sanak Peak and the E shoulder of Sanak Mountain, and run in on this range, course **318°.** When the S point of the bay is about 0.7 mile distant, haul N a little so as to bring the N side of the bay in line with the extreme SW tangent of Sanak Mountain, and run in on this range, course

311°, until the S point at the entrance bears 177°. Then steer **294°** for the middle of the bay but avoid the 1¼-fathom spot S of the course, and select anchorage according to draft.

(730) **Charts 16547, 16540.–Sandman Reefs,** a large area of foul ground with numerous islands, islets, and rocks, extend from the Pavlof Islands and Deer Island on the N almost to the Sanak Islands on the SW. This area has not been completely surveyed and should be avoided.

(731) **Pinnacle Rock** and **Clubbing Rocks,** on the E and W side of Sandman Reefs respectively, are Steller sea lion rookery sites. There is a 3-mile vessel exclusionary buffer zone surrounding these rocks. (See **50 CFR 227.12,** chapter 2, for limits and regulations.)

(732) **Hague Rock,** at the S end of Sandman Reefs, is 47 feet high, rocky, and grass covered, with deep water close to the S side. A reef extends over 1 mile NW from the rock. **Hague Rock Light** (54°33.1'N., 162°24.1'W.), 60 feet above the water, is shown from a square frame with a red and white diamond-shaped daymark.

(733) The wide and clear passage between Hague Rock and Sanak Islands is used by large vessels going between the Pacific Ocean and Ikatan Bay.

(734) **Cherni Island,** 5 miles N of Hague Rock Light, is grass covered, and shows as rolling land in the N part gradually rising to two prominent 162-foot sharp hills near the S end. The SW side of the island is a bare rock cliff, rising to 90 feet. There is a good small boat anchorage at the N end of the island; strong N winds here only cause small swells at high tide. The anchorage can be approached only from the N with local knowledge. Cattle are reported on the island.

7. ALEUTIAN ISLANDS

(1) This chapter describes the Aleutian Islands and the many passes leading from the Pacific Ocean into the Bering Sea. Also described are the harbors of Dutch Harbor on Unalaska Island, Kuluk Bay on Adak Island, Massacre Bay on Attu Island, and many other smaller harbors in the Aleutian Islands.

(2) **Charts 16011, 16012.–Aleutian Islands,** extending in a 900-mile arc from Unimak Island to Attu Island, are a westward continuation of the Alaska Peninsula and form the southern limit of the Bering Sea. The most important groups of islands in the chain are Fox Islands, Islands of the Four Mountains, Andreanof Islands, Rat Islands, and Near Islands.

(3) Most of the islands are mountainous; the coasts are bluff and exposed; the shores are bold, with many off-lying islets, rocks and reefs; the beaches are rocky and narrow; and the water is usually deep close to shore. As a rule, seabottom features are similar to those of the adjacent land.

(4) **Anchorages.**–Most of the larger islands in the Aleutians provide some sheltered anchorages as mentioned in the text for the individual places. The better known harbors are: Akutan Harbor on Akutan Island, Dutch Harbor on Unalaska Island, Nazan Bay on Atka Island, Kuluk Bay on Adak Island, Constantine Harbor on Amchitka Island, Kiska Harbor on Kiska Island, and Massacre Bay on Attu Island.

(5) **Dangers.**–Nearly all beaches in the Aleutian Islands present natural obstacles to landing. The shores are generally precipitous; the breakers are heavy and in many cases the approaches are filled with jagged rocks and kelp beds which are unusually abundant in the Aleutians; in winter, the kelp disappears entirely. Sand beaches are rare; usually being found only at the heads of bays; and in no case does a beach extend more than 50 yards inland from the high-water line.

(6) When heavy swells and seas are encountered along a beach, a landing in a small boat should not be attempted as there are strong and dangerous undertows accompanied by variable currents. In addition to the lack of surveys, navigation in this region is made difficult by the prevailing thick weather and further by the lack of knowledge of the currents which attain considerable velocity at times.

(7) **Currents.**–S of latitude 50°N., is an E drift across the Pacific. An eddy, accompanying this flow, sets W along the S shore of the Alaska Peninsula and the Aleutian Islands and then drifts through the passes into the Bering Sea. These currents form a part of the general circulation of the North Pacific Ocean.

(8) Through the Aleutian Islands passes, the velocities of the currents caused by tidal and wind effects are large enough to mask the continual N drift through the passes.

(9) In the past, numerous reports have been received to the effect that the flood currents flowing into the Bering Sea are very much stronger than the ebb currents. These reports have been largely discounted by observations in a number of the passages which in general reveal equally strong ebb currents flowing through the passes from the Bering Sea. It is believed that because of the large diurnal inequality in the current of this region, mariners have been deceived by the long periods of flood current that occur near the times of the moon's maximum declination.

(10) Currents are highly complex, making generalizations impossible. They set counter to general trends in many places along shores, even within major passes. Whirls and eddies in wide distribution further complicate the problem.

(11) All passages in the Aleutian Islands have strong currents. In the narrow Akun Strait, the current is reported to reach a velocity of 12 knots. Because of the scarcity of reliable observations, definite current predictions can be made for only a few of the passes. Current predictions for some of the more important passes may be obtained from the **Tidal Current Tables.** The effect of the tidal currents has often been felt offshore at a considerable distance from the passes, resulting in unexpected sets. Mariners should guard against such contingency. In the region of the Aleutian Islands the navigator must heed the currents carefully; a vessel is in more danger there from that cause than from any other, except the lack of surveys. In bad weather, the currents cause much heavier seas, and this effect has been noticed as much as 20 miles off the passes.

(12) In general, tide rips occur to the S of the passes on the ebb and to the N on the flood, furnishing a rough means of determining the set of the current, although local tide rips may be caused by detached banks.

(13) Tide rips even well off the entrances may appear as broken, choppy seas, with a few steep, short swells near the edge. In rough weather, the effect is to make the seas higher and steeper. The tide rips are much more noticeable during periods of tropic tides. Whirls are more likely to occur in the passes near the times of slack water.

(14) A characteristic of the currents in the vicinity of the Fox Island Passes is the sudden change from slack to strength of flood. A change from slack to almost 2 knots in 10 minutes has been noted, and in many cases the maximum flood occurs within 1½ hours after slack. It is therefore probable that the worst tide rips occur at the first of the flood, and under exceptional combinations of weather and tropic tides an effect resembling a bore may be caused in the narrower passes.

(15) In Unimak Pass the current is probably strongest between Scotch Cap Light and Ugamak Island, where at strength of flood or ebb the velocity averages about 3 knots, but the maximum may exceed this figure considerably during tropic tides when 6 knots during the flood and 6.5 knots during the ebb are to be expected.

(16) The current has a large diurnal constituent that at times of tropic tides may cause the current to set continuously in a flood direction for as much as 18 hours.

(17) The set of the flood in Unimak Pass averages about 300°. A vessel proceeding from Unimak Pass toward Avatanak Strait will experience a set when off Ugamak Strait and off Derbin Strait. When crossing the deep, usually marked by tide rips, N of Derbin Strait, a strong set in the direction of the axis of the deep is often experienced. Only weak currents are noted along the shore of Tigalda Island, but farther to the N strong ebb currents, setting toward Avatanak Strait, have been encountered.

(18) Tide rips occur off the E end of Ugamak Island and in places where there is a sudden change of depth.

(19) Instances have been reported of vessels, hove-to N of Unimak Pass and waiting for clear weather, being carried through the pass by the current and finding themselves on the opposite side when the fog lifted.

(20) In Akutan Pass the currents have an average velocity at strength of about 5.5 knots; however, velocities of 9 knots may occur.

(21) The tide rips in Akutan Pass are strong during the periods of largest tides. With a heavy NW wind, the rips are menacing in the vicinity of the 15-fathom spot just S of Cape Morgan. They are confused and make a vessel very uncomfortable; they are dangerous for small craft. However, the strongest rips are not generally found in the middle of the pass. With a current setting N, the rips will be strongest in the N entrance, and with a current setting S, the strongest rips will be found at the S entrance to the pass. When the current setting N is opposed by a strong N wind, the tide rips in the N entrance to the pass are dangerous, and it is advisable not to use this pass in a gale. Under ordinary conditions, when there are no strong winds, this pass can be used by full-powered steamers at any stage of the current, but sailing vessels should not use it except at or near slack water. It is said that the most dangerous rips occur at the N entrance to the pass.

(22) In Unalga Pass, NE of Fisherman Point near the center of the pass, the average tidal current at strength is about 6 knots. At times of tropic tides, current velocities may reach 9 knots. The maximum velocity occurs in a short stretch between Fisherman Point and Unalga Island, and the strongest current can be avoided by favoring the Unalga Island shore. The current along the S side of Unalga Island will rarely exceed 2 knots.

(23) The tide rips in Unalga Pass accompanying a flood current are most pronounced NE of Erskine Point. With an ebb current the most pronounced tide rips occur off Brundage Head. During the periods of tropic tides, however, tide rips may occur throughout the length of the pass. Small boats can avoid the tide rips by keeping close to the Unalga Island shore.

(24) Treacherous seas caused by wind or ocean swell opposing the current may be encountered in the narrow part of Unalga Pass. When tide rips are heaviest in Akutan and Unalga Passes, the water is broken into heavy choppy seas which board a vessel and make it difficult to control the steering. Tide rips are dangerous for small vessels even if there is no wind or sea.

(25) Additional information on currents will be found elsewhere in the text under their respective localities.

(26) **Tides.**–General tide information in the Aleutian chain is contained in the Tide Tables.

(27) **Local magnetic disturbance.**–Differences have been found in many areas in the vicinity of the Aleutian Islands. On land, differences from normal variations of as much as 8° have been observed, with 3° and 4° rather common. Unusual disturbances have been observed on the NW coast of Tigalda Island E of Kelp Bay; on the S shore of Akun Bay; on Cape Aiak, Unalaska Island; in Nazan Bay, Atka Island; on Yunaska Island; and on Amutka Island.

(28) **Weather.**–The weather of the Aleutians is characterized by persistently overcast skies, strong winds, and violent storms. It is often variable and quite local. Clear weather is seldom encountered over a large area. N shores are usually better off than S ones. The winter temperatures are moderated by the relatively warm waters of the Japan Current, so the islands are usually free from ice, which would hamper navigation.

(29) Winds are variable, local, and often strong. From the Fox Islands to the Andreanof Islands, SW through NW winds are the most common except in midwinter, when winds from all directions are frequent. There are numerous local variations to this general flow. On Unimak Island, southeasterlies are common in midwinter. Southeasterlies are also prevalent on the N side of Unalaska Island from November through February. At Atka, NW winds are frequent year round. Williwaws and intense lows bring gales from October through March. Winds have climbed to 65 knots at Dutch Harbor, and to 74 knots on Umnak Island. A maximum wind of 104 knots has occurred at Adak.

(30) In the W Aleutians over the Rat and Near Islands, winds are also strong and variable. From about April through November, S through NW winds are common, while N through SE winds blow frequently in winter. Williwaws can be violent; windspeeds reached 91 knots at Attu one February.

(31) In the Aleutians, about 30 to 75 inches of precipitation occurs on 200 to more than 300 days. This means there are a lot of days with snow and drizzle. For example, at Adak there is an average of 335 days with measurable precipitation, but only 100 days when 0.1 inch or more is measured. In general, precipitation increases W along the chain, but exposure can have some influence on larger islands. Snow is a frequent form of precipitation from November through April, when 30 to 100 inches fall on 10 to 25 days per month.

(32) Temperatures are mild, and their range is small. In the coldest part of the winter, usually January, average daily maximums range from the mid-to upper thirties °F, while minimums fall to the 25° to 30°F range. Occasionally a cold air outbreak will drop temperatures into the teens. Extreme low temperatures range from about 8° to 15°F. This is considerably warmer than along the Alaska Peninsula, where extremes drop well below 0°F. Temperatures begin to moderate after February. July and August are usually the warmest months. Daytime highs from 55° to 60°F are common, while at night temperatures usually fall about 10°F to the 45° to 50°F range. Extreme high temperatures range from about 65° to 75°F; a few places have had a high of 80°F.

(33) The poorest visibilities in the Alaska area occur along the Aleutians. They are best in winter, although even then they can be hampered by fog, snow, and rain. In summer when warm air from the Pacific moves over relatively cooler waters near the Aleutians, extensive fog formation takes place. Often the sun's heat has little effect in dissipating this fog, and it takes a change in air flow to clear the region. This advection or sea fog forms most often from June through September. At its peak in July and August, it can reduce visibilities to below 2 miles on 10 to 20 days per month throughout the chain. It is most likely to affect the S shores, although quite often it blankets the entire region. In winter, land fog is more local and can be expected, along with snow and rain, to drop visibilities to less than 2 miles on 1 to 4 days per month.

(34) The **Aleutian Trench** begins off Cape St. Elias in the Gulf of Alaska and parallels the Alaska Peninsula and the Aleutian Islands for more than 2,200 miles. The axis of the trench is 60 to 90 miles S of the Aleutians, and depths range from 2,400 fathoms in the E part to more than 4,000 fathoms in the W part.

(35) **Chart 16520.–Unimak Island,** the first of the Aleutian Island chain, is separated from the end of the Alaska Peninsula by narrow Isanotski Strait (also called False Pass). This pass is practically closed by shoals at its entrance from the Bering Sea. Unimak Island is about 50 miles long and 23 miles wide; it is extremely mountainous, bare of trees and generally grass covered.

(36) Unimak Island is one of the group known as the **Fox Islands,** the others being Unalaska and Umnak and their associated islands. The Krenitzin Islands, a part of the Fox Islands group, are between Unimak and Unalaska Islands. All

these islands are bare of trees and are generally grass covered. They are frequented by many birds, and immense flocks are frequently encountered in the vicinity.

(37) The higher peaks on Unimak Island are excellent landmarks if they can be seen, but in summer they are usually obscured by fogs or low-lying clouds. The lower hills and islands and objects near the sea level are generally the only landmarks available.

(38) **Shishaldin Volcano,** 9,372 feet high, near the center of Unimak Island, is cone shaped and very regular in outline, with faint wreaths of smoke and vapor drifting at times from its summit. It is for the most part snowclad, except where the rocky cliffs and projections afford no lodgment.

(39) **Isanotski Peaks** are E of Shishaldin. They are rugged and have a broken or castellated double summit, the highest point rising to 8,135 feet. The summit is bare and looks as though it were composed of great vertical rock masses. This mountain is known locally as **Ragged Jack.**

(40) **Roundtop Mountain** is a rounded summit 6,140 feet high, surrounded by snowfields.

(41) **Pogromni Volcano,** about 9 miles from the W end of Unimak Island, is 6,568 feet high and is a snowclad, conical peak with vertical ridges cropping through the snow. Pogromni is a guiding landmark in clear weather for making Unimak Pass both from S and from the Bering Sea.

(42) The S coast of Unimak Island has cliffs in places, with lower land and sand beaches, between, and is backed by the high mountain masses of the central part of the island. The coast is fairly regular, with no indentations of any extent, and there are no harbors nor sheltered anchorages W of Ikatan Peninsula. The coast is exposed to the ocean swell and there is generally a heavy surf, which makes landing dangerous. The 10-fathom curve is less than 0.8 mile from the beach in most places, and there are no known outlying dangers.

(43) **Chart 16535.–Cape Lazaref,** about 800 feet high, on the S coast of Unimak Island, is the southwesternmost of three high cliffs, with sand beaches between them. The NE cliff of the series is at **Cape Aksit.** From the sharp point of the cape, **Lazaref Reef** extends 1 mile S. On this reef are **North Pinnacle Rock** and **South Pinnacle Rock,** about 100 feet high. Anchorage, with fairly good protection from W winds, can be had NE of this reef, about 0.5 mile S of a group of rocks that are about 0.4 mile off the E side of the cape, in 10 fathoms, sandy bottom. **Rock Island,** small and 112 feet high, is 1.5 miles W from the cape and 0.4 mile from the beach. In February 1984, the NOAA Ship MILLER FREEMAN reported finding anchorage with excellent protection from a N storm close to shore between Cape Lazaref and Rock Island. Outside this protected zone, winds of 50 to 60 knots were encountered.

(44) **Chart 16520.**–From Cape Lazaref the coast trends W, curving gradually W and S, for about 30 miles to form **Unimak Bight,** broad and open, and having a sandy beach. This sand beach is broken by a lava bed 8.5 miles W of Cape Lazaref, and by three conical hills, the southernmost formed into several columns and reaching the water to make a small projection, **Cape Rukavitsie,** 15 miles W of Cape Lazaref.

(45) At the S end of the sand beach is a broad valley; the S point is a sharp steep-sided projection, about 350 feet high, which forms **Promontory Cove,** small, and open to N. The cove is reported to afford anchorage with protection from S winds but not from the swell. The bottom is sandy, and shoaling toward the beach is gradual.

(46) **Cape Lutke,** the SW headland of Unimak Bight, is a cliff 610 feet high, joined by a lower ridge to the higher land farther back. At this point the coast changes direction to SW and then W for 13 miles to Seal Cape.

(47) **Seal Cape,** on the N side of Unimak Pass in entering from the Pacific, is not particularly noticeable, but the locality is well marked by Arch Point, Promontory Hill, and Scotch Cap. The coast is bold and can be approached close enough (0.3 to 0.5 mile) in moderately thick weather to be seen and followed.

(48) **Arch Point,** 3 miles NE of Seal Cape, is a rocky projection 172 feet high with an arch through the point near its extremity. The arch is visible only from onshore or close to shore. A small sand beach on the W side of Arch Point is well protected from any weather, except from the S, by the point itself and by a projecting ledge. The heavy surf, which generally prevails along most of this coast, is reported to be absent on this beach. Small boats could probably land here in an emergency.

(49) **Promontory Hill,** 5 miles NE from Seal Cape, is a short ridge, about 1,100 feet high, having a NW and SE direction, and detached from the interior high land. Its outlines are smoothly rounded and it has a slight saddle, the whole having a bare, brown, appearance. It is isolated and prominent, and together with Scotch Cap is a good landmark for the E entrance to Unimak Pass. Approaching Unimak Pass from the E and SE, Promontory Hill can often be seen when other landmarks are fog covered.

(50) From Seal Cape around to Cape Sarichef, a distance of 19 miles, the coast of Unimak Island has a number of projecting points, is low in appearance, and slopes gradually upward to the high land of the island. Between Seal Cape and Sennett Point, the 10-fathom curve is from 0.3 to 0.7 mile offshore. The 20-fathom curve is close inshore in places and is irregular. A study of the chart will show that great care is required in navigating on soundings alone around the W end of Unimak Island which is a region of strong currents. There are no dangers if the coast is given a berth of 0.5 mile.

(51) Along this part of the coast there are several prominent hills. **Red Hill,** a very distinctive formation, is near Cape Sarichef. This isolated hill, 798 feet high, is closer to the shore than the other peaks in the vicinity and is easily recognized by its reddish hue. It is prominent from the N, NE, and W, and is often clear when higher peaks are obscured by fog or clouds.

(52) **Scotch Cap,** 420 feet high, is a precipitous cliff of rock that extends along the beach nearly 1 mile. Back of the cliff the land slopes downward for nearly 1 mile, then rises uniformly to the higher land of the island. Scotch Cap can be seen many miles in clear weather and is unmistakable.

(53) **Scotch Cap Pinnacle,** a rock 172 feet high, is 50 yards seaward from the cliff.

(54) **Scotch Cap Light** (54°23.7'N., 164°44.7'W.), 110 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark about 1.8 miles ESE of Scotch Cap.

(55) **Sennett Point,** midway between Scotch Cap and Cape Sarichef, is a low, flat, grass-covered bluff with a bold rocky coastline. Many detached rocks are near the surf-worn ledges that extend offshore from the base of the bluff.

(56) About 1 mile N of Sennett Point a reef makes out 0.2 mile from shore; the rocks at the outer end of the reef are 3 feet high. The bight between the reef and Sennett Point offers the best shelter and has the best holding ground in this locality. Anchorage inside the 10-fathom curve is usually free from current, no matter how strong it may be running in Unimak Pass. In 1938 a survey ship rode out several SE gales at this anchorage.

(57) A good landing is just N of Sennett Point. It is a small protected beach between the rocky ledges of the point and a group of inshore rocks, the highest is 13 feet. In S weather, this is the best small-boat landing on the W coast of Unimak Island. Mail and supplies for both Scotch Cap and Cape Sarichef Lights are landed on this beach when landings cannot be made at either light. A small cabin on the shore is kept in repair by the U.S. Coast Guard, and is equipped with stove fuel and a few necessary supplies. In N weather landings are made in the bight S of Sennett Point.

(58) About 2 miles S of Cape Sarichef Light is a small, rocky beach, which is well protected by rocks and ledges and could be used as an emergency landing in rough weather. The beach is at the S edge of the black lava flow from a prominent, extinct volcano, 1,240 feet high and 3 miles inland.

(59) **Cape Sarichef** is a steep, grassy bluff about 175 feet high; back of it is a tableland, then a gradual slope upward to Pogromni Volcano. The black lava flow extends N along the coast to within 0.5 mile of the light. At **Sealion Point,** 1.5 miles S of the light, is a flat rock, 35 feet high, which is prominent from seaward.

(60) A shoal area extends W from Cape Sarichef for about 3 miles. Depths on the shoal are 7½ to 15 fathoms; the bottom is mainly gravel, with some rocky patches. The shoal appears to be a submerged extension of the lava flow on the coast. Ships should avoid crossing it because of the heavy tide rips, overfalls, and eddies; the current reaches a velocity of 4 to 6 knots. During favorable weather and sea, passage may be made inside the rocky patches by following the shore at a distance of 0.5 mile.

(61) **Cape Sarichef Light** (54°35.9'N., 164°55.8'W.), 170 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the W end of Unimak Island. Several large buildings are near the light. In very smooth weather, boats can land in the small cove directly below the light.

(62) **Unimak Pass** is the first ship passage SW of the Alaska Peninsula into the Bering Sea. It is about 10 miles wide between the SW end of Unimak Island and Ugamak Island, which is one of the smaller islands of the Krenitzin Group.

(63) Unimak Pass is the widest of the Fox Islands Passes and the most generally used by deep-draft vessels. Unalga and Akutan Passes, 50 miles farther to the W, are convenient under certain conditions if bound for Dutch Harbor, but Unimak Pass is the only one of the three that is lighted.

(64) Besides being a gateway to the Bering Sea, Unimak Pass is also used by some vessels to effect a shorter and better weather route across the North Pacific Ocean. The route W via the Bering Sea avoids the prevailing head winds and heavy seas that are encountered S of the Aleutians.

(65) Unimak Pass is free from outlying dangers, but the currents and prevailing thick weather make it necessary to exercise unusual care in approaching the pass, especially from S. The Krenitzin Islands furnish considerable protection from S and SW weather, but during E or N weather the seas in Unimak Pass are accentuated by the current. A northeaster will also augment the prevailing SW current along the Alaska Peninsula. (See the Tidal Current Tables for current predictions for Unimak Pass.)

(66) SE of Unimak Pass is **Davidson Bank,** on which the depths vary between 35 and 50 fathoms; the seaward edge of the bank drops off sharply into deep water. At times there is a marked change in the color of the water from blue to green when coming from deep water onto the bank. The current runs W with an average velocity of about 0.2 knot; with an E wind it reaches a velocity of more than 1 knot along the 100-fathom curve. Tide rips are of frequent occurrence.

(67) A vessel should be sure of its position before attempting to enter Unimak Pass, and in thick weather should not attempt the other passes.

(68) Vessels should approach Unimak Pass through the prescribed **Unimak Pass Shipping Safety Fairway.** The Unimak Pass Safety Fairway is composed of an E-W fairway with a connecting N-S fairway in the W section. (See **166.100 through 166.110 and 166.400,** chapter 2, for limits and regulations.)

(69) Approaching Unimak Pass from the E, care must be taken to avoid Sanak Reef and Aleks Rock. A good rule is to stay on, or S of 54°N. and make 163°W., while still outside the 100-fathom curve; then stand WNW across Davidson Bank for a position about 3 miles S of Scotch Cap Light.

(70) If the weather is very clear, the mountains of Unimak Island can be seen and recognized, but under ordinary conditions the first land sighted will be Promontory Hill, Ugamak Island, or Tigalda Island. From a distance Tigalda Island will appear as a number of small islands, but closer to, it is one island with six distinct peaks or short ridges. Some navigators prefer to stand W on 54°N. beyond 164°W. so as to sight Tigalda or Ugamak Islands; these islands often show when Unimak Island is fogged in.

(71) The comparatively low land in the depression on the middle part of Avatanak Island is often clear when no other land is showing, especially in N weather. The grotesque irregularities of the topography make it easy to identify the locality. If approaching from the S, this stretch probably offers the best chance for identification of surroundings, especially since it is easy of approach and comparatively free from current.

(72) **Chart 16531.–Ugamak Island,** marked by a light on its N side, is the easternmost of the **Krenitzin Islands,** which extend from Unimak Pass to Akutan Pass. The island has a sharp peak, 1,042 feet high, at the E end; when viewed from the SE, several pinnacles protrude from the side of this peak, giving it an extremely rugged appearance. Near the middle of the island is a knob 905 feet high. The island is mainly tundra covered. The shore is backed by bluffs 50 to 1,000 feet high. Off the SE point of the island is a conical pinnacle, 310 feet high, which is separated from the island by a narrow gorge 10 to 15 yards wide. About 0.3 mile off the SE end are two rocks awash, generally marked by breakers. Twin grassy islets, the N of which is 127 feet high, are 0.6 mile S of the E point of **Ugamak Bay,** a cove on the S side of Ugamak Island. The islets are separated by a deep gorge and appear as one; the collective name of **Round Island** is applied to them.

(73) Strong currents sweep around the E end of Ugamak Island and heavy tide rips occur. It is advisable to give this end of the island a berth of about 2 miles.

(74) The E end of Ugamak Island is a Steller sea lion rookery site. There is a 3-mile vessel exclusionary buffer zone around this rookery which encompasses the entire island and the islands and islets within the 3 mile limit. (See **50 CFR 227.12,** chapter 2, for limits and regulations.)

(75) **Local magnetic disturbance.**–Differences of as much as 5° from the normal variation have been observed on Tigalda Island and as much as 3° between Akutan and Rootok Islands.

(76) **Aiktak Island,** 556 feet high, is S of the W part of Ugamak Island; the two islands are separated by a pass 0.5 mile wide and 6 to 10 fathoms deep. Small vessels use this

pass for temporary anchorage, but moderately strong currents make the anchorage unfavorable. On the S side of Aiktak Island are sheer bluffs, the tops of which approach the highest parts of the island. The islet off the NE end is grass covered and less than 100 feet high.

(77) Temporary anchorage in N weather may be found in Ugamak Bay in 16 fathoms about 0.5 mile from shore. In S weather, some shelter may be found on the N side of Ugamak Island in a small bight 1.5 miles on the E end; depths are 16 to 20 fathoms, 0.3 mile from shore.

(78) **Ugamak Strait** has a width of 3 miles between Ugamak and Aiktak Islands on the N and Kaligagan Island on the S. A detached shoal, covered 10 fathoms, is in the middle of the NW entrance to the strait. Heavy rips and swirls occur in this area at certain stages of the tide. Passage of Ugamak Strait has been made on a **288°** course, heading approximately for Billings Head on Akun Island; this course passes about 1.3 miles N of the northernmost rock off Tigalda Island. Allowance must be made for the current which sets across this course. The velocity of the current is 3.8 knots; velocities greater than 6 knots have been observed. (See the Tidal Current Tables for current predictions for Ugamak Strait.)

(79) **Tigalda Island,** on the S side of Ugamak Strait, is 11 miles long in an E-W direction and 3 miles wide. It has six mountain ridges, 1,000 to 1,600 feet high, which trend NW and are separated by low valleys. The W end of the island is comparatively low. Grass and tundra cover the island.

(80) **Kaligagan Island,** in Ugamak Strait, 0.8 mile off the NE end of Tigalda Island, is 0.8 mile long and 478 feet high. A large number of bare rocks or islets extend 2.5 miles W and NW of Kaligagan Island. The northernmost is the highest (63 feet) and is about 1.8 miles N of the Tigalda Island shore. Passages between groups of these rocks are deep and safe for small craft.

(81) Proceeding to Tigalda Bay from among the islets, care should be taken to avoid a group of rocks awash that extend 270 yards off the N side of the entrance point of the bay. These rocks are marked by thick kelp. Currents in the passage between Kaligagan and Tigalda Islands are approximately as strong as in the main passage of Ugamak Strait and currents are present among the groups of islets.

(82) **Tigalda Bay,** on the N side of Tigalda Island, 3 miles from its E end, is sheltered from all except NW winds. The bay is about 0.6 mile wide and 1.5 miles long in an E-W direction, and has depths of 8 to 10 fathoms, rocky bottom. Because of the poor holding bottom, the anchorage is not secure in strong winds. An anchorage off the entrance to the bay in 12 to 15 fathoms, gravel bottom, is preferred, and furnishes just as good shelter in S and E weather. The diurnal range of tide is 3.3 feet.

(83) The small bay just E of Tigalda Bay is not recommended as an anchorage for small craft because the swell making in from the N or W is not broken up by the group of islets.

(84) **Welcome Bay,** just W of Tigalda Bay, is an open bay 0.8 mile wide. At the head, a narrow passage leads to a lagoon largely bare at extreme low water. The passage at its narrowest part is 90 yards wide and 2½ fathoms deep. The bay anchorage is in 15 fathoms, sand and gravel bottom, 0.4 mile from shore. An anchorage for small craft is in 4 to 6 fathoms, sand bottom, at the entrance to the passage.

(85) **Kelp Bay,** on the N side of Tigalda Island and 2 miles from the W end, provides temporary anchorage in S weather. The entrance is constricted by a reef that extends 0.3 mile from the W entrance point. The point to the E of the bay is marked by several off-lying rocks, the outermost showing 9 feet. Because of a shoal area that extends 0.8 mile N of the point, large vessels should pass at a distance of not less than 1 mile. Anchorage is found in the center of Kelp Bay in 7 to 10 fathoms just inside the entrance.

(86) A small bay 2 miles E of Kelp Bay provides anchorage for small craft in S weather. Care should be taken to avoid covered rocks 170 yards off the E entrance point and others 150 yards offshore on the W side. Anchorage in 7 fathoms is found 0.3 mile from the head of the bay.

(87) At the W end of the S shore of Tigalda Island is a pinnacle rock, 165 feet high, and about 100 yards offshore, that shows prominently in a SE and NW direction. The point about 3 miles E of the W end is marked by **Derbin Island,** about 0.4 mile long and 206 feet high, lying close to the shore. E of this point the S shore of Tigalda Island consists of high cliffs intersected by low valleys. About 2.5 miles E of Derbin Island are two round bare rocks, 85 and 27 feet high, about 0.4 mile from the shore. The section of the coast abreast of the rocks is a steep rocky bluff rising to a 1,682-foot peak. About 2.5 miles E of the two rounded rocks is a 191-foot pinnacle near the shore. An arch through the pinnacle rock gives it the appearance of a huge chair.

(88) **Derbin Bay,** the bight E of Derbin Island, provides temporary anchorage in N weather. The recommended anchorage is in 16 to 18 fathoms, 0.5 mile from shore and 0.8 mile from Derbin Island. The E shore of the bight is foul, with a covered rock 300 yards SW of a 134-foot rocky islet. Small craft should favor the W shore of the bight in running to anchorage in 7 to 10 fathoms, 0.4 mile from the head of the bight.

(89) A small indentation, 0.3 mile long and 0.1 mile wide, is 1 mile SW of the E extremity of Tigalda Island. Rocky bottom and rocks awash along the shores make this anchorage acceptable only in case of an emergency. The depths range from 5 to 7 fathoms. A low pass extends in a NW direction across the island to Tigalda Bay.

(90) **Derbin Strait,** separating Tigalda and Avatanak Islands, is a little over 1 mile wide. No known dangers are more than 0.3 mile from shore. A safe course through the strait is **326°** in midchannel, with Billings Head of Akun Island ahead. On the E side of the S entrance is Derbin Island; on the W side is a bare rock, 30 feet high and 400 yards off Avatanak Island.

(91) A reef awash at half tide extends 330 yards W from the 165-foot pinnacle rock about midway on the E side of Derbin Strait. On the W side of the N entrance is a bare rock 2 feet high, 400 yards off the NE point of Avatanak Island.

(92) Tidal currents in Derbin Strait average about 5.5 knots, although velocities of almost 8 knots have been observed. The flood sets NW and the ebb SE. In midchannel, with wind and current opposing, the strait becomes exceedingly rough. A swell from SW to SE makes into the strait and is accentuated by the current. There are numerous eddies and cross currents near the shore. The ebb current causes tide rips a considerable distance offshore, especially on spring tides. Small boats should avoid Derbin Strait except under favorable conditions. (See the Tidal Current Tables for current predictions for Derbin Strait.)

(93) **Avatanak Island** is 9 miles long and 3 miles wide at its E end, but the W half of the island averages less than 0.8 mile in width. The middle of the island is a depression less than 100 feet high, the sides of which slope gently upward to 1,635 and 1,276 feet on the E and W ends, respectively. The low land of the depression is often clear when no other land is showing especially in N weather. There are many grotesque irregularities in the topography.

(94) **Avatanak Point,** the S end of the island, is sharp and bold and has a ragged chain of rocks and rocks awash that

extend over 0.3 mile in a S direction. The southernmost of these is a symmetrical oval rock 6 feet high.

(95) In 1981, the NOAA Ship MILLER FREEMAN anchored in the center of the bight E of Avatanak Point in a 35-knot NNW wind; good holding ground was in 15 to 16 fathoms, sand bottom.

(96) Two pinnacle rocks are W of the W extremity of the island; the highest and outermost is 200 yards offshore and 60 feet high.

(97) Near the center of the island on the S side is **Chimney Cove,** which affords temporary protection to small craft from N weather. It is exposed to the ocean swell. The cove is marked by a vertical chimney-shaped slab of rock, over 200 feet high, which projects from the ground surface on the W point of the cove. The rock also shows in Avatanak Strait over the low-lying middle ground. Larger vessels may find temporary anchorage in 15 to 20 fathoms S of this rock, well clear of any currents.

(98) **Rootok Strait,** separating Avatanak Island from Rootok Island, is a little more than 1 mile wide, but the clear channel is reduced to about 0.5 mile by a reef that extends from the E side and by rocks that extend from the W side. The reef, composed of separate rocks and heavily fringed with kelp, is bare at various stages of the tide, and extends 525 yards in a SW direction from the highest of the two pinnacle rocks off the W extremity of Avatanak Island. The rocks on the W side extend 250 yards from the Rootok Island shore. Depths less than 10 fathoms extend almost 0.5 mile N and NE from the NE point of Rootok Island.

(99) A detached shoal covered 3½ fathoms is near the middle of the S entrance, about 1 mile NE of the E end of Rootok Island.

(100) A flat-topped rock about 20 feet high is just off the E end of Rootok Island and other rocks extend 400 yards from the rock into the strait.

(101) In the bight indenting the E shore of Rootok Island, a rock awash at low tides is about 500 yards from the shore. Several pinnacle rocks fringe the S shore of this bight.

(102) To make the passage through Rootok Strait, steer **298°** for the N end of Rootok Island, leaving the E end of the island 0.6 mile to port; when the W end of Avatanak Island is abeam, change course to **331°** and pass in midchannel between the bare rocks off Avatanak Island and those close to the N end of Rootok Island.

(103) The currents in Rootok Strait have an estimated maximum velocity of 4 knots. Tide rips and whirls occur off the N entrance, but, as this area is sheltered from winds from most directions, they are mild compared to the rips that occur in other passes.

(104) **Rootok Island,** the westernmost island on the S side of Avatanak Strait, is 3 miles by 2.2 miles in extent. The island's most prominent features are the twin peaks, 1,545 and 1,532 feet high and 600 yards apart in an E-W direction. The S side of the island is a continuous cliff broken only by a small valley slightly E of the twin peaks. A flat-topped rock about 20 feet high is off the E point of Rootok Island. The island is fringed with rocks and kelp and affords no secure anchorage. It is used as a fox farm, the buildings being in the S valley of the bight on the E side.

(105) **Akun Island,** 23 miles SW of Unimak Island, is the northernmost island of the Krenitzin Group. It is about 12 miles long, and very irregular in shape, being nearly divided by Akun Bay and Lost Harbor and a low depression joining them. The island is high and rugged, particularly its N part, which reaches an elevation of 2,620 feet at **Mount Gilbert,** an extinct crater on the N side of Lost Harbor.

(106) **Avatanak Strait** is a broad passage separating Avatanak and Rootok Islands from Akun Island. The strait has a general NE-SW direction and is 3 miles wide at its narrowest part. There are no hidden dangers over 0.3 mile from shore and navigation is not difficult in clear weather. It is reported that strong NW winds draw heavily through Akun Strait into the W end of Avatanak Strait.

(107) Currents with a velocity of 6.5 knots have been observed in Avatanak Strait; but average strengths of flood and ebb are about 4 knots and 3.5 knots, respectively. The ebb sets to the W, and the strength of the current is felt well to the W of Rootok Island; but to the E of the strait along the N side of Tigalda Island the currents are weak. (See the Tidal Current Tables for predictions for Avatanak Strait.)

(108) Tide rips and swirls occur in the narrowest part, off the entrance to Akun Strait, and among the islands off the S shore of Akun Island. A pronounced set is often experienced when crossing the narrow depression abreast of Derbin Strait, and light tide rips occur there.

(109) **Basalt Rock,** in Avatanak Strait and 1 mile N of Avatanak Island, is a symmetrically rounded rock 50 feet high; it is steep-to and the channel inside is clear, with depths of 10 to 20 fathoms.

(110) **Jackass Point,** the S extremity of Akun Island, terminates in a chain of irregularly shaped rocky islets, the highest of which is 80 feet. Tall and conspicuous **Pinnacle Rock,** 145 feet high, is 0.5 mile W of Jackass Point and 0.3 mile offshore.

(111) **Easy Cove,** at the S end of Akun Island, is 0.4 mile wide with about the same distance to its head. Small vessels may find temporary shelter from N winds in 8 to 10 fathoms.

(112) **Poa Island,** about 2.5 miles NE of Jackass Point, is steep sided, about 0.6 mile long in an E-W direction, and 305 feet high.

(113) **Tangik Island,** about 1 mile NE of Poa Island, is about 0.4 mile long and 225 feet high at its E end. It is surrounded by rocks, and a reef extends about 350 yards SW from its SW end. The channel between Tangik and Poa Islands is clear except for reefs close to the S side of Tangik Island, which should be given a berth of at least 0.3 mile.

(114) **Trident Bay,** W of Tangik and Poa Islands, is about 0.8 mile wide and 1 mile long. The entrance is constricted to less than 0.5 mile by an islet, 82 feet high, on the N side and a chain of rocks, terminating in a flat-topped rock 32 feet high, on the S side. Three small coves indent the shore at the head of the bay. A rock awash at low water is about 225 yards off the point between the middle and S coves. The heads of the coves are shoal.

(115) Anchorage can be found in the middle of Trident Bay in 20 fathoms, with good protection from all directions but the SE; however, the islands off the entrance provide some protection from this direction. With a SW swell, small boats find better protection at the entrance to the W cove in 2 to 6 fathoms. The survey ship found this bay the best sheltered in the vicinity, and had sufficient swinging room.

(116) To enter Trident Bay from S, steer **350°,** heading for the W tangent of the islet at the N entrance point. Pass midway between Pao Island and the land to the W. When the outermost flat-topped rock is abeam to port, swing sharply to **300°,** heading for the sand beach in the middle cove with the S tangent of Poa Island directly astern. In making this turn, favor the flat-topped rock which is steep-to, as the currents eddying around the entrance to the bay have a tendency to keep the ship's head from coming around. A bank of 8 fathoms extends across the entrance channel.

(117) **Cross Bay** is an indentation about 1 mile wide on the SE side of Akun Island and to the N of Tangik Island. Rocks extend about 300 yards off its middle point. The

channel N of Tangik Island is clear, but the channel W of the island with 4 fathoms or less should be avoided.

(118) **Round Head,** the SE point of the peninsula that extends E from Akun Island, is a rounded steep-sided headland 465 feet high; a pinnacle 52 feet high is 200 yards off the point. From Round Head the shore of Akun Island trends W for 3 miles and is less rugged. It then turns to the S for 1.5 miles to **Cross Point** forming an indentation known as **Seredka Bay.** Anchorage with good shelter from N and W winds can be found in 10 to 20 fathoms about 0.4 mile from the shore. The NE side of Cross Point is fringed with rocks and kelp.

(119) **Tanginak Island,** of small extent but 270 feet high, is 2.2 miles off the E end of Akun Island. Although it appears to be one rounded island, it is in reality two islets separated by a narrow passage. The passage between Tanginak and Akun Islands is deep, but strong currents sweep through it, accompanied by tide rips and swirls.

(120) About 4.8 miles N of Tanginak Island and in the approach to Akun Bay is **Fathometer Reef,** a 3¼-fathom rocky shoal, which is about 0.3 mile in diameter and is surrounded by depths of over 30 fathoms. Heavy tide rips and swirls occur in the vicinity except at slack water. Vessels should keep well clear of the reef, as no kelp has been reported on it and breakers may not be distinguishable from the tide rips.

(121) **Akun Bay** is the broad indentation in the NE side of Akun Island; it affords anchorage at its head except with winds from the SE to NW, but heavy williwaws are experienced with offshore winds. There are no known dangers in the bay except close to shore. At its head, where the bay is 2.5 miles wide, there are two large bights; the N bight is known as **Helianthus Cove.** Anchorage may be made in either of the bights, about 0.5 mile from shore, in 10 to 15 fathoms. Small vessels can find fairly good shelter from all directions in the S part of Helianthus Cove. Both bights have freshwater lakes at the head; the lakes are about 10 feet above high water. A very low depression extends across the island from Helianthus Cove to Lost Harbor.

(122) A long peninsula extends E from the middle of Akun Island; off the N point at the outer end of the peninsula is a twin pinnacle, 230 feet high, which marks the SE limit of Akun Bay. A gully indents the cliffs at the most E point of the peninsula.

(123) The N ends of Akun Island are **Billings Head** and **Akun Head,** 4 miles to the W. These massive heads, separated by Little Bay, both have precipitous faces. Akun Head has a flat top 1,645 feet high. The bluffs on its N and W sides are marked by rust-colored stratification. Billings Head rises to 1,660 feet.

(124) **Billings Head Bight,** on the N side of Billings Head, is a Steller sea lion rookery site. There is a 3-mile vessel exclusionary buffer zone around the rookery which encompasses Akun Head, Little Bay, Billings Head, and the N portion of Akun Bay. (See **50 CFR 227.12,** chapter 2, for limits and regulations.)

(125) **Billings Head Light** (54°17.8'N., 165°31.4'W.), 210 feet above the water, is shown from a small house with a red and white diamond-shaped daymark on the N side of the head.

(126) **Little Bay** indents the N end of Akun Island. A spit makes out from the W shore. The area S of the spit is closed by a rocky bar and only boats drawing a few feet can enter. Anchorage outside of the spit may be had in 8 to 10 fathoms, sandy bottom.

(127) **Chart 16532.–Akun Strait,** between Akun and Akutan Islands, is about 1 mile at its narrowest part, but the navigable channel is reduced to 400 yards by reefs that extend from the E shore and by Race Rocks on the W. Race Rocks, a flat rocky islet 25 feet high and some smaller bare rocks, are near the N end of the strait and 0.3 mile from its W shore. **Akun Strait Light** (54°08.0'N., 165°39.7'W.), 46 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on Race Rocks.

(128) Shoal water and heavy kelp surround Race Rocks for a distance of about 250 yards; **Swirl Rock,** awash at half tide, is 250 yards N of the light and is conspicuous by the heavy overfall and swirls. The main channel is to the E and N of Race Rocks and Swirl Rock and has a least depth of 4½ fathoms. The channel to the W of Race Rocks has a least depth of 2 fathoms and is subject to currents which are just as strong as in the main channel.

(129) With NW winds in the summer, a bank of fog frequently streaks through Akun Strait, but under such circumstances, vessels navigating Avatanak Pass will usually sight the S shore of Akutan Island.

(130) Currents in Akun Strait attain an estimated velocity of 12 knots in the narrowest part, setting N with the flood. The slack period is very short. Tide rips, swirls, and overfalls occur, and with a N wind or swell are extremely heavy. By skirting the kelp off Race Rocks and passing within 100 yards to the N of Swirl Rock, local vessels are able to keep out of the strength of the current.

(131) **Green Bight,** indenting the SE shore of Akutan Island at the entrance to Akun Strait, offers temporary anchorage in 6 to 8 fathoms 0.4 mile from shore. It is convenient while waiting for slack water to pass through the strait.

(132) The W or Akutan Island shore of Akun Strait is low, except in the middle where a rounded peak 650 feet high forms a steep cliff on the N point of Green Bight. Shoal water marked by heavy kelp extends about 500 yards E from this point.

(133) From this low point with an arch, 1.6 miles W from Jackass Point, the E shore of Akun Strait extends NW for about 2 miles to a point with a flat grassy islet, 80 feet high, close by. Shoal water marked by heavy kelp fringes this shore. A rounded rock, 10 feet high, is 650 yards NW from the arch. A group of rocks, bare at low water, are about 500 yards NW of the rounded rock and about the samedistance off the E shore of the strait.

(134) The W end of the flat grassy islet can be approached to within 250 yards on the W, but shoal water marked by heavy kelp extends about 700 yards S. A flat islet, 200 feet high, is 0.4 mile N of the grassy islet; the passage between the two islets is obstructed and foul.

(135) **Akutan Bay** opens into the Bering Sea between Akun Head and North Head. This approach from the Bering Sea is used to reach Akutan Harbor and other arms of the bay. Akun Strait, previously described, connects Akutan Bay with Avatanak Strait and the Pacific, but it is comparatively shoal and contracted, and is not recommended.

(136) **Akutan Harbor** opens into Akutan Bay on the N side of the peninsula which juts into Akun Strait from Akutan Island; the preferred approach to the harbor is from N through Akutan Bay. The harbor is 4 miles long and from 0.5 to 1.8 miles wide. Except for crabpots, there are no known dangers over 300 yards from shore. From the head of the harbor, a trail leads inland to the hot springs.

(137) **Akutan Point,** on the N side of the entrance to Akutan Harbor, is a grassy hummock 175 feet high, which is connected with the island proper by a low grassy neck. A light is on the point.

(138) **Akutan** is on the N side of the harbor about 2 miles W from the E end of Akutan Point. Two wharves are at

Akutan. On the opposite side of the harbor 1 mile farther W is a former whaling station with a wharf in disrepair. A processing ship is permanently moored alongside the wharf; the vessel is fastened to mooring buoys near the wharf. A concrete piling, covered at high water, is just off the wharf; this wharf is not recommended for mooring. There is a post office in Akutan. Unscheduled seaplane flights to other areas are about 3 times a week.

(139) A recommended anchorage is about 300 yards off the village in 22 fathoms. Vessels can also anchor in the broad bight in the S shore in 15 fathoms, with the E end of Akutan Point bearing 018°. The bottom at both anchorages is very sticky. The harbor is well sheltered from all except E winds, but heavy williwaws are encountered during gales.

(140) A cannery (54°07'55"N., 165°47'12"W.), about 0.5 mile W of Akutan, has a dock with 500 feet on the S face and 200 feet on the E and W faces. Fuel, water, electricity, and limited marine supplies are available. The cannery monitors VHF-FM Channel 6.

(141) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(142) The Aleutian Islands are served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(143) Vessels using Southwest Alaska Pilots Association pilots and en route to Akutan can meet the pilot boat about 1 mile E of Akutan Point (54°08.7'N., 165°43.6'W.).

(144) The pilot boat can be contacted by calling "AKUTAN PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(145) **Surf Bay,** on the Akun Island side of Akutan Bay and just N of Akun Strait, is an open bight exposed to the W and N. A group of rocky islets, the highest, 64 feet, is in the middle of the bay about 1 mile from shore. A group of rocks, awash at low water, is 0.3 mile N of the islets, and irregular bottom, with least depth of 2¼ fathoms, is found 0.3 mile NW of the rocks. The channel S of the islets is clear and anchorage can be found in 10 fathoms, 0.4 mile from shore, with good shelter in S and E weather. On the E side of Surf Bay is a sand beach about 1 mile long.

(146) **Lost Harbor,** 3 miles N of Surf Bay, affords fairly good shelter, although in NW weather considerable swell rolls in from Akutan Bay. The N side of the harbor has gently sloping sand bottom, with depths of 6 fathoms or more 0.4 mile from shore. A prominent stack and buildings mark the remains of a former sulphur mine on the N shore.

(147) In July 1990, numerous submerged obstructions were reported about 0.6 mile E of the stack in about 54°14'07"N., 165°36'39"W.

(148) **Sandy Cove** is a small bight about 3 miles NW of Akutan Point. Small craft can anchor in the center of the bay in about 5 fathoms, sandy bottom. The cove is exposed to the NE.

(149) **Hot Springs Bay** is a wide indentation in Akutan Island opening into Akutan Bay. The point on the NW side of the entrance is a high, rock cliff; **Ridge Point,** on the E side of the entrance, is a narrow ridge about 356 feet high, which has bare rock cliffs on its W side, but slopes rapidly on its E side into a grassy valley and sandy cove. At the head of the bay are three bights; a stream drains into the middle bight from the hot springs 0.5 mile inland.

(150) A rock, covered 2¼ fathoms, is 0.5 mile from the SE shore 1.5 miles inside Hot Springs Bay from Ridge Point. There are no other known dangers in the bay. Anchorage in S and W weather can be found in the W part of the bay 0.5 mile from shore, in 14 to 16 fathoms, sandy bottom.

(151) **Chart 16531.–Akutan Island,** largest of the Krenitzin Group, is about 9 miles NE from Unalaska Island and is separated from the latter by Akutan and Unalga Passes.

(152) The shore of Akutan Island bordering on Akutan Bay and Akun Strait is described in connection with those bodies of water.

(153) **Akutan Peak,** 4,244 feet high, rises about 600 feet on the S rim of a crater, about 1.2 miles in diameter, to form a sharp summit. It is the highest peak between Unimak and Unalaska Islands.

(154) **North Head,** the N end of Akutan Island, is a high bold cliff, with a large, deep grassy valley in the otherwise high shore on its E side. About 2 miles SW of the cape, a narrow, grassy valley separates the high ridge behind North Head from another high ridge; the W side of the valley is a bluff. **North Head Light** (54°13.3'N., 165°58.8'W.), 60 feet above the water, is shown from a small house with a red and white diamond-shaped daymark on the point 1.5 miles W of the head.

(155) **Open Bight** is an indentation just E of North Head. No depths greather than 10 fathoms are found in the bight. It is exposed to N swell from the Bering Sea and is not recommended as an anchorage.

(156) A rock awash is about 250 yards off the rounded point just E of Open Bight; a covered rock is inshore from the rock awash.

(157) **Lava Point,** 6 miles SW of North Head, is a fairly flat lava bed varying in elevation from 150 feet along the shore to 300 feet at the base of the hill back of it. The cliffs all around the point are nearly vertical except in places where they are broken off. Numerous tunnels are under the cliffs. The NW face of the hill back of the point is concave and very steep.

(158) At the end of Lava Point is a flat rock having the same height as the point and slightly detached from it. In foggy weather low points will sometimes be seen below the fog, and the lava flow terminating in Lava Point often enables the navigator to identify this point. Due to the similarity of the headlands along these islands, this area is one where the navigator has unusual difficulty in identifying landmarks.

(159) **Lava Bight,** just S of Lava Point, provides temporary anchorage in S and E weather. On the S shore of the bight are several waterfalls, including a large one to the E of a group of small ones. The anchorage is in 12 to 15 fathoms, sandy bottom, 0.5 mile from shore, with the large waterfall bearing **160°**.

(160) A large circular reef is off the W coast of Akutan Island between Lava Bight and Reef Point; the outer edge of the reef is about 0.9 mile from the shore. The reef is marked by heavy kelp and is studded with numerous rocks which uncover 3 feet. The W part of North Head open at Lava Point is a good range to clear this reef in passing to the N of it. Between the reef and the shore is a passage which has a least depth of 2¾ fathoms and is clear of kelp; small boats use the passage to avoid the disturbed water outside.

(161) **Reef Bight,** on the S side of the reef, is not recommended for anchorage because of poor holding ground.

(162) **Reef Point,** the W extremity of Akutan Island, is steep and rocky and reaches a height of 500 feet. A low rock 150 yards off the point has the appearance of a stranded freighter when seen from the N or S.

(163) **Currents.**–Flood currents with an estimated velocity of 2 knots set along the W shore of Akutan Island as far N as Reef Point. Near Lava Point an ebb current of 1 knot has been observed. Off North Head, currents are weak. A N wind blowing against a flood current produces tide rips as far N as Lava Point.

(164) The S shore of Akutan Island between Green Bight and Sarana Bay is a steep rocky bluff with numerous boulders that extend about 200 yards offshore. A rectangular rock, 75 feet high, is 225 yards offshore, about 1 mile SW from the S end of Green Bight. Numerous waterfalls are visible along this shore in rainy weather.

(165) **Talus Point,** on the E side of the entrance to Sarana Bay, is the end of a rocky ridge, about 1,700 feet high, which has several massive pinnacles split from the top. It is more easily distinguished from offshore than Battery Point.

(166) **Sarana Bay,** between Talus Point and Battery Point, is 4 miles wide at its entrance, but narrows rapidly to an inner cove about 1 mile wide and 0.7 mile to its head. **Vulcan Point,** on the E side of the entrance to the inner cove, is marked by a flat-topped rock 45 feet high; a reef extends 450 yards SE from the rock. Anchorage in 5 to 10 fathoms can be found in the inner cove, but the shore should not be approached closer than about 450 yards. The bay is wide open to the S and in a S swell is very uncomfortable.

(167) **Battery Point,** the southernmost headland of Akutan Island, is marked by a peak with a distinctively shaped conical top resembling a liberty cap; it is faced by steep, high cliffs. Large vessels should give Battery Point a berth of 1.5 miles to avoid a 7-fathom shoal 1.3 miles offshore in a SE direction; swirls and tide rips mark the shoal. A 3¾-fathom shoal, marked by kelp, is 0.4 mile off the SE side of Battery Point, and a rock awash is 370 yards off the SW side.

(168) **Broad Bight** and **Cascade Bight** are the E and W bights, respectively, between Battery Point and Cape Morgan. This region can be used only for temporary anchorage in N weather. The heads of the two bights have beaches of sand and gravel and each is backed by a low, grassy valley. The bights are separated by a ridge terminating in a bold rocky headland with steep cliffs 800 feet high. Anchorage in Broad Bight can be found in 16 to 20 fathoms, sandy bottom, 0.8 mile from the beach and 1.1 miles 105° from the point of the headland; anchorage in Cascade Bight is in 14 to 16 fathoms, sandy bottom, 0.8 mile from the beach and 0.6 mile W of the same point.

(169) About 1.3 miles SW of Cascade Bight is a group of rocky islets; one of them, 298 feet high, is 0.8 mile E of Cape Morgan. Close to these islets on the offshore side the depth is 14 fathoms.

(170) **Cape Morgan,** the SW end of Akutan Island, is a prominent headland with steep, high cliffs intersected by dikes of hard rock of characteristic color. **Triplet Rocks,** three pinnacles 8 to 15 feet high, are 600 yards off the cape. In navigating Akutan Pass, Triplet Rocks should be given a berth of over 0.5 mile.

(171) Cape Morgan is a Steller sea lion rookery site. There is a 3-mile vessel exclusionary buffer zone around this rookery which encompasses Flat, Cascade, and Broad Bights and Triplet Rocks. (See **50 CFR 227.12,** chapter 2, for limits and regulations.)

(172) **Flat Bight** is N of a bold headland which forms the NW part of the Cape Morgan peninsula. At the headland, foul ground with thick kelp extends 0.5 mile offshore, and a covered rock is near a rock awash 0.3 mile N of the headland. The bight is bordered by a gravel beach 1 mile long, which in turn is backed by a low, grassy valley. Temporary anchorage in E weather can be found 0.6 mile from shore in 12 fathoms, sand bottom.

(173) A large rock 2 feet high is 1 mile S of Reef Point and 400 yards from shore. A depth of 12 fathoms can be carried to the face of this rock. There is no kelp around it. Several other rocks are inshore of this one, but they are inside the kelp line. A rock awash is 0.8 mile farther to the S and 250 yards from shore.

(174) The shore between Reef Point and Flat Bight is an eroded bluff 300 to 600 feet high; when close by, a reddish outcrop is discernible.

(175) **Chart 16528.–Akutan Pass** and Unalga Pass, on either side of Unalga Island, are ship passages, secondary to Unimak Pass, for entering the Bering Sea from the Pacific through the E part of the Aleutian Chain. Akutan Pass is 2.5 miles wide in its narrowest part between the Baby Islands on the SW and Triplet Rocks off Cape Morgan. The depths in the pass are very irregular, but no hidden dangers have been found. Depths less than 10 fathoms extend about 0.4 mile S from Triplet Rocks, and the tide rips there are intensified, appearing as breakers. Small craft should avoid them. A narrow, crescent-shaped shoal with a least depth of 8 fathoms is 3.5 miles NW from Cape Morgan. The shoal can be detected by the swirls and tide rips marking it.

(176) Akutan Pass is wider than Unalaga Pass, but the currents and tide rips are similar. However, the current is felt over a much greater distance, so that with an adverse current it has been found that better time can be made by using Unalaga Pass. On the larger tides, the flood creates such heavy tide rips N of Unalaga Island, even in calm weather, that it is advisable to be prepared to take seas aboard. Tide rips 15 feet high have been observed. In approaching both Akutan Pass and Baby Pass, fewer rips will be encountered if courses are directed for the area SE of the Baby Islands and then swing over to either pass. This area is comparatively quiet on the ebb when both of the passes have heavy tide rips.

(177) Akutan Pass, in the daytime and with clear weather and a fair current, furnishes a convenient route for vessels bound to or from Unalaska Bay. From E it is recommended that courses be steered to make land in the vicinity of Tigalda Island and Avatanak Island; then follow the S side of these islands until the course is shaped from Rootok Island to Cape Morgan. A midchannel course through the pass is recommended.

(178) Remarks on currents in Akutan Pass will be found in the first part of this chapter. (See the Tidal Current Tables for predictions for Akutan Pass.)

(179) **Baby Islands,** a group of six low islands in Akutan Pass and N of the E end of Unalga Island, have numerous rocks among them. The islands are all tundra covered. On the W island is a large rookery and the ground is very pitted over almost the entire top. The SE island is used as a fox ranch. When seen apart from Unalga Island, the Baby Islands are prominent although they tend to blend together to appear as one island.

(180) Strong currents sweep among the Baby Islands. The S end of the passage between the two SE islands is blocked by a reef bare at low water, forming a small protected bay, but strong currents make it a rather uncomfortable anchorage for small boats.

(181) **Baby Pass,** about 0.8 mile wide, separates Unalga Island from the Baby Islands. Ledges along the shore restrict the navigable width, but depths up to 20 fathoms will be found in midchannel. Less water is found at the N end of the pass.

(182) On the Unalga shore of Baby Pass is a shallow cove in which small boats may get fair protection from S and W weather; however, a rock awash at low water is a little S of the middle of the cove. Off the N point of the cove is a group of bare rocks that extend into Baby Pass. The outer rock, 12 feet high, is 300 yards from the point. Foul ground extends 400 yards into Baby Pass from the 0.8 mile stretch of shore W of the cove.

(183) Very heavy tide rips occur to the NW of the Baby Islands on the flood, and extend a considerable distance to the SE on the ebb. (See remarks on tide rips in Akutan Pass.) The flood and ebb current velocity is about 4 and 5 knots, respectively. Flood and ebb velocities of 5.5 and 7 knots occur at times of tropic tides. (See the Tidal Current Tables for predictions for Baby Pass.

(184) **Unalga Island** is separated from Unalaska Island by Unalga Pass. The island is low compared to the neighboring islands, the highest point being a rounded hill of 707 feet SW of the central point. The E end of Unalga Island is a flat-topped hill, 145 feet high.

(185) **Malga Bay,** on the NW side of Unalga Island, is about 0.6 mile in diameter and affords shelter in S weather. The E shore of the bay is a chain of jagged rocks and islets, the highest being 106 feet. Temporary anchorage in S weather can be found in the center of the bay in 11 fathoms.

(186) On the N coast of Unalga Island, precipitous bluffs rise 100 to 200 feet, blending abruptly at the top into rolling, slightly rising, tundra-covered tableland. There is generally no beach, though a flat rock shelf, from 10 to 30 feet wide, extends from the bluffs to the water's edge. In places a few scattered boulders may be found on the shelf.

(187) On the S shore of Unalga Island, a prominent cylindrical rock, 120 feet high, is 0.5 mile S of the E end of the island and 375 yards offshore. A point terminating in a rounded knoll, 150 feet high, is 1.8 miles SW of the E extremity.

(188) A large barn, about 1 mile SW of the E end of Unalga Island, is on the side of a hill over 100 feet high, and is conspicuous from the S. Several small houses are in the gully below the barn, but can be seen only when close-to.

(189) Numerous boulders and rocks border the S shore of Unalga Island. A dangerous rock, covered 2¼ fathoms, is 700 yards off, midway of this shore.

(190) Off the SW extremity of Unalga Island, a group of rocks extend about 200 yards into Unalga Pass, and a rock about 4 feet high near the outer end of the group is conspicuous while entering the pass. The 4-foot rock should be given a berth of 300 yards.

(191) **Unalga Pass,** the narrowest of the three principally used passes in the E Aleutians, is about 1.3 miles wide in its narrowest part and, with the exception of rocks which make out a short distance from Unalaska and Unalga Islands, is free from dangers. The depths in Unalga Pass vary from 9 fathoms, at the SE end of the pass, to over 50 fathoms.

(192) Under normal conditions the pass is not difficult to navigate as the current sets fair with the pass. In thick weather the shore of Unalga Island can be approached close enough to pick up an echo and followed through the pass. The soundings, especially in the S approaches, furnish numerous characteristic depths to assist a vessel, equipped with echo sounding apparatus, to determine its position. For these reasons, coupled with the fact that this pass has been thoroughly surveyed, it is believed that it has distinct advantages over Akutan Pass for vessels going N, especially in thick weather. However, under exceptional circumstances, currents and tide rips of unusual magnitude may be encountered; and treacherous seas, particularly in the narrow part of Unalga Pass, caused by wind opposing the current, often sweep a vessel without warning. These have caused severe damage and men have been washed overboard with resultant loss of life. There are temporary anchorages, easy of access, at either end of Unalga Pass where better conditions may be awaited.

(193) S of Unalga Pass, a belt of deep water leading into Beaver Inlet makes the approach to the pass on echo soundings comparatively easy; the 50-fathom curve can be followed along the E limit of the deep, and the 100-fathom curve along the N limit. In the outer reaches of Beaver Inlet it has been found possible to catch a glimpse of the shore during the summer fogs. For this reason and because of ease of access, it can be recommended as good practice in thick weather to make the slight detour into the inlet to check the vessel's position before entering Unalga Pass. The currents in the entrance to Beaver Inlet generally do not exceed 2 knots.

(194) (See the Tidal Current Tables for current predictions for Unalga Pass.)

(195) **Deep Bay,** indenting Unalaska Island on the N side of the entrance to Beaver Inlet, is protected on the NE by rocks awash and small islets which make offshore about 0.3 mile; the ledge continues, totally submerged, 0.3 mile farther and terminates in a kelp-marked ¾-fathom rocky shoal which breaks in SE weather. A kelp-marked 1¼-fathom rocky shoal is 0.3 mile off the bluff point on the SW side of the entrance. Temporary anchorage in NW weather can be found at the entrance to the small cove in the NW corner of the bay, in 10 to 20 fathoms.

(196) Beaver Inlet is described later in this chapter.

(197) From the ledge marking the E part of Deep Bay, the shore extends NE for 2 miles to Brundage Head. This stretch of shore has numerous rocks and islets that extend as much as 0.3 mile offshore, and strong currents are noticeable.

(198) **Brundage Head,** on the W side of the S entrance to Unalga Pass, has a knoll 192 feet high at its outer end. A pinnacle rock, 22 feet high and 300 yards E of the point, has deep water outside of it.

(199) **Fisherman Point,** about 1 mile NW from Brundage Head, is 140 feet high. A reef, with several bare rocks about 15 feet high and marked by heavy kelp, extends over 400 yards N from the point. The shore between Fisherman Point and Brundage Head is fringed with rocks, but none extend more than about 300 yards into the pass.

(200) **English Bay,** on the W side of Fisherman Point, is a secure anchorage for small vessels. The W shore of the bay trends due S for about 2 miles to a low point, where it turns sharply W for 0.9 mile to the head of an arm about 0.3 mile wide. The most secure anchorage is in this narrow arm, SW of the low point at the turn. The width of this anchorage between the 5-fathom curves is about 300 yards. Good anchorage with more swinging room can be found E of the low point in 8 to 10 fathoms, but a shoal area that extends 400 yards off the shore N of the point must be cleared.

(201) In entering English Bay, account must be taken of the strong currents in Unalga Pass; follow a midchannel course, giving the W shore a berth of at least 0.3 mile, and when heading into the arm at the head of the bay favor the S shore slightly. Good holding ground in 12 to 20 fathoms will be found near the entrance.

(202) From English Bay N, the Unalaska shore of Unalga Pass is much higher.

(203) **Erskine Point,** about 3 miles NW of Fisherman Point, is the N extremity of a ridge 1,432 feet high. Along the shore from English Bay to Erskine Point are numerous rocks, but none are more than 250 yards off.

(204) **Lofty Mountain,** 2,284 feet high and 2.5 miles SW from Erskine Point, is a symmetrically-shaped conical peak, the highest point in the vicinity. It is easily identified, and as it is often clear when surroundings are obscured, makes a valuable landmark.

(205) **Chart 16011.–Unalaska Island,** one of the larger of the Fox Islands which form the E group of the Aleutian Island chain, is about 67 miles in length along the axis of the chain. The island is mountainous, and during the greater part of the year the higher elevations are covered with snow. The irregular coastline is broken by three long deep bays, Beaver Inlet, Unalaska Bay, and Makushin Bay, as well as by numerous smaller bays and coves. In general, the bays have deep water close to shore, sometimes too deep for convenient anchorage. Makushin Volcano, the highest point on the island, is near the NW side and about 25 miles from the E end of the island. In clear weather the volcano is a prominent landmark for vessels bound to Dutch Harbor, in Unalaska Bay.

(206) **Naval Defensive Sea Area and Airspace Reservation.**–Under the authority of Executive Orders 8680 of February 14, 1941 and 8729 of April 2, 1941, Unalaska Island is a designated Naval Defensive Sea Area and Airspace Reservation. Restrictions imposed under the authority of the above executive orders have been suspended subject to reinstatement without notice at any time that the interests of national defense may require such action.

(207) **Chart 16528.–Kalekta Bay** is a broad, open bay in the N end of Unalaska Island just E of Unalaska Bay. An obstruction, covered 11 feet, is reported to be 800 yards off the W shore of the bay in about 53°59'N., 166°21'W. There are no other known dangers over 400 yards from shore. There are a number of places where a vessel may anchor; but as this bay is open N, English Bay and Dutch Harbor are recommended. A pinnacle rock is off Erskine Point, the E point at the entrance, somewhat similar to Priest Rock off Cape Kalekta, but the rock off Erskine Point is distinguished by a smaller one between it and the point. On the W side of Kalekta Bay, 1.8 miles in from Cape Kalekta, is a narrow pinnacle rock 45 feet high, 100 yards offshore.

(208) On the W side of Kalekta Bay, 3 miles S from Cape Kalekta, a gap cuts through to Constantine Bay in a WSW direction. This gap is filled by a lagoon not connected with either bay. A reef extends 400 yards offshore just S of this gap. Anchorage may be found in the S end of the bay 0.5 mile from shore in 12 to 20 fathoms, sandy bottom. Small craft may find anchorage in the center of the small bight 0.5 mile in diameter on the E side of the bay, 1 mile in from Erskine Point, in 5 fathoms, rocky bottom. The holding ground is poor and this bight is not recommended for anchorage except in emergency.

(209) **Unalaska Bay** opens into the Bering Sea between Cape Kalekta and Cape Cheerful when on the N side of Unalaska Island. The bay has little commerce except for diesel oil and supplies for the local village of Unalaska. The shores of the bay are in general mountainous, with precipitous sea faces. Amaknak Island is near the S end of the bay. W of the island the water is deep, but there is no good harbor in this part of the bay; E of the island are the important harbors and anchorages of Iliuliuk Bay, Dutch Harbor, and Iliuliuk Harbor. The channel to Iliuliuk Bay and Dutch Harbor is free from dangers, except along the shores. Iliuliuk Harbor is obstructed at its entrance by ledges, but with the aid of the buoys, it is not difficult to enter with a vessel under 250 feet in length.

(210) Unalaska Bay is open to navigation at all seasons. It is reported that on two occasions the drift ice of Bering Sea entered Unalaska Bay, but such an occurrence is so rare that it need not be considered. Ice often forms in the sheltered coves and harbors in cold, calm weather, but it never attains any thickness or interferes with navigation.

(211) **Prominent features.**–Makushin Volcano (see chart 16518), 6,680 feet high, is the highest point on Unalaska Island. The volcano can generally be seen in clear weather. Table Top Mountain, 2,710 feet high, back of Cape Cheerful, and the crater of an extinct volcano with three points, the highest being 2,293 feet, W of Eider Point, are distinctive. Either peak may be used as a leading mark in approaching Cape Cheerful until close enough to distinguish the surrounding features; however, the crater W of Eider Point can be used only when it is not obstructed from view by the higher elevations NW of it. On getting close to the island, when the fog hangs over the land but leaves a clear space just along the water's edge, Wislow Island (see chart 16518) forms a good mark. It is in a small bay about 2 miles W of Cape Cheerful, and is a small, rounded island, regular in shape, and stands far enough from the land to be seen as not a part of the main island. W, under similar conditions, Koriga Point can be seen at times. The land slopes gently to the point from Makushin Volcano, and ends in a small peak-like formation. From E the cascade SE of Cape Cheerful is also useful as a mark, particularly in low visibility. Strangers, when in the vicinity and uncertain of the identity of the bay and its landmarks, should endeavor to pick out Ulakta Head. Looking into the bay, its flat top breaking off abruptly to sloping sides presents an appearance unlike any other in the vicinity, and shows up well against the background of mountains. When sighted, steer for it, leave it on the starboard hand, and follow around, keeping out of kelp.

(212) **Chelan Bank,** the extensive 45-fathom bank that extends about 7 miles NE from the vicinity of Cape Cheerful, may be found useful in fixing the position of a vessel by soundings. The bottom on the bank is composed of black sand and gravel; on the shelving areas the bottom is of gray sand and gravel up to about the 80-fathom depth. Chelan Bank, at its NE end, almost makes a junction with a similar bank that extends N and W from Cape Kalekta, the two banks practically enclosing Unalaska Bay. A light tide rip occurs along the outer edge of Chelan Bank.

(213) **Routes, Unalaska Bay.**–When bound for the bay from any part of Bering Sea, it is recommended to shape the course for Cape Cheerful. In thick weather it is better to fall W of Cape Cheerful and then round it than to fall to the E, with the possibility of being carried by currents into the dangerous regions of the passes.

(214) **Cape Kalekta** is the headland at the E side of the entrance to Unalaska Bay. The headland has two summits 785 and 904 feet high, and a ridge, which sags to about 700 feet, connects the headland with the mountains to the S. The rounded extremity of the cape is the base of the slope from the lesser summit. When viewed sidewise, this slope which forms the end of the headland is rounded in outline, rising precipitously at the water's edge and then bending gradually to meet the lesser summit.

(215) The 904-foot summit is very close to the W side of the cape. It is predominant, being the highest point on the headland. Viewing the cape from either side, this summit has somewhat the shape of a crown. When off the extremity of the cape it appears as a sharp peak and the outline of a spur along the W descent becomes visible. This spur is composed of the massive protuberances, the most prominent of which takes the shape of a vertical shaft of rock rising above the level of the top of Priest Rock.

(216) Cape Kalekta is rugged and precipitous at its extremity and particularly so on its W side. The headland rises almost vertically at the waterline with a few detached rocks including Priest Rock, but no beaches. The area about the extremity is foul and marked by kelp, and a dangerous ledge which uncovers 1 foot, usually marked by breakers, is nearly

0.4 mile N from the cape. The ledge is roughly in line with the pinnacle of Priest Rock and the W parts of the low islets N of Priest Rock. Broken bottom extends about 200 yards farther out. The N end of the cape should be given a berth of at least 1.2 miles to avoid being carried toward the dangers by strong currents. There are pronounced tide rips.

(217) **Priest Rock,** close-to, off the N side of Cape Kalekta, is a pinnacle 204 feet high. It is one of the most important landmarks in making Unalaska. Priest Rock should not be confused with the pinnacle rock off Erskine Point. Two low rocky islets of appreciable area are N of Priest Rock.

(218) The cascade S of Cape Cheerful is visible off Cape Kalekta.

(219) The point on the E shore of Unalaska Bay, about 1.4 miles S of Priest Rock, presents a smooth, rounded profile and is grass covered. The shore on either side of the point has little or no irregularity. The land about the point rises somewhat abruptly at the shore to about 150 feet, then rounds to assume a more or less flat area. This area has a gentle slope toward the steeper slopes leading up to a series of jagged peaks 0.5 mile inland from the point. The peaks have no particular distinctiveness. The 10-fathom depth curve is almost 0.5 mile off the point and broken bottom with a 1½-fathom spot is inside the curve.

(220) **Princess Head,** on the E side of Unalaska Bay, about 1.9 miles from Priest Rock, is a wall-like rock formation that extends out for 200 yards from the shore cliff of that locality. The outer 200-foot length forms the highest part or head of the feature. The head has a fairly level top 214 feet high. The side facing the SW presents the surface of a rough square, distinguished from the remainder of the rock formation by its lighter shade. Small knobs on the top of the head mark the upper corners of the square. The head is an important and distinctive landmark, especially when in close to the E shore of Unalaska Bay, in thick weather or when fog closes out the peaks. Two low detached rocks are off the end of Princess Head.

(221) The rounded shore in the vicinity of Princess Head is the base of a mountain rising to a peak 1,729 feet high. The S slope of this mountain descends gradually to the lagoon in a low gap which bisects Cape Kalekta peninsula. The point on the rounded shore is a spur from the base of the mountain. The spur parallels Princess Head and is 0.3 mile SW of it. A smaller projection from the shore is close N of the point. A group of bare rocks are off the point; about 100 yards off the outer one of this group is a rock that uncovers 2 feet.

(222) **Constantine Bay,** on the E side of Unalaska Bay, has shoal and irregular depths, less than 10 fathoms, and its use as an anchorage, except by small craft under favorable conditions, is not recommended. The shore at the head of the bay is sandy. The SW shore is fringed with rocky ledges. On the E side of the bay is a gap in the land that extends ENE to Kalekta Bay. This gap is filled with a lagoon which is not connected with either bay.

(223) The headland W of Constantine Bay is rugged and precipitous and the area near and around its extremity is foul with rocks and kelp. The bluffs along the 1.5-mile stretch of shore S of the extremity, facing Unalaska Bay, are especially high. They are very rugged and have gray, rocky knobs and deep vertical scars, giving the appearance of vertical stratification. **Split Top Mountain** marks the S end of this formation; the bluffs rise to more than 1,600 feet near the peak.

(224) **Summer Bay,** a wide opening in the E shore of Unalaska Bay, opposite Ulakta Head, is composed of several coves, the heads of which are low and sandy. **Morris Cove,** on the E side just N of a prominent headland, has depths less than 4 fathoms, and the bottom is somewhat irregular. In the small cove between the S cove and the headland, the depths decrease uniformly from 4 fathoms in midchannel to the sand shore at the head. The depths in the S cove are shallow and irregular.

(225) **Chart 16529.–Second Priest Rock,** a pinnacle 75 feet high, is close to the N side of the headland between Summer and Iliuliuk Bays. The pinnacle stands on the reef bordering the shore of the headland. A dangerous rocky shoal extends 0.2 mile N from the headland.

(226) **Ulakta Head,** the N end of **Amaknak Island,** is about 900 feet high. It has a flat top, and in clear weather it is one of the best landmarks for fixing the position of Unalaska Bay. Looking into the bay, its flat top, breaking off abruptly to sloping sides, presents an appearance unlike any other in the vicinity, and shows up well against the background of mountains. From its NW point a reef extends 0.1 mile, marked by **Needle Rock,** similar in appearance to Priest Rock, but not so large.

(227) **Ulakta Head Light** (53°55.5′N., 166°30.4′W.), 61 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the reef bordering the NE side of Ulatka Head. A pinnacle rock, 30 feet high, adjacent to the shore, is about 50 yards W of the light. Another rock, 20 feet high, is 75 yards NW of the light.

(228) **Mount Ballyhoo,** 1,589 feet high, dominates Amaknak Island.

(229) **Iliuliuk Bay** has its N entrance between Ulakta Head and Second Priest Rock. The entrance is marked by a light bell buoy. N of Spithead is a covered ridge that extends across the bay with at least 7 to 8 fathoms near the middle of the bay; kelp has been seen on this ridge in about midchannel. S of this ridge the depths increase to 20 fathoms. There is anchorage almost anywhere in the bay. The usual anchorage is at the head in 14 to 16 fathoms, muddy bottom, where, even with N winds, the force of the sea does not seem to reach.

(230) At the head of Iliuliuk Bay, behind the town of Unalaska, is a ravine or break in the mountains, that extends through to the water S. This is sometimes useful as a guide in entering the bay. Buildings at Unalaska, on the lowland at the head of the bay, are prominent.

(231) **Spithead** is the end of the long, low, sandspit which forms the E side of Dutch Harbor. **Spithead Light** (53°53.9′N., 166°30.8′W.), 38 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the S end of the spit. Shoal water, less than 6 fathoms, marked prominently by kelp, extends 0.3 mile into Iliuliuk Bay from the middle part of the sandspit.

(232) The W shore of Iliuliuk Bay S of the sandspit is fringed with rocks and should not be approached closer than 0.3 mile.

(233) **Rocky Point** has a kelp-marked reef that extends 400 yards toward Spithead; the outer limit is marked by a lighted buoy. A rock, covered ¾ fathom, is 250 yards NE of the point. Along the E side of Rocky Point the reef is extensive; the 10-fathom curve, which marks the outer limit of broken bottom in this part of Iliuliuk Bay, roughly parallels the side of the point at a distance of nearly 400 yards.

(234) A signal station and six oil storage tanks are on the hillcrest W of Rocky Point. Eight additional tanks are 0.1 mile S of Rocky Point.

(235) **Dutch Harbor,** on the W side of Iliuliuk Bay, has its entrance between Spithead and Rocky Point. The water is deep close to the shores and in all parts of the harbor, except off Rocky Point. The entrance is about 0.5 mile wide and 16 to 18 fathoms deep.

(236) Mariners are advised not to anchor in the area W of a line from Rocky Point to the city dock (53°54'15"N., 166°31'33"W.), because their anchor may be fouled on lost ground tackle on the bottom of the harbor. Anchorage may be had elsewhere in the harbor (except in or near cable areas), in 14 to 22 fathoms. Violent williwaws are experienced during gales, especially from the SW, and the best shelter will be found under the high part of the island well N of the entrance. SW gales practically have a clear sweep across the entrance because of the lowland W. Vessels forced to moor at Chevron U.S.A., Dutch Harbor Terminal Wharf during the early spring and fall will find it necessary to use chains and wire cables in addition to mooring lines during the severe gales.

(237) **Wharves.**–Numerous wharves, piers, and docks are at Amaknak and Unalaska Islands. For a complete description of the port facilities refer to Port Series No. 38, published and sold by the U.S. Army Corps of Engineers. (See appendix for address.)

(238) **Pacific Western, Dutch Harbor Terminal Wharf:** a T-head pier about 0.3 mile W of Rocky Point; 320-foot face; 31 feet alongside; deck height, 18 feet; pipelines extend from wharf to storage tanks in rear, total capacity of 381,000 barrels; receipt and shipment of petroleum products; bunkering vessels; owned and operated by Pacific Western.

(239) In 1976, a 45-foot section of the northernmost third of the loading face was unusable. Submerged piles, the remains of a previous structure, may exist close to the SE end of the pier; this area should be avoided. Large vessels berthing at this pier should drop anchor well offshore and warp in to enable them to get away at once in case of a sudden onshore wind.

(240) **Unalaska City Dock:** 0.7 mile NNE of Pacific Western, Dutch Harbor Terminal Wharf; 427-foot face, 650 feet total berthing space; 35 feet alongside; deck height, 18 feet; 5,000 feet of covered storage area; open storage area for 100 containers; receipt and shipment of containerized and conventional general cargo; owned and operated by City of Unalaska.

(241) The Coast Guard maintains a wet storage area for buoys, close NE of Unalaska City Dock.

(242) **Sea Alaska Products Docks:** 0.6 mile NE of Unalaska City Dock; 1,310 feet total berthing space; 35 feet alongside; deck heights, 10 feet; receipt of seafood; handling supplies and equipment; owned and operated by Sea Alaska Products, subsidiary of ConAgra Corp.

(243) **Unalaska Small-Boat Harbor Wharf:** midway on the W side of the spit; 975 feet total berthing space; 20 to 30 feet alongside; deck heights, 2 to 12 feet; mooring commercial vessels and recreation craft; owned and operated by the City of Unalaska.

(244) **Ounalaska Corp. Docks:** N end of the harbor; 220 feet of berthing space; 20 feet alongside; deck heights, 16 feet; handling fishing equipment and supplies; owned and operated by Ounalaska Corp.

(245) **American President Lines Dutch Harbor Wharf:** 0.35 mile SW of Rocky Point; 260-foot face, 324 feet berthing space with dolphins; 40 feet alongside; deck height, 12 feet; cranes to 40 tons; 9,000 square feet of covered storage area; open storage area for 306 containers; receipt and shipment of containerized and conventional general cargo; owned by Dutch Harbor Development Corp. and operated by American President Lines, Ltd.

(246) Immediately S of the container pier, and fronting Iliuliuk Bay, are the ruins of another oil pier; submerged piles and broken dolphins may exist.

(247) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(248) The Aleutian Islands are served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(249) Vessels using Southwest Alaska Pilots Association pilots and en route to Dutch Harbor can meet the pilot boat about 1 mile E of Ulatka Head Light (53°55.5'N., 166°30.4'W.). The pilotage outer boundary is 2 miles N of Ulaka Head Light.

(250) The pilot boat can be contacted by calling "DUTCH HARBOR PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(251) Dutch Harbor is a **customs station.**

(252) **Tides.**–(See the Tide Tables for predictions for Dutch Harbor.) The diurnal range of tide is 3.7 feet. The tidal current in Dutch Harbor is inappreciable, and in Iliuliuk Harbor the velocity does not exceed 1 knot.

(253) **Supplies.**–Provisions and fuel are available in Unalaska and Dutch Harbor.

(254) **Repairs.**–A shipyard is at the old submarine base at Dutch Harbor. A covered marine railway at the shipyard can handle craft over 100 feet long and to 300 tons. A boat repair facility at Dutch Harbor has a machine shop and specializes in underwater repairs.

(255) **Communication.**–Passengers, freight, and mail for Dutch Harbor are handled by air. Dutch harbor has regular airline service year round. Telephone service is available. The Dutch Harbor marine operator monitors VHF-FM channel 28.

(256) An outpatient clinic in Dutch Harbor has two physician's assistants on call 24 hours a day. The clinic monitors 4125 kHz during working hours and may also be reached through the Unalaska Police Department on VHF-FM channel 16.

(257) **Unalaska** is on a low strip of land between the shore at the head of Iliuliuk Bay and a stream which empties into Iliuliuk Harbor. The wharf is at the W end of the strip of lowland. The N side of the wharf faces the passage connecting the bay and harbor and the W side faces the harbor. The channel approach to the passage is endangered by Iliuliuk Reef which is off the town in Iliuliuk Bay.

(258) Unalaska is the largest settlement in the Aleutian Islands. The original Russian settlement was known as Iliuliuk. The principal sources of income are trapping and seasonal employment in the Pribilof Islands. Unalaska has a public grade and high school, and a general store.

(259) A radio station is at Unalaska. Telephone service is available. Passengers, freight, and mail for Unalaska are handled by air.

(260) **Iliuliuk Reef,** a ledge bare in places, extends 250 yards in an E-W direction. From the E dry rocks, a ledge covered 12 to 15 feet and marked by kelp extends 150 yards S.

(261) **East Channel,** a buoyed passage between Iliuliuk Bay and Harbor, has a controlling depth of about 20 feet. **South Channel,** a buoyed passage between Captains Bay and Iliuliuk Harbor, has a controlling depth of about 28 feet. A fixed highway bridge with a clearance of 20 feet crosses South Channel about 300 yards SSE of Expedition Island.

(262) The channel N of Iliuliuk Reef has a least depth of 17 feet, but it should not be attempted without local knowledge. On the N side of the channel at its E end, 200 yards N of the E end of Iliuliuk Reef, is a depth of 1¼ fathoms off the end of a pointed reef that extends from the shore.

(263) The Alyeska Fisheries Shore Plant Wharf at Unalaska provides 910 feet of berthing space with a depth of 35 feet alongside. It is owned and operated by Pan Alaska

Fisheries, Inc., subsidiary of Castle and Cooke, Inc. A spit makes out from the N shore of the passage N of the wharf.

(264) The Coast Guard reports that an eddy has been noted making against the E end of the wharf at Unalaska on the ebb but it is not dangerous. The currents setting in and out of the harbor generally follow the trend of the channels and do not exceed 1 knot in the main entrance channel.

(265) **Iliuliuk Harbor,** the harbor for Unalaska, may be entered through East Channel from Iliuliuk Bay or through South Channel from Captains Bay. The latter channel carries the greater depth and is the most easily navigated during N weather. The distance through East Channel is shorter for vessels from Dutch Harbor or the Bering Sea but South Channel is nearer for vessels from Captains Bay. Iliuliuk Harbor is small but landlocked with good holding ground, and an average depth of 10 fathoms. There is sufficient room for backing and filling in turning a moderate-sized ship. Violent williwaws are experienced with S gales. Vessels under 200 feet in length have ridden out gales here, but the short scope of chain allowable usually causes the anchor to drag. Because of the limited swinging room, an anchorage in Dutch Harbor or Unalaska Bay is recommended during severe weather. During the fishing season, the harbor entrances become highly congested with fishing vessels, and caution should be exercised when entering or leaving.

(266) Seafood processing facilities are along the shores of Iliuliuk Harbor.

(267) **Expedition Island** is in the S part of Iliuliuk Harbor. On the island is a small grove of evergreens. The trees are from Sitka and were transplanted in 1805 by a Russian Orthodox priest. A similar grove is near the old Indian village of Amaknak. The trees are 25 feet in height and their number apparently has not increased.

(268) The dock resembling an off-center "T" on the NE side of the island has a 210-foot face with 25 feet alongside; it is owned and operated by Great Land Seafood and Universal Seafood.

(269) **Bailey Ledge,** near midchannel at the S end of the passage leading from Captains Bay to Iliuliuk Harbor, is of small extent, steep-to, and marked by a red and white daymark on a pile. Only a small amount of kelp marks this ledge, which uncovers 2 feet.

(270) **South Amaknak Rocks** is in a foul area that extends from the S extremity of Amaknak Island. The smaller 15-foot rock near the S edge of the foul ground is about 250 yards SE of the larger 30-foot rock. A deepwater channel is indicated midway between this group of rocks and Bailey Ledge and also about 250 yards E of the E South Amaknak Rock, thence deep water may be carried to the S entrance of Iliuliuk Harbor by favoring the E shore.

(271) **Chart 16530.–Captains Bay** is the arm at the head of Unalaska Bay. Its entrance from Unalaska Bay direct is W of Amaknak Island. The bay is also entered, as previously indicated, by passing E of Amaknak Island through Iliuliuk Harbor, and through the channel leading S from the harbor.

(272) The entrance to Captains Bay W of Amaknak Island is marked by Arch Rock, 4 feet high, adjacent to the point 0.8 mile from the S extremity of the island. Directly opposite Arch Rock is a bold point marking the W side of the entrance. A reef extends 220 yards channelward from the bold point, and from the reef a bar of 5 to 8 fathoms extends to a point nearly three-quarters of the distance across the entrance toward Arch Rock. Large vessels in entering should pass about 100 to 200 yards off Arch Rock as the deepwater channel will be found at those distances.

(273) A wharf about 200 yards long with reported depths of 6 to 8 fathoms alongside is on the E side of the bay about 1.7 miles below Arch Rock. The wharf is owned by Crowley Maritime/Pacific Pioneer. Fuel and water are available. In March 1982, unexploded ordnance was reported about 40 feet seaward of the wharf; vessels are advised not to use anchors in this area.

(274) Anchorage may be had in 17 to 20 fathoms, even bottom of mud and sand, about 0.4 mile E of the northernmost island of the group at the head of Captains Bay. In approaching this anchorage favor the E shore to avoid **Swallow Reef** and the shoal to the S, which is NE and E of the northernmost island. A reef extends 150 yards from the E shore about abreast of Swallow Reef. A buoy is about 200 yards NE of Swallow Reef. Small craft may obtain secure shelter in 9 fathoms, sand and mud bottom, at **Port Levashef,** E of the most S of the larger islands.

(275) **Hog Island,** 300 feet high, is off the W side of Amaknak Island in Unalaska Bay. Foul ground extends nearly 0.5 mile N of Hog Island. The reef that extends 0.3 mile from the N point, a part of the foul ground, has numerous rock ledges jutting up from the rocky bottom. Clear passage exists between Hog Island and Amaknak Island. Favor Amaknak Island to avoid a 3¼ fathom shoal, that is 600 yards NE of the S end of Hog Island. A large, thick kelp patch is S of Hog Island and should be avoided.

(276) **Nateekin Bay,** on the SW side of Unalaska Bay, affords good anchorage, except for NE winds, for small craft in 3 to 4 fathoms, 490 yards E of the head of the middle bight on the NW shore. A shoal area covered 1 fathom is SE of this anchorage.

(277) **Chart 16528.–Broad Bay,** a bight in the W shore of Unalaska Bay 2.5 miles S of Eider Point, affords fair anchorage in 25 fathoms, sandy bottom, 0.5 mile offshore. The anchorage is exposed to NE weather.

(278) **Wide Bay,** 1.2 miles SW of Eider Point also affords fair anchorage in 25 fathoms, mud and sand bottom, 0.4 mile from the W head of the bight.

(279) **Makushin Valley,** which borders on Broad Bay, is a flat, covered with grass, and about 15 feet above high water. A sizable stream courses through the valley. The shore along Broad Bay is composed of very coarse sand. A similar valley and shore are found at Wide Bay. The cascade just N of Broad Bay can be seen only in the restricted area to the SE.

(280) **Eider Point** is at the S end of a rocky bluff-formation of great height which characterizes the coast for several miles along the W side of the entrance to Unalaska Bay. In places along this shore there are massive accumulations of loose rock and earth lying at the base of the bluffs, formed by slides. The bluffs are of horizontal strata and like those about Cape Cheerful have a distinct reddish hue. Eider Point is a comparatively low projection pointing S, and from it a narrow reef extends in the same direction for 0.6 mile into Unalaska Bay. The reef uncovers 2 to 4 feet and usually breaks at high tide but not generally along its outer limit. Although deep water can be carried from seaward to the vicinity of the end of the reef, Eider Point should be given a berth of at least 1 mile when passing S of it.

(281) A 133-foot-high cascade, 1.5 miles N of Eider Point, is the most distinguishable feature between the point and Cape Cheerful. It is an excellent landmark during a low-ceiling fog when only the lower part of the cascade can be seen. The bluff at the cascade has a remarkably smooth, stratified face, up to an elevation of about 100 feet, where it forms a distinct horizontal line directly above which the upper strata have very irregular surfaces and appear to overhang in

places. The cascade emerges from a slight depression at the top to form a comparatively narrow white waterfall to a sea level bench at the foot of the bluff. On either side of the cascade are rockslide and earthslide accumulations.

(282) **Chart 16518.–Cape Cheerful,** on the N coast of Unalaska Island just W of Unalaska Bay, consists of a main and secondary headland about 1 mile apart, the two headlands being separated by a low grassy valley emerging on the coast. The valley is flat at the base and resembles an amphitheater; it is called The Dry Dock.

(283) The main headland is the W of the two and is adjacent to Reese Bay; it projects farther to seaward and is marked by a peak 1,808 feet high. The peak is close to the extremity of the headland and dominates the end of the cape from most directions of approach. It may, however, merge with the higher elevations back of the secondary headland or be shut out by them when the peak and higher elevations are on range.

(284) **Table Top Mountain,** 2,710 feet high, is the highest summit back of Cape Cheerful, but there are several peaks to the E of it approaching this elevation. The W slope of this mountain descends to the deep valley that extends inland from Reese Bay. The mountain has a wide flat top.

(285) The bluffs about Cape Cheerful present a rugged and almost vertical appearance, and rise to 1,000 feet. They are of horizontal strata and have a distinct reddish hue. Large slides of loose rock at the waterline can be seen along the cape. The area outside the base of the bluffs, that is at or near the high-water line, is very rocky and strewn with boulders. Foul ground extends several hundred yards off the extremity of the secondary headland and its NE side. Depths of over 20 fathoms are found 0.5 mile off Cape Cheerful.

(286) The currents apparently meet in the vicinity of Cape Cheerful, the flood setting NW from Unalga Pass and NE from Point Kadin, creating eddies which set toward the shore. In rough weather the seas are apparently accentuated in the vicinity of the cape and it is therefore advisable to give it a wide berth under such conditions.

(287) **Reese Bay,** a cove between Cape Cheerful and Cape Wislow, is about 1 mile wide at the head, which consists of a low, narrow strip of sand with some marsh grass. It indents the shoreline about 1 mile, but appears larger because of the pronounced valley or mountain gap that extends inland from the coarse sand beach at the head of the cove. It is a long flat, covered with grass, partly filled by **McLees Lake,** and flanked by the side slopes of ridges that terminate at each cape. **Wislow Island** is in the middle of Reese Bay, and although rocky, appears regularly rounded in shape. It is 121 feet high, and the top is grass covered. Wislow Island stands out prominently against the low background and is a good landmark during low visibility. Anchorage in 14 fathoms may be found 0.5 mile NE from Wislow Island, with some shelter from SE weather. There are depths of 2 to 3 fathoms S of Wislow Island, but no shelter in N weather, and the shape of the bay apparently concentrates the effect of any N swell, so that it breaks well off the shore at the head of the bay.

(288) The channel W of Wislow Island is blocked by a detached, rocky shoal, marked by kelp, with a depth of 1¼ fathoms, lying 350 yards W from the S end of Wislow Island.

(289) **Cape Wislow,** 2.5 miles W of Cape Cheerful, is dominated by **Mount Marshall Reese,** 2,545 feet high. This peak is at the N end of the long ridge which parallels the low valley that extends inland from Reese Bay. The land slopes gradually and evenly from Mount Marshall Reese to the end of Cape Wislow where it terminates in a bluff about 600 feet high.

(290) SW of Cape Wislow, about 1 and 3 miles, respectively, are two remarkable rocky cliffs about 2,000 feet high. They appear as equilateral triangles from the NW. A small triangular bluff, 560 feet high, is between them. Several large waterfalls emerge from the gullies between these bluffs; the most prominent of the waterfalls is about 1.7 miles W of Cape Wislow. Emerging from a V-shaped gully, the water makes a vertical drop of 139 feet to the high-water line. Being a spray of white foamy water, it is visible against the dark rocky cliff for some distance, and makes a good landmark when viewed from the NE.

(291) **Irishmans Hat,** a square tower rock 85 feet high, is about 0.2 mile offshore from the foot of the W cliff 3 miles SW of Cape Wislow. This rock can seldom be identified from any direction except NE where it shows clear of the land. Irishmans Hat is surrounded by a kelp-covered reef.

(292) **Driftwood Bay,** just W of Irishmans Hat and about 6 miles W from Cape Cheerful, is an open bight, with a sand and gravel beach at its head. The lowland inshore from the bay is a large, swampy valley covered with marsh grass. The lowland to the S, separating the mountainous mass of Makushin Volcano from the highland in the vicinity of Mount Marshall Reese, often can be recognized from offshore when the mountains are in clouds.

(293) Anchorage with some shelter from SW and SE weather can be found in 11 fathoms 0.5 mile from the W shore, with Point Tebenkof bearing about 275°. The depths shoal rapidly towards the head of the bay, and depths of 3 fathoms and less are found 600 yards offshore near the SE part of the bay.

(294) **Point Tebenkof,** the W point of Driftwood Bay, is probably the most readily identifiable of any of the points along this stretch of coast, especially from the SW. The point terminates in a grassy bluff 800 to 1,000 feet high which overlooks the points to the SW.

(295) From Point Tebenkof the land rises gradually and evenly to a flat-topped peak or ridge 3,505 feet high, 2.8 miles inland. From the SW this ridge is seen on the skyline as a straight line slightly inclined to the horizon and terminating at the inshore end in a smoothly rounded peak which is a spur from the higher land about Makushin Volcano.

(296) **Red Cinder Dome,** 1,874 feet high, is 1.1 miles S of Point Tebenkof and to the E of the ridge. This crater peak shows over the ridge to the W as a flat-topped hump appearing as a part of this ridge. It is a useful landmark because it is often clear when all other peaks are obscured. It can be identified readily from NE as it shows clear over the lower land at the head of Driftwood Bay, while all other points and landmarks merge with the higher land in the background.

(297) Point Tebenkof should be given a berth of at least 0.5 mile. Two rocks awash at high water are 200 yards offshore about 0.4 mile W of the point, and a 2¼-fathoms shoal, marked by heavy kelp, is 375 yards offshore, outside of the rocks awash.

(298) A large slide 1.3 miles W of Point Tebenkof may be identified under certain conditions of light. The bare place has the shape of an enormous keyhole, about 600 feet high.

(299) **Bishop Point** is a level tablelike projection, 254 feet high, about 3 miles SW from Point Tebenkof. It terminates in a pinnacle 102 feet high. A deep gorge extends 3.5 miles S from the point. Cascades are visible in summer high up on the walls of this gorge.

(300) Temporary anchorage in S weather may be found 0.4 mile from shore in about 16 fathoms 1 mile ENE from Bishop Point or 0.5 mile WSW from it.

(301) Two large waterfalls, one of which is divided into two cascades about 100 feet high, are 1.6 miles SW from Bishop Point, and are visible to the N and NE.

(302) **Koriga Point,** 5 miles SW of Point Tebenkof, is about 140 feet high and is difficult to distinguish except from the SW. There are a number of rocky islets close to shore E and W of the point. Deep water, 40 fathoms, is found within 0.3 mile of the point.

(303) A round hill, 320 feet high, is about 0.8 mile SW of Koriga Point, and can be identified from the SW when it is clear of Point Tebenkof but is difficult to distinguish when seen against the higher land.

(304) The shore SW of Koriga Point is composed of rocky bluffs 100 to 300 feet high. A small cove, with a sandy beach, 1.8 miles SW of the point, has depths of less than 5 fathoms, and the E part of the cove is obstructed by rocks and kelp.

(305) **Point Kadin,** 3 miles SW of Koriga Point, is an inconspicuous, rounding section of the NW coast of Unalaska Island. A group of rocks 18 feet high are 250 yards off the cape. About 0.4 mile SW is another group of rocks 7 feet high, 350 yards offshore from a waterfall about 60 feet high, visible only from the N. Extending NW and W more than 0.5 mile from these rocks is a rocky bank with depths from 5¼ to 8 fathoms, while depths of 11 fathoms are found about 1 mile W. Tide rips occur in this vicinity, and in heavy weather the seas are perceptibly heavier. It is recommended that Point Kadin be given a wide berth, especially in bad weather.

(306) **Makushin Volcano,** 6,680 feet high, is a flat-topped snow-covered mass with several jagged peaks of about the same elevation surrounding it. It can easily be identified when not covered by clouds. The westernmost of these jagged peaks is particularly sharp and distinct and has an elevation of 5,242 feet. A large glacier covers the entire top of the peak and extends down into the large valleys at its base. Faint clouds of vapor steam from the NE end of the snow field may be visible.

(307) **Cape Kovrizhka,** 5 miles SW of Point Kadin, is very prominent and easily distinguished by the dome-shaped rocky hill, 233 feet high, that forms its westernmost extremity. Numerous rocks are found around this cape, and it should be given a berth of 1 mile. Under certain combinations of wind and current comparatively heavy tide rips occur in the vicinity of the cape.

(308) **Round Top,** about 1 mile inland at Cape Kovrizhka, is a massive, round-topped peak, 2,452 feet high, separated from the peaks surrounding Makushin Volcano and higher than any of the nearby peaks. It is a useful landmark.

(309) On the N side of Cape Kovrizhka is a small open bay which affords a temporary anchorage during moderate SE weather. Differences from normal magnetic variation of as much as 3° have been observed at the cape.

(310) **Chart 16517.–Volcano Bay,** immediately S and E of Cape Kovrizhka, is small and open to the W and S, forming a fair anchorage for E weather. However, strong winds are to be expected, and with winds shifting to the S and W the bay becomes quite rough and dangerous for small craft.

(311) **Makushin Bay,** indenting the W side of Unalaska Island, is 2.5 miles wide at the entrance and extends in an E direction for 5 miles to the entrance of Anderson, Cannery, and Portage Bays.

(312) **Makushin Point,** on the N side of the entrance to Makushin Bay, rises to 762 feet and is grass covered. It is made prominent by a number of small knolls scattered over its top. Just N of the point there is a low valley that extends from Makushin Bay to Volcano Bay.

(313) The abandoned village of **Makushin** is on the E side of Makushin Point. Water is obtainable from a stream nearby.

(314) The N side of the entrance to Makushin Bay is marked by **Rock Islet,** 104 feet high, 0.5 mile SW of Makushin Point, with several rocks between it and the point. There are no known dangers if the S shore is given a clearance of at least 0.3 mile. An abrupt shoal, with least depth of 16 fathoms is 1.2 miles SW from Rock Islet.

(315) A prevailing current sets in a N direction off Makushin Bay. The combined effect of the currents, including tidal currents, and winds causes a very noticeable choppy sea with attending tide rips across the entrance of the bay.

(316) Vessels have anchored in 15 fathoms, mud bottom, about 0.3 mile off the beach in the cove E of Makushin Point with **Priest Rock,** 80 feet high just S of the abandoned village, bearing 230°. This anchorage is good for W and N weather, but with S weather considerable swell makes in, and in E weather, it becomes quite rough.

(317) **Humpback Bay,** on the NE side of Makushin Bay, offers good anchorage for large vessels in all but W weather. Enter the bay from the SW on a course of 055°, keeping Cathedral Rocks about 600 yards to starboard. Anchorage can be had in 25 to 47 fathoms, mud bottom.

(318) **Anderson Bay,** the S arm of Makushin Bay, affords several good anchorages of moderate size and at least one anchorage for one or more larger ships. A gravel spit, forming **Tarasof Point,** on the W side of the entrance, is a distinctive feature. The bay extends about 6 miles in a SE direction and terminates in two arms, **Naginak Cove** on the W and **Udamak Cove** on the E, with wedge-shaped **Iksiak Point** between them. Four well-rounded, grass-covered islands are in the E half of the bay. These islands are well apart from one another; **Peter Island,** the northernmost, is near **Anderson Point,** the E entrance point of the bay, and the southernmost is well inside the entrance to Udamak Cove.

(319) Anchorage in Anderson Bay is in 20 fathoms, mud bottom, in a bight between the second island from the N and the main shore. The anchorage in Naginak Cove is in a mud bottom N of the narrow pass formed by two opposing points. The pass is about 1.2 miles from Iksiak Point, and is obstructed by a dangerous 1½-fathom shoal in midchannel. Anchorage in Udamak Cove is E of the fourth island in 22 fathoms, mud bottom, on a ridge that extends from the middle of the island to the main E shore.

(320) **Cannery Bay,** 1 mile to the E of Anderson Bay, extends about 3 miles in a SE and E direction. Near the head and on the S side of the bay is an abandoned wharf and cannery. The only anchorage in the bay is at the E end, about 0.4 mile NE of the abandoned cannery in 15 to 17 fathoms, soft bottom.

(321) **Portage Bay** extends about 4 miles in an E direction from **Cannery Point.** Two shoals, with least depths of 5¾ and 6½ fathoms, are almost in midentrance. Indifferent anchorage for small vessels may be had in 19 fathoms, sticky bottom, midway between the N shore and the 1½-fathom shoal and rocks near the head of the bay.

(322) A trail to Unalaska begins at the prominent valley about 1 mile from the head and on the N side of Portage Bay. The trip to Unalaska takes about 8 hours.

(323) **Cape Starichkof,** forming the S entrance point to Makushin Bay, is marked by an off-lying rock 27 feet high. Numerous rocks, covered and awash, are found along the shore in this vicinity, but are not known to extend more than 0.3 mile from the beach. The mountains rise abruptly from the beach in this vicinity to 1,600 feet.

(324) Two miles S of Cape Starichkof is a deep narrow valley, trending E. Convenient anchorage in SE weather can be found 0.5 mile from shore off this valley in about 20 fathoms, with the center of the valley bearing about 110° and a conspicuous small 4-foot rock, 150 yards off the shore at the S edge of the valley, bearing about 150°. Launches can find more shelter by anchoring closer to shore. A small bank with least depth of 6¼ fathoms is 450 yards W of the rock previously mentioned.

(325) **Skan Bay,** on the W side of Unalaska Island, has its NE entrance point at the ledge 2 miles S of Cape Starichkof. It is 2 miles wide at the entrance and extends about 4 miles in a SE direction.

(326) A bank, with a least depth of 3¾ fathoms, is in the bay entrance, 1.4 miles 205° from the point on the NE side and 0.8 mile N of the SW entrance point.

(327) The two arms at the head of Skan Bay are separated by **Skan Point,** a high headland. The E arm is too deep for convenient anchorage. The entrance to the S arm is about 0.4 mile wide and choked with heavy kelp, but has a least depth of about 5 fathoms in midchannel. This arm extends over 1 mile to the S, has depths over 30 fathoms, and provides good shelter from all directions; but the depth is too great in that the length of anchor cable required would not allow sufficient swinging room.

(328) The survey ship used an anchorage just inside the SW entrance point of Skan Bay, a little less than 0.5 mile from shore in 15 fathoms, where some shelter from W weather was found.

(329) **Chart 16515.–Spray Cape,** about 3 miles W of the SW entrance point of Skan Bay, is conspicuous from the N. A small islet, about 80 feet high, is close to shore off its NW side, and rocks covered at high water extend SW from this point.

(330) The shore between Skan Bay and Spray Cape is fringed with pinnacle rocks and islets, and a bank, covered 6¾ fathoms at its outer edge, extends more than 0.5 mile offshore.

(331) From Spray Cape the shore trends S for 3.5 miles to the entrance of Pumicestone Bay. It is high and steep, fringed by rocks. An anchorage with good shelter in SE weather can be found 0.4 mile from shore at the entrance to Pumicestone Bay in 20 fathoms off a small bight.

(332) **Pumicestone Bay,** on the NW side of the long W extension of Unalaska Island, is 1.5 miles wide at the entrance, but narrows rapidly to less than 0.5 mile. The bay extends about 7 miles in an E direction with an abrupt S-turn to the N and E about 4 miles from the entrance. The turn is partially blocked by a small flat-topped island about 30 yards in extent and 36 feet high, leaving a clear channel 300 yards wide.

(333) The N shore of Pumicestone Bay is formed by low, grass-covered hills. The shore is extremely rocky and rugged, the bluffs having a general elevation of 50 feet. The S shore is almost vertical and is characterized by many slides. The bay is divided by the turn into an outer and an inner bay. The inner bay is almost surrounded by high, precipitous mountains, except at the head where the mountains recede from the shore, leaving a narrow, flat grassland some 200 to 400 yards in width.

(334) Two large streams flow into the bay, one on the NE and the other at the S side of the head of the bay. At the turn of Pumicestone Bay is a strip of shingle beach on the E side, backed by a narrow strip of grassland, that extends to the high bluffs in back of it. A conspicuous waterfall about 800 feet high is at the S end of the beach.

(335) The outer bay is very deep. The water shoals gradually from over 40 fathoms at the entrance to less than 30 fathoms at the turn. There is little shoal water suitable for anchorage, and no protection from W weather.

(336) At the head, the inner bay widens forming a basin 0.5 mile in diameter where good anchorage may be found in 20 fathoms or less. The SE part of this basin shoals abruptly from 10 fathoms to less than 1 fathom.

(337) **Kashega Point,** on the S side of the entrance to Pumicestone Bay, is 1,447 feet high and deep water is found close to its N shore.

(338) About 1.5 miles S of Kashega Point is a bold rocky island about 80 feet high, 600 yards from shore. **McIver Bight,** about 1 mile in diameter, indents the shore E of this island. Good anchorage can be found in the center of the bay in about 10 fathoms with the island bearing W. The bay is exposed to the W and NW, but small boats can find some shelter from W weather by anchoring closer to shore. The SE part of the bay has depths of 2 to 4 fathoms.

(339) **Kashega Bay** is on the NW side of the long W extension of Unalaska Island and about 25 miles from Umnak Pass. At the SW side of the entrance is **Buck Island,** low and grassy. About 1.5 miles NW of Buck Island is a narrow rocky ledge that extends NW about 0.4 mile on which are the two conspicuous **Kashega Pinnacles.** The outer one is about 95 feet high, the inner one about 35 feet high. These pinnacles are the most conspicuous landmarks in approaching the bay. About 0.3 mile NW of the higher pinnacle is a small rock 5 feet high.

(340) The bay has a navigable entrance 0.5 mile wide and is about 1.5 miles long in a SE direction. **Kashega,** a small village at the SE end, has a school, church, sheep-ranch buildings, and a few houses. The village shows seaward through a small angle and then is not visible until arriving well inside the bay. Neither a post office nor supplies are available. The anchorage in the bay is exposed to the NW and the holding bottom is reported none too good. In proceeding to the anchorage, favor the N shore to avoid a kelp-marked 2¼-fathom shoal 250 yards from the S shore and 0.5 mile NW of the village church; anchor in 6 fathoms with the church bearing about 165°.

(341) The valley at the head of Kashega Bay leads to Kuliliak Bay on the Pacific Ocean side of Unalaska Island. It is about 4 miles long and 1 mile wide, and extends in an E-W direction. The floor of this valley is covered with freshwater lagoons which are fed by small streams. The sides of the valley are bounded by high hills entirely covered with grass. The hills to the N are rolling, while to the S they are steep with a jagged skyline. The streams which empty from the lagoons into Kashega Bay are shallow at their mouths. Local residents of Kashega village report that during heavy NW weather the tide backs up into the lagoons. The shores of the lagoons are mostly rocky with very few stretches of sand beach.

(342) Just W of Kashega Bay is **Buck Bight.** It is clear, except near the head. The bight is open to the N.

(343) **Sedanka Point,** 175 feet high, is the W extremity of the ridge bordering the S side of Kashega Bay. A conspicuous rocky pinnacle, 43 feet high, is 1.5 miles NW of the point of the cape with a smaller pinnacle 200 yards to the SE. A long ledge extends toward the pinnacles from the point and a conspicuous flat-topped islet, 105 feet high, is 0.3 mile off the point.

(344) **Kismaliuk Bay** is an irregular-shaped bay that extends roughly SE for 2 miles, then branching into two arms. The arms are separated by a low broad point from which a chain of bare rocky islets extend about 0.5 mile in a NW direction. The outer islet is 20 feet high.

(345) The N arm is of little importance and affords little protection from NW weather. The depth shoals gradually from 17 fathoms at the entrance.

(346) The S arm, protected by the chain of islets, affords excellent protection. The entrance channel is clear and about 500 yards wide, with a midchannel depth of 11 fathoms. The water shoals gradually to the head of the arm.

(347) **Alimuda Bay** is the long bay immediately W of Kismaliuk Bay and separated from it by **Manning Point,** a bold, blunt, precipitous point of land from which an exposed rock ledge makes out some 400 yards in a NW direction. The bay extends about 3.5 miles SE, with a width at the entrance of over 1.5 miles.

(348) The water shoals gradually from 20 fathoms at the entrance to the gravel beach at the head. About 1 mile inside the entrance a low, flat, reef, with several exposed rocks, makes out some 300 yards from a point on the E shore. About 1 mile farther inside, shoal water, that extends some 600 yards off the same shore, has a least depth of 1½ fathoms. A bar, covered 4¾ fathoms, extends SW across the bay about 0.7 mile from the head. Between this bar and the head of the bay, a depth of 8 fathoms is found, where small vessels can anchor. As this bar is exposed to all N and W weather, large swells rolling over it, often breaking there, reform to pile up in breakers at the head of the bay. This bay affords no real protection for any but small boats and then only in the extreme SE bend behind a small reef making out from the SE shore.

(349) **Wedge Point,** a bold narrow ridge having remarkable serrations, separates Alimuda and Aspid Bays. **Aspid Bay** extends about 2.2 miles in a S direction and affords little protection from N and NW weather. The depth at the entrance is about 15 fathoms; from there the water shoals gradually to the head of the bay. The bottom is good for anchoring in 9 to 10 fathoms.

(350) **Cape Aspid,** on the N side of Unalaska Island about 15 miles from its W extremity at Umnak Pass, has a conical hilltop, 901 feet high, near its outer end. The shape of the hill, terminating in bluffs at the shore, is unlike any other land in the vicinity, as all the adjoining hills are flat topped with comparatively gentle slopes. The cape is a useful landmark from all directions except N where the hill merges with the higher land to the S. A ledge extends about 400 yards offshore, terminating in an islet about 24 feet high.

(351) The wide bight SW of Cape Aspid affords shelter in E and S weather in 12 to 15 fathoms, 0.4 mile from shore. A 4¾-fathom spot, marked by kelp, is 0.6 mile NE of Ram Point and about 0.4 mile from shore.

(352) At some distance off the coast, between Capes Aspid and Spray, the currents vary in intensity from little or nothing off Spray Cape to about 1 knot off Cape Aspid. The current generally sets E, the flood being stronger than the ebb. Farther inshore, at Cape Aspid, the currents are stronger and small tide rips appear at the turn of the current. These rips extend as far E as Sedanka Point.

(353) **Chart 16516.–Ram Point,** 2.7 miles SW of Cape Aspid, is a prominent wedge-shaped rock 240 feet high. Ledges, bare at low water, extend 0.2 mile offshore from the point. To the W of the point there is a stretch of low land over which the masts of vessels anchored in Chernofski Harbor are visible from offshore.

(354) **Chernofski Point,** the E entrance point of Chernofski Harbor, is the extremity of a narrow peninsula composed of several hills, the highest being 315 feet. The seaward face of the peninsula is rugged and broken and there are rocks that extend seaward on the line of the ridge. A deep, wide cleft across the middle of this peninsula may be identified when bearing S of SE.

(355) Several small detached banks, covered 10 to 12 fathoms, surrounded by deeper water are to the N of Chernofski Point.

(356) **Chernofski Harbor** is a small, land-locked harbor that in its inner part affords complete shelter from swell and from winds except williwaws. Depths are suitable for anchorage; bottom is mud. With heavy S and SE winds the harbor experiences a strong sweep from the valleys at the head. the entrance between Chernofski Point and **West Point** is through a narrow canal formed by low promontories, about 4 miles SW of Cape Aspid.

(357) The entrance to Chernofski Harbor is difficult as there are no conspicuous landmarks. From the entrance, the NE tangent of Umnak Island (Cape Idak) bears 309° (see chart 16500). Wedge-shaped Ram Point, about 1 mile E of Chernofski Point, may help to identify the locality. A shoal with a least depth of 5½ fathoms is almost in the middle of the entrance, about 900 yards SW of Chernofski Point. A midchannel course should be followed into the harbor because of the projecting ledges that extend on both sides. Anchorage can be had in the middle of **Mutton Cove** in 10 to 12 fathoms, mud bottom.

(358) A large pier is on the NE side of the cove; a smaller pier is on the SW side.

(359) Water can be obtained from a stream in the S part of the bay. The head of the bay, at the SE end, is shallow and can be used only by small boats.

(360) The N coast of Unalaska Island W of Chernofski Harbor is described in connection with Umnak Pass.

(361) **Chart 16522.–Sedanka Island,** close to the E end of Unalaska Island on the Pacific side and separated from the latter island by narrow, deep Udagak Strait, appears as a part of Unalaska Island. The island is mountainous and covered with tundra. There are numerous peaks, separated by deep valleys, running NW, but none of the peaks are conspicuous from E. The highest peak, 2,130 feet, is in the SW part of the island. The outer coast is broken by bays and coves separated by bold, rocky headlands.

(362) **Cape Sedanka,** the E point of the island, terminates in a knoll 375 feet high. Rocks and islets fringe the shore, but deep water is found at a distance of 400 yards. The coast on the SE side of the cape is unusually steep and reaches an elevation of 1,269 feet.

(363) **Egg Island** is 0.6 mile in diameter, 541 feet high, and is about 1.5 miles NE from Cape Sedanka. It is a grassy island with a bluff rocky shore, and has numerous rocks and islets within 200 yards of the shore, but beyond this distance deep water is found all around the island.

(364) **Old Man Rocks,** a group of four, two of which are prominent, are 0.9 mile NW of Egg Island. The two conspicuous rocks are 100 and 39 feet high. The group is surrounded by deep water at a distance of 200 yards.

(365) **Sedanka Pass** separates Egg Island and Old Man Rocks from Sedanka Island. It is about 1.5 miles wide and has depths of 30 to 40 fathoms. The Sedanka Island shore should be given a berth of 0.5 mile. Strong currents with rips are experienced occasionally around Cape Sedanka and just S of Old Man Rocks.

(366) **The Signals** are three rocks off the E coast of Sedanka Island. **Outer Signal,** 30 feet high, is 3.2 miles S of Egg Island and has a small rock, 10 feet high, 0.3 mile SE of it. Deep water is found close to these rocks. **Inner Signal** is 3 miles S of Cape Sedanka and 0.8 mile off the nearest Sedanka Island shore; it is 126 feet high and is surrounded by a shoal and reef area 0.4 mile in diameter. A bar, covered

7 to 8 fathoms reaches from this area to the nearest point of Sedanka Island. The passage between the Inner and Outer Signals is clear.

(367) About 15 miles SE of Egg Island (see chart 16520), after gradual shoaling from the 100-fathom curve to about 45 fathoms, the water deepens to over 60 fathoms, forming an underwater basin about 6 miles wide that leads NW into Beaver Inlet, furnishing an excellent pathway for vessels equipped with echo sounding apparatus. A crescent-shaped bank of rock formation within the basin of deep water and 2 miles E of Egg Island has general depths of 12 to 14 fathoms and a least depth of 9 fathoms on the W part of the bank. The 50-fathom curve surrounding the bank approximates a circle about 1.5 miles in diameter.

(368) When navigating on soundings in thick weather this bank and the characteristic deep water afford an opportunity to check a vessel's position. The navigator in finding his way on soundings to the bank must guard against the mischance of nearing Egg Island; the shoaling of the depths in doing so may mislead him in assuming that he is approaching the bank. A definite knowledge from soundings taken regularly along the course from seaward is necessary to avoid this error.

(369) From Cape Sedanka the shore on the Pacific side trends SW for 3 miles, then turns SE for 1 mile to a precipitous point, enclosing a small bight where temporary anchorage in W weather can be found. A depth of 7 fathoms is 0.5 mile from shore in the SW part of the bight. The bottom of fine gray sand slopes gradually from the sand beach at the head of the bight to the 20-fathom curve 1 mile offshore. To enter the bight, pass midway between Outer Signal and Egg Island.

(370) On the SE side of Sedanka Island, E of Udagak Strait, are three bays separated by bold headlands; the largest bay is 4 miles NE of the entrance to Udagak Strait and extends 2 miles inland in a NW direction. Good anchorage may be found 0.5 mile from the head of the bay in 7 fathoms. This bay is protected from all except SE weather. The two other bays, that are nearer Udagak Strait, afford protection from the N and W.

(371) The S end of Sedanka Island is a double point. On the E prong is a conspicuous sharp pinnacle rising about 100 feet from a flat ledge.

(372) **Udagak Strait,** between Sedanka and Unalaska Islands, provides a direct passage from the Pacific Ocean to Beaver Inlet. Foul ground extends 300 yards from the W shore of the strait at the entrance, but a midchannel course clears this ground. The narrows at the halfway point in Udagak Strait have a width of 0.25 mile, and the channel is slightly over 0.1 mile wide in a depth over 10 fathoms.

(373) The current velocity is about 2 knots on the flood and about 1 knot on the ebb. At the S entrance of the strait and through the narrows the flood sets from the Pacific. (See the Tidal Current Tables for current predictions.)

(374) The strait has good water throughout. However, in the narrows, which run E and W, the channel turns around a reef on the S side of the E end, and then in a reverse turn passes around a rocky shoal on the N side at the W end. The reef is off the NE side of a broad gravel spit that forms the S side of the narrows. The reef is marked by kelp and rocks awash at three points. One or more of the rocks are generally visible. The rocky shoal has a least depth of 3¼ fathoms and extends 200 yards from the S side of a pointed, gravel spit which forms the W end of the N side of the narrows. The currents in the narrows necessitate caution as to their sheering effect on a vessel swinging to avoid the dangers. Anchorage in the S entrance of the strait is uncomfortable because of the current.

(375) **Udagak Bay,** an indentation in the W shore of Udagak Strait, affords anchorage in 12 to 19 fathoms, sand and mud bottom, about 0.3 to 0.4 mile from the head of the bay. Small boats may anchor in 6 to 10 fathoms, mud bottom, farther toward the head. The bay affords good protection in any weather.

(376) Light tide rips were frequently observed in the area off the mouth of Udagak Bay, sometimes they extended well into the bay. These rips usually occurred when the wind was contrary to the current. Numerous swirls were also encountered in the same area at all times when the currents were more than 1 knot.

(377) **Beaver Inlet** has its entrance between Brundage Head and Cape Sedanka and extends 17 miles SW into the E end of Unalaska Island. It has an average width of about 3 miles in its outer reaches, narrowing to about 1.6 miles near its head. The deep water in the bay extends E between Unalga and Egg Islands, making access to the inlet comparatively easy for a vessel equipped with echo sounding apparatus.

(378) Currents in Beaver Inlet are negligible, and in the entrance between Egg and Unalga Islands will not ordinarily exceed 2 knots.

(379) **Local magnetic disturbance.**–Differences of as much as 4° from the normal variation have been observed on Round Island and as much as 3° on the N shore of Erskine Bay.

(380) From Cape Sedanka, the SE entrance point of Beaver Inlet, the shore trends NW for 1.6 miles to a point marked by a small natural arch and having a chain of rocky islets that extend N about 200 yards. Just W of this point is an open bight, 1 mile wide and 0.4 mile long, which furnishes convenient temporary anchorage in S weather, well out of any swell. Anchor in the middle of the bight about 0.3 mile from shore, with Old Man Rocks showing between the rocky islets off the point to the E, in about 16 fathoms. Smaller boats can move farther into lesser depths near the W end of the bight.

(381) **Sisek Cove,** about 4 miles SW from Old Man Rocks, is too deep for anchorage.

(382) **Udamat Bay** makes into Sedanka Island from Beaver Inlet 5.5 miles SW from Old Man Rocks and just W of **Biorka,** a small native settlement having a conspicuous church. The bay is 1 mile wide to a point 0.8 mile from its head where it narrows to 0.3 mile. A low valley extends SE from the head of the bay to the outer coast. About 1.4 miles S of the E entrance point, a reef makes out 200 yards from the E shore. With this exception the shores are clear, and a depth of 20 fathoms will be found within 250 yards or less of the shore. If necessary to anchor in the bay, the best places are at the head of the bay or just N of the reef, mentioned above, in a small bight indenting the E shore, but there will be scant swinging room. A small rocky patch, covered 15 to 25 fathoms, is 0.4 mile NW from the same reef, and may offer anchorage with more swinging room.

(383) **Strait Bay,** about 8 miles SW from Old Man Rocks, is 1.1 miles long, tapering from 1 mile wide at its entrance to 0.4 mile wide near the head. The bay is clear except for a 5½-fathom spot in the center. Anchorage may be had at the head of the bay in 20 fathoms about 250 yards from shore. A valley extends S and E from its head and during a blow the wind is funneled into the bay through this valley.

(384) **Amugul Bay** makes S from Beaver Inlet about 3 miles SW of the entrance to Udagak Strait. **Round Island,** 136 feet high, marks the E side of Amugul Bay entrance. The bay affords fair anchorage for medium-sized craft in 22 fathoms, mud bottom, 0.2 mile from the head of the W bight. The S

arm affords excellent anchorage for small craft in 10 fathoms, mud bottom, 0.1 mile from the head.

(385) At the head of Beaver Inlet are four small bays; named in order, following the S shore around to the N shore, they are: **Tanaskan Bay, Final Bay, Kisselen Bay,** and **Erskine Bay.** Temporary anchorage only can be found near the heads of these bays for medium-sized craft. The small bight on the S side of Kisselen Bay affords excellent anchorage for small craft in 5 fathoms, mud bottom, 0.1 mile from the head. In approaching this anchorage, care should be taken to avoid a reef, which uncovers 1 foot, 160 yards S of the S island of a group of four. In Final Bay are heavy williwaws and a strong draw.

(386) **Dushkot Island** is along the N shore of Beaver Inlet near the head.

(387) **Uniktali Bay** makes into the N shore of Beaver Inlet about 15 miles above its entrance. This bay is nearly 3 miles long in a W direction and 0.3 mile wide at its narrowest part near its head. An anchorage, practically landlocked, but limited to medium-sized vessels, may be found in 20 fathoms, muddy bottom, 0.5 mile from the head of Uniktali Bay. In entering, keep to midbay as far as the narrows, then favor the S shore to avoid a 6-fathom shoal that is 260 yards off the N shore.

(388) **Small Bay,** E of Uniktali Bay, affords good anchorage in 10 fathoms, 0.3 mile from the head.

(389) **Ugadaga Bay** is an indentation in the N shore of Beaver Inlet 8 miles above the entrance. From the head of Ugadaga Bay a trail leads to Unalaska. Fair anchorage may be found 0.4 mile from the head of the bay in 20 fathoms, even bottom.

(390) **Agamgik Bay,** indenting the N shore of Beaver Inlet, 5.5 miles SW of its entrance, offers anchorage in good holding ground with fair shelter, except in severe SE weather. The bay is 1.2 miles wide at the entrance. Opposite a small rocky peninsula jutting out from the W side about 1.4 miles from the W entrance point, the width is reduced to 0.4 mile. The anchorage is in this narrow portion in 16 to 20 fathoms. The bay is comparatively free from williwaws.

(391) **Eagle Rock,** a large, flat-topped pinnacle 75 feet high, is 125 yards off the rounded point on the E side of the entrance to Agamgik Bay. Off the W point of the entrance, covered rocks and rocks awash extend from 0.1 to 0.3 mile into the entrance. A rock, 6 feet high, is outside of this rocky area and 600 yards E of the point.

(392) The N shore of Beaver Inlet (see chart 16528) extends E from the E entrance point of Agamgik Bay for almost 3 miles to the W entrance point of Deep Bay, where it turns sharply to the N and NW for 1.2 miles, forming the W shore of Deep Bay, which has been described earlier with Unalga Pass. About halfway between the two bays is a conspicuous waterfall, 350 feet high, with a pinnacle rock 40 feet high just to the W of its base.

(393) The gap between the mountains on either side of the S part of Udagak Strait stands out in a measure, from a SE direction, against a background of mountains on the W side of the N end of the strait. The 1.5-mile stretch of shore forming the S entrance of the strait on the Unalaska Island side is at the base of a very steep side of a ridge, the summit of which is 1,920 feet high.

(394) Mountain ridges just W of Udagak Strait are normal to the trend of the outer coast, generally ending in deeply eroded cliffs. The mountains appear in confusion and can be identified only by a close study of the chart.

(395) With the exception of Outer Signal, Inner Signal, the reef off Reef Point, and the rocks and ledges close to shore, the S coasts of Sedanka Island and Unalaska Island, as far W as Eagle Point, are free from outlying dangers.

(396) Between Udagak Strait and Kayak Cape the valleys between the headlands have been partially filled with debris, forming a series of bights with shingle beaches at their heads. Behind these beaches are grassy flats and, in most cases, lagoons. The headlands between the bights protrude from the generally high mountain mass. The valleys, with the exception of one that leads through a mountain pass to the head of one of the bays of Beaver Inlet, are in the form of amphitheaters. Numerous rocks and ledges are within 50 to 100 yards from the shores and occasionally as far as 200 to 350 yards. The waters along the shoreline are generally foul with covered and bare boulders.

(397) **Hive Bay,** about 5 miles SW of Udagak Strait, is the largest of these bights, its two arms affording good protection from N weather. The W arm of the bay affords good anchorage in 8 to 10 fathoms with generally good holding ground. A rock that uncovers 3 feet is on the W side of the entrance to the E arm of Hive Bay. The headland between the two arms is recessive and undistinguished. The headland W of Hive Bay is deeply eroded. It has sharp ridges and three closely spaced summits of nearly equal elevation, with successively lower spurs toward the point. The cliffs are marked by narrow dark strata rising toward the point. The W side of this headland has a very conspicuous boulder slide.

(398) The bight just W of Hive Bay has a short stretch of shingle beach, behind which is a valley leading inland over gentle slopes to a mountain pass with an estimated elevation of 400 feet. Beyond the pass is Tanaskan Bay, an arm of Beaver Inlet. The headland forming the W side of this bight has a reddish cliff, particularly noticeable from the SW.

(399) **Staraya Bay,** N of Kayak Cape, is divided into two parts by a bold promontory on which the remnants of volcanic craters are easily seen. Near the outer end of the headland forming the E side of the N arm of the bay is a natural rock bridge arching from the cliff and footing in the shallow water near the shore. This span is about 50 feet, and the height under the arch is about the same. Ledges extend about 200 yards offshore from the outer end of this headland. The W arm of Staraya Bay is a bight which has a shingle beach of unusual length and height, 20 to 25 feet, and a large lagoon behind the beach. In the center of the mouth of this bight is a shoal area with a 1-fathom rock.

(400) **Kayak Cape** is the first prominent point W of Udagak Strait. It is lower than points to the W, bold at the extremity and its narrow ridge is marked by several prominent humps, 1,000 to 1,400 feet high. Both sides of the cape display a conspicuous black stratum about 400 feet high at the point of the cape. These strata may be seen when the overcast is not too low.

(401) **Chart 16521.**–From Kayak Cape W the shoreline trends to the SW and is deeply indented by several large bays, affording various degrees of protection. Only two of these, Usof Bay and Blueberry Bay, are considered to give adequate protection from all kinds of weather. Raven Bay is landlocked at the head and gives excellent protection for small craft.

(402) **Protection Bay,** just W of Kayak Cape, extends about 2 miles inland. There is a slight hook to the W at the head of the bay, giving some protection for small craft from the S. Rocks extend 500 yards SE off the point of the hook. This bay has the least shelter of any in the vicinity, but its depth is more convenient for anchoring.

(403) **Cape Yanaliuk,** about 4 miles SW of Kayak Cape, is easily identified by the mushroom-shaped rock just off the point. Altogether there are two small rock islets just off this point. The cape is narrow and precipitous except for a short

distance on the SW side, which is a grass-covered slope, topped and flanked at each end by rock cliffs. The cape has a markedly jagged appearance. A small bight on the E side of the cape extends 1 mile inland but affords no protection in bad weather.

(404) **Three Island Bay,** W of Cape Yanaliuk, extends inland for about 5 miles in a NNW direction; it affords fair protection for small craft in any weather in 8 to 15 fathoms at the head of the bay, behind three small islands which give the bay its name. Deep water carries through to the head of the bay between the islands. Care must be exercised not to anchor too close to the rocks N of the E island, nor to the shoal water at the N end of the bay. Swinging room is restricted for vessels exceeding 100 feet in length, and the area affords only fair anchorage and protection for small craft. It is subject to violent williwaws, and in S weather a rather heavy swell from outside makes it uncomfortable. **Foam Cove,** 1 mile above the W entrance point, provides fair temporary anchorage near the mouth of a stream which shows conspicuously from the bay entrance.

(405) **Blueberry Bay,** the next bay W of Three Island Bay, extends inland in a NW direction for about 3 miles. A fairly sharp turn to the N for about 1 mile makes the head of the bay landlocked and affords good shelter. The upper half of Blueberry Bay has a rugged shorelinecharacterized by narrow gravel and boulder beaches, or rocky shoreline with smooth rock slopes. Anchorage may be had in 15 to 20 fathoms in the middle of Blueberry Bay about 0.5 mile below the head in good holding bottom. The swinging room is entirely adequate for small craft and should suffice for ships of moderate size. Being entirely landlocked, there is almost entire freedom from swell. Winds are generally more moderate than in nearby localities and, as far as is known, never blow across the bay. Water is available.

(406) **Whalebone Cape** is characterized by a bare, rocky, 2,000-foot peak, that appears as a series of broken rust-colored cliffs from offshore. At the base of the mountain is a gray rockslide about 300 feet high. The foot of the slide extends to the high water line. The shore around the point of the cape is very rugged and broken, and dangerous for boat landings because of numerous rock islets, rocks awash, and covered rocks close inshore.

(407) **Usof Bay,** just W of Whalebone Cape, extends inland about 8 miles in a NNW direction and affords good anchorage at the head in 20 fathoms, sand bottom. The width of the bay narrows to 0.5 mile about 5 miles from the entrance and a slight turn to the N for about 1 mile makes the head of the bay landlocked. The general depth of the bay is over 60 fathoms. A small hanging glacier shows at the head of the bay over the W side of the narrows as seen from the entrance.

(408) Good anchorage for small craft is found in **Johnson Cove,** at the mouth of a canyon on the W side about 5 miles in from the entrance, in 7 to 10 fathoms, mud bottom. The S arm of Johnson Cove should be avoided as it is shallow and filled with rocks. To the N of the canyon is a conspicuous cascade.

(409) The shoreline of Usof Bay is rocky and precipitous except at the heads of several coves or bights which occur at irregular intervals. Thick, long grass covers the flats and ascends the mountains, in some cases covering the slopes as high as 2,000 feet. There are numerous rock islets offshore at short distances and irregular intervals. Kelp is general along the rocky shoreline. A strong W set of the current was noticed on the rising tide off the W side of the entrance to Usof Bay in 1939. This condition was noted by the survey party because it was generally taken for granted that the set is to the E on a rising tide. There is not sufficient proof that this condition exists on every rising tide.

(410) **Cape Prominence,** the W entrance point of Usof Bay, is marked by a tall cylindrical pinnacle connected at its base with the main point; it shows conspicuously from SSW. A flat ledge makes off 200 to 300 yards, and may be mistaken for the ledges off Reef Point.

(411) Another cylindrical rock is about 700 yards N on the E side of the cape. It is not so noticeable, but is an aid in identifying Cape Prominence. Breakers extend for about 500 yards off the cape.

(412) **Open Bay** is the bight between Cape Prominence and Reef Point. It has anchorage for large or small vessels in 20 to 5 fathoms with good holding ground and sufficient swinging room. It affords limited protection from the SW and E, but none from the S and SE.

(413) **Reef Point** is easily identified by a conspicuous cathedral rock, 240 feet high, just off the S extremity. A ledge, just a few feet above high water, extends 0.5 mile off the point. No dangers were noted outside of this ledge. All of this ledge is not above high water; the depth is 5 fathoms between the outer end and inner parts. The outer end is a reef which is continually awash, because of the ocean swell, at all stages of the tide, but may actually be 2 feet above low water.

(414) **Raven Bay,** on the W side of Reef Point, is entered on either side of **Ogangen Island** and extends 3.5 miles inland. The island, 1,180 feet high and 2 miles long by 0.5 mile wide, has its longer axis paralleling the W shore of the bay; the passage between is 0.2 to 0.4 mile wide and has depths of 9 to 15 fathoms.

(415) E of Ogangen Island, the bay narrows from a width of 2 miles at the entrance to 0.3 mile at the N end of the island; depths are 25 to 40 fathoms. NE of the island, **Crow Arm,** narrow and stocking-shaped, extends 1 mile to the N; the arm is too deep for the restricted swinging room and is subject to considerate swell during S weather.

(416) The W arm of Raven Bay narrows to 250 yards 0.6 mile N of Ogangen Island and continues N for another mile; excellent anchorage for small boats may be had in 3 fathoms just S of the prominent islet at the head of the arm. The sandflats at the extreme head are suitable for beaching small craft.

(417) The small cove W of the middle part of the narrows affords anchorage for small boats in 3 to 5 fathoms, but the swinging room is restricted by the reef on the W side. At the head of the cove are abandoned saltery buildings.

(418) A rock that uncovers is 400 yards S of the cove and slightly to the E of midchannel; the best water is W of the rock. Just S of the entrance to the narrows, a 4¾-fathom rocky shoal can be avoided by favoring the shore on either side.

(419) **Eagle Bay,** 3 miles W of Raven Bay, is about 1.3 miles wide at its entrance and extends 2.5 miles in a N direction; it is characterized by a particularly rugged and precipitous shoreline. High rocky cliffs rise directly from the high waterline in most parts of the bay and even where cliffs do not exist, the rise is very steep and broken. The very rugged country surrounding Eagle Bay causes violent williwaws in NW, N, and E weather. **Snipe Point,** which divides the bay into two arms, is very rugged at its S tip and quite rough and weathered on the top.

(420) The E side of the entrance to the bay is marked by **Spire Rock,** a very sharp pinnacle, 100 feet high and about 100 yards offshore. On the W side of the entrance **Label Reef,** awash at high water, extends about 400 yards offshore from the E side of Eagle Point. This reef is plainly visible at any stage of the tide because of breakers.

(421) Each arm of Eagle Bay is about 1 mile long and both extend in a NE direction. The northernmost arm is only 0.4 mile wide at its widest point and has numerous islands near its head. The islands are flat, grass covered on top, with steep rocky sides rising directly from the water, and are used as nesting places by many birds in the summer months. The arm is navigable as far as these islands.

(422) The E arm of Eagle Bay is about 0.5 mile wide for half of its length, and affords good shelter in all but extreme S weather about 0.3 mile inside the entrance.

(423) Good anchorage may be had in Eagle Bay, but the S swell is often uncomfortable. Anchorage with protection from all weather is available below the island in the N arm, but swinging room is limited. Depths of 11 fathoms extend into both arms of the bay; however, broken bottom with a 3¼-fathom spot extends from Snipe Point almost halfway across the entrance to the N arm.

(424) A portage at the head of Eagle Bay leads to Pumicestone Bay on the N side of the island.

(425) **Eagle Point** is the prominent headland between Eagle and Kuliliak Bays. The point is very rugged at its S end, and is distinguished by two prominent mountain peaks. The S peak, at the extreme S end of the point, is 1,340 feet high; when viewed from the S, it appears conical in shape with a very sharp top, but from the E or W it appears flat on top, with a sharp, rock peak at the S end of the flat portion. The N peak, about 1 mile NE from the S one, is 1,520 feet high, and appears pyramidal in shape from all directions, with a bare rock top. The blunt, S face of the cape is much weathered, with high rock cliffs, numerous slides, and many pinnacle rocks along the shore.

(426) A shoal, with 14 fathoms 0.4 mile from shore, makes out to S from the most S tip of Eagle Point. Passing vessels are advised to stay at least 0.5 mile off the cape in order to keep outside the 20-fathom curve.

(427) Appreciable tidal current was noted for a distance of 1 mile off Eagle Point. The flood sets W and the ebb E. With an appreciable swell running against this current, high, sharp, broken seas, with curling tops resembling tide rips, were noted off the point.

(428) **Chart 16514.–Kuliliak Bay** indents the SE coast of Unalaska Island immediately to the W of Eagle Point. The bay is divided by a narrow ridge of land into two parts, forming an outer bay and a well-protected inner bay. The end of this narrow ridge of land, **Repetition Point,** is the E point of the entrance to the inner bay.

(429) A chain of low, black rocks extends 325 yards offshore in a SW direction from the SW corner of Eagle Point and marks the E side of the entrance to outer Kuliliak Bay. A shoal, covered 18 fathoms, 0.8 mile from shore, extends SW from the outer rock of this group.

(430) Outer Kililiak Bay is open to the S. The shores are characterized by rock cliffs, except at the head of the deep bight which forms the NE part of the outer bay. At the head of this bight is a sand beach and a valley passes N of Eagle Point into Eagle Bay. Anchorage in 13 to 14 fathoms may be had at the opening of the bight, with some protection in SE weather and good protection in N and NW weather.

(431) A reef, with the outer part of it awash at half-tide, makes out from the center of the N shore of outer Kililiak Bay, and a shoal covered 8 fathoms extends 330 yards S from the reef. Otherwise the bottom of the outer bay is very even, decreasing in depth very gradually from 30 fathoms at the entrance to 12 fathoms at an average distance of about 200 yards off the N shore.

(432) Inner Kililiak Bay affords good shelter E of Nest Rock in 7 fathoms in all weather. The entrance is about 500 yards wide between the cliffs 200 feet high on the W side and on the steep tip of Repetition Point on the E side.

(433) **Dome Rock,** the outer rock of a conspicuous group that extends 120 yards SW from Repetition Point, is a good landmark on the E side of the entrance to the inner bay; the rock is about 30 feet wide and 5 feet high.

(434) Along the W shore of the entrance to inner Kuliliak Bay, flat reefs, rocks awash, covered rocks, and heavy kelp form a fringe some 200 yards wide. In this area is a large black rock, part of which rises to a sharp point 10 feet above high water, 75 yards out from the base of the shore cliff. About 160 yards NE from this large, black rock and 180 yards offshore is **Perch Rock,** a small, black rock about 1 foot high and surrounded by kelp.

(435) **Trava Point** is a small, flat, grassy point on the S side of inner Kuliliak Bay and 0.5 mile NE of the entrance. **Nest Rock** is a small, grass-covered rock island, 15 feet high and 0.9 mile NE of the entrance. **Williwaw Point** is a low, sandy point 0.3 mile beyond Nest Rock. A cascade is 0.5 mile inland from the head of the bay.

(436) The W shore of the inner bay is a curving, pebble beach fronting a low, grassy bluff. A low, wide valley, through which fog often drifts and winds always draw in N and W weather, extends across Unalaska Island to Kashega Bay. The W and NW shores of the inner bay, E of Nest Rock, are lined with low reefs, rocks awash and covered, and heavy kelp for a distance of 100 to 300 yards offshore. A rock, awash at half tide and surrounded by kelp, is 300 yards off the N shore directly N of the entrance. A fringe of heavy kelp, 50 yards wide, lines the S shore from the entrance to Trava Point.

(437) Proceeding to sheltered anchorage inside the inner bay, the controlling depth is 4½ fathoms after passing the entrance. A channel with this depth is close to the SE shore of the bay and just outside a heavy fringe of kelp along the NW shore of Repetition Point. On the N side of this channel the water shoals very gradually to the opposite side of the bay. NE of Trava Point the water deepens and the bottom is flat.

(438) In N and W weather violent williwaws occur in the head of inner Kulikiak Bay, above Williwaw Point. In S weather short seas, almost breaking across the entrance, make it difficult to enter.

(439) W of Kililiak Bay the country is less rugged; the peaks are lower and are separated by wide valleys. In the spring and early summer the snow disappears from all the peaks to the W, while in the area E of Kuliliak Bay many peaks remain snow-covered throughout the summer.

(440) From Kulikiak Bay the shore trends SW for 11 miles to Lance Point. Rocky ledges extend some distance off the intervening points.

(441) **Lance Point,** 12 miles SW of Eagle Point, is 465 feet high and has the appearance of a low tongue projecting from the higher land N of it. **Huddle Rocks,** four small islands, the largest 170 feet high, are about 1 mile SW of the point.

(442) About 5 miles W of Lance Point is a small bight that affords shelter for small craft in all but SE weather. Many rough rocky ledges extend from the shore between Lance Point and this small bight, at the head of which is a broad sand beach divided into two parts by a small rocky point. Three streams flow through the low, grassy valley behind the beach. An islet, 70 feet high, is SE of the low point that forms the S side of the bight; rocks awash are 300 yards NE of the islet. A chain of small rocky islets extends across the entrance to the bight, and a broad, flat reef that uncovers 1 foot is NW of these islets.

(443) **Local Magnetic Disturbance.**–Differences of as much as 6° from the normal variation have been observed at Cape

Aiak and as much as 3° on Huddle Rocks and at Lance Point.

(444) **Cape Aiak,** on the S coast of Unalaska Island, 8 miles SW of Lance Point or about 15 miles from Konets Head, is 1,820 feet high, and from the NE at a distance appears like a flat-topped island with a massive horn or pinnacle on the S slope. Breakers extend 300 yards S from the S end of the point.

(445) Between Cape Aiak and Konets Head, the flood current sets W toward Umnak Pass and increases in velocity as the pass is approached. It is strongest near the shore. The ebb is weaker than the flood.

(446) **Surveyor Bay,** on the W side of Cape Aiak, is 4 miles wide and 2 miles to its head. About 2 miles NW of Cape Aiak, the **Gargoyle Islands,** a group of fantastically eroded pinnacles about 250 feet high, make out 0.4 mile from a point on the N shore and divide the bay into two bights. A reef, awash at high water, connects the islands to the shore.

(447) A shoal, which has a least depth of 3 fathoms and breaks in heavy weather, is 0.3 mile S from the SW extremity of the islands; another 3-fathom shoal is 0.6 mile W of the same point and 0.5 mile S of a reef-fringed islet close to shore.

(448) Small-boat anchorage with some shelter from SE can be found in 5 fathoms 250 yards from the shore in the cove NW of the Gargoyle Islands. In using the anchorage, care must be taken to avoid a covered rock 400 yards from shore that breaks in moderate weather. The anchorage is not recommended but is the best available shelter between Kuliliak Bay and Umnak Pass.

(449) The W bight of Surveyor Bay has low sand dunes along its N shore; the W shore is fringed with ledges, one of which extends 700 yards off. A 4¾-fathom rocky patch, 1.5 miles NNE from Serpent Point, is about in the center of the bight.

(450) **Serpent Point,** on the W side of the entrance to Surveyor Bay, is a low narrow point projecting SE. Anchorage with good shelter except from the S and SE can be found 0.8 mile N of the point and 0.5 mile from the W shore of the bay in 15 fathoms. An 8-fathom shoal is 0.5 mile S of the point.

(451) **Chart 16513.**–About 1.8 miles W of Serpent Point, a chain of grassy islets projects S from **Cape Izigan** and terminates in **South Rock,** 23 feet high; this is the southernmost land feature of Unalaska Island. South Rock is 6 miles SW of Cape Aiak and 9 miles SE of Konets Head, the W end of Unalaska Island. Depths of 20 fathoms are found 300 yards off the S side of the rock.

(452) **Tiderip Point,** 6 miles NW from South Rock, is marked by a round hill 397 feet high. A chain of rocks, one 25 feet high, extends 0.5 mile S from the point.

(453) **Konets Head,** the W extremity of Unalaska Island, is marked by a conspicuous knoll 127 feet high.

(454) **Lone Peak,** about 3.5 miles NE of Konets Head, is the top of a long narrow ridge, 1,847 feet high, running roughly parallel to the coast. From NE and SW the peak appears like a sharp cone and forms a useful landmark.

(455) The shore between Tiderip Point and Konets Head is fringed by reefs and ledges that extend almost 0.5 mile offshore. Ledges extend about 300 yards W from Konets Head but deep water is found 400 yards W of the ledges. A bank, with a least depth of 8 fathoms surrounded by much deeper water, is 1.8 miles W from Konets Head. Heavy tide rips occur on this bank on the ebb.

(456) About 1.5 miles S of Konets Head is **Emerald Island,** a flat-topped, grassy island 0.3 mile in diameter and 204 feet high. The island is fringed by reefs, and a rock that uncovers 3 feet is 700 yards SE of it. Another group of rocks, the highest 8 feet, is 0.5 mile to the N of the island. Rocks extend 350 yards off the W side of the island.

(457) By using the channel between Emerald Island and Konets Head the tide rips to the S of Emerald Island can be avoided. The narrowest part of the channel is at the NW end, where it is less than 0.4 mile in width. The shores bordering the pass are broken with many projecting ledges, but these can be distinguished easily.

(458) Irregular bottom with depths of 6½ to 12 fathoms extends 3.5 miles S of Emerald Island. Tide rips which have the appearance of breakers occur on these spots on the ebb; with a strong ebb and an opposing breeze they attain considerable size. It is advisable to avoid this area.

(459) **Polivnoi Rock,** 17 feet high and 100 yards in diameter, is 5 miles SW from Konets Head; a breaker is 300 yards SW of the rock. Sea lions are often seen in the vicinity. In heavy weather, seas wash over the rock. An 8-fathom rocky shoal, marked by heavy tide tips, is 1.2 miles 065° from the rock.

(460) A convenient anchorage in S weather can be found about 1 mile NE of Konets Head in about 20 fathoms. In approaching this anchorage on the ebb, allowance should be made for the current. The flood is not felt immediately N of Konets Head.

(461) A small bank, with a least depth of 5¼ fathoms, is about 0.5 mile from shore, 2 miles NE from Konets Head. NE of the bank, the shore is steep-to and is exposed to the strong current of Umnak Pass.

(462) **Boulder Bay,** 5 miles NE from Konets Head, is a small bay with a kelp patch in the middle of its entrance. Two small shacks are in a cove on the E shore.

(463) **No Name Cove,** 3 miles NE of Boulder Bay and on the W side of **Ranchers Point,** is a small bay about 0.5 mile wide and 0.5 mile to its head. A small indentation on its W side furnishes good shelter for small craft except in severe N weather.

(464) **Station Bay,** on the E side of Ranchers Point, is divided into two arms. The E arm is about 0.3 mile wide and 1.5 miles long in a SE direction. The buildings of a ranch are on the W shore near the head of this arm. Anchorage for small vessels can be found off these buildings in 7 fathoms. Near the entrance to this arm is a conspicuous column rock about 94 feet high. **Peacock Point,** separating Station Bay from the unnamed bight to the E, has broken ledges and rocks that extend 700 yards NW. The W arm of the bay is about 0.5 mile wide and almost 1 mile long in a S direction.

(465) Chernofski Harbor, 2 miles E of Station Bay, was described earlier in this chapter.

(466) **Umnak Pass,** separating Unalaska Island from Umnak Island, is about 3 miles wide and about 10.5 miles long in a NE and SW direction from the vicinity of Polivnoi Rock to that of Pustoi Island. For description of the shore, see various headings previously described in connection with Unalaska Island and those following in connection with Umnak Island.

(467) **Currents.**–The current in Umnak Pass is similar to that in Unimak Pass. At times of tropic tides the current may set in a flood direction for as much as 18 hours. The current velocity is 3.5 knots on the flood and sets NE, and 2.5 knots on the ebb and sets SW. Velocities of 4.5 knots have been observed.

(468) The current velocity is 2 knots on the ebb and 3.5 knots on the flood between Konets Head and Emerald Island. Velocities of 4.5 knots have been observed. The flood current causes a set almost at right angles to the course when navigating Umnak Pass.

(469) The current velocity is 2.5 knots near Polivnoi Rock.

(470) (See the Tidal Current Tables for predictions for Umnak Pass.)

(471) The effect of the current in Umnak Pass is felt in a diminishing degree as far as Cape Idak and Cape Aspid on the N side, and on the S side it is felt about 10 miles to the S of Polivnoi Rock.

(472) On the ebb, very pronounced tide rips occur on the S sides of the shoaler banks in Umnak Pass and in the S approach. These tide rips are different from the tide rips encountered in Akutan Pass and Unalga Pass. In smooth weather they look like a line of breakers and may attain a considerable height. In moderate or stormy weather they merge with the seas, increasing their roughness to a considerable extent.

(473) On the flood, light confused tide rips occur in the vicinity of Ship Rock and on the banks to the NE of it, while the pass, with its countercurrents, resembles a broad, shallow river, the effect being caused by several lanes of currents and countercurrents. Off the points along the Umnak Island shore, tide rips are dangerous for skiffs and small launches, especially between Otter Point and Kettle Cape.

(474) From the S, navigation is more difficult, as Polivnoi Rock is low and Kettle Cape is not easily distinguishable against the higher background. With a heavy, S swell and a strong ebb it might even be found dangerous to attempt the pass because of heavy tide rips. The passage N of Emerald Island might be found preferable under such circumstances.

(475) In the approach to the pass the soundings are confusing as there are numerous banks with depths of 6 to 10 fathoms at distances of 4 to 6 miles from Emerald Island and Polivnoi Rock.

(476) **Routes.**–The following courses through Umnak Pass will avoid the worst of the tide rips: From a position 1 mile E of Ship Rock make good course **217°** for 5 miles to a position abeam of the rocks N of Emerald Island. After passing Konets Head look out for a strong set from the passage N of Emerald Island. Tide rips will be seen on the 8-fathom bank, 2 miles W of Konets Head, if the current is ebbing. Thence proceed on a course **205°**, with Ship Rock astern, for 3.5 miles, to position abeam of Polivnoi Rock, 1.5 miles distant. If bound SW, the 6-fathom spot 2.5 miles 195° from Polivnoi Rock can be avoided by continuing course **205°** beyond it.

(477) **Chart 16500.–Umnak Island,** third largest of the Aleutian Islands, is about 65 miles by 15 miles in extreme length and breadth. On the island are reindeer, foxes and a few head of horses and cattle. Mount Vsevidof, a volcano 6,920 feet high, is the summit of the island. It is situated SW of the center of the island, near the W shore, with no other mountains SW from it. Several prominent buildings and antennas are on **High Hill,** on the W end of the island.

(478) **Chart 16513.–Tulik Volcano,** an enormous crater 7 miles across, is situated in the N part of Umnak Island. Dense smoke may be visible from various parts of the crater.

(479) **Mount Tulik** is a conical peak 4,111 feet high on the SE rim of the crater; another very sharp peak, 3,519 feet high, is on the opposite side of the rim.

(480) **Kettle Cape,** on the SE side of Umnak Island and at the S entrance to Umnak Pass, is a jagged rocky ridge about 490 feet high that from certain directions resembles a kettle. It is the first prominent point W of Umnak Pass. The point is more conspicuous than its height or the configuration of the shore would indicate, as low land surrounds it.

(481) Kettle Cape is fringed by rocks; the outer ones to the SE are about 0.2 mile offshore and are visible only at about low water. A large area of shoal water, 1.5 miles SE of Kettle Cape, has a least found depth of 1¾ fathoms. This area breaks heavily in moderate S weather. It is marked by kelp but the kelp is difficult to see except in flat calm weather. Depths of 10 to 14 fathoms are found between this shoal and Kettle Cape. Some shelter can be found E of Kettle Cape from W and N weather.

(482) The shore NE from Kettle Cape is composed of sections of sand beach backed by low, earth bluffs and gulleys from whence it rises gradually to the rim of the enormous crater of Tulik Volcano which occupies the whole N part of Umnak Island. Outside the high water line are several shoals and reefs.

(483) Two miles NE from Kettle Cape and extending several miles NE, the shore is fringed by rocks that extend 500 yards offshore, and comparatively shoal water, less than 10 fathoms extends 1.3 miles offshore. Heavy tide rips, dangerous for small boats, occur in this area.

(484) **Black Rock,** a flat rocky ledge 10 feet high, is 7.6 miles NE of Kettle Cape and 0.5 mile from shore. Depths of 12 to 20 fathoms are found 0.5 mile S and E of this rock.

(485) About 2.7 miles NE from Black Rock is a point with a rocky ledge that extends about 350 yards NE; a landing can be made behind the ledge.

(486) **Otter Point** is 12 miles NE of Kettle Cape. The intervening shoreline is featureless and Otter Point, when abreast of it, is only recognizable from the change in direction of the shoreline which turns to the N. From the NE, a knoll 275 feet high, rising above a comparatively flat area just W of Otter Point, stands out conspicuously.

(487) **Ship Rock,** 1 mile SE of Otter Point, is one of the most conspicuous landmarks in the vicinity. It is an island about 500 yards long and 200 yards wide with a sharp inaccessible peak 424 feet high at its S end. At its N end is a lower peak ending in an abrupt bluff, giving the island its distinctive shape, but from NE and SW only the single higher peak is visible. The channel between Ship Rock and Umnak Island has depths of over 20 fathoms, but because of strong currents and tide rips it should be avoided.

(488) A bank covered 9 fathoms, on which swirls and tide rips occur, extends almost 0.5 mile E of the island, with deep water beyond.

(489) **Pustoi Island** is flat and grassy, 68 feet high and about 500 yards in diameter. It is 0.9 mile NE of Otter Point. The channel between Pustoi Island and Otter Point has a depth of 8 fathoms. Deep water is close off the E end of the island.

(490) From Otter Point, the shore trends N for 2 miles, then NNW for 1 mile, then NE for 2 miles forming broad **Otter Bight.** Good anchorage can be found with shelter from S, W, and N, in 8 to 20 fathoms. The adjoining beach is suitable for landing except in heavy N weather.

(491) A vessel could remain in Otter Bight in moderate SE weather but not in severe storms. In approaching the anchorage, the depths shoal rapidly from 20 to 10 fathoms about when Pustoi Island comes on range with Ship Rock. Depths of 10 fathoms are found 1 mile from shore, but depths of not less than about 6 fathoms will be found 600 yards from shore.

(492) A reef extends 400 yards from shore at a point 3 miles N of Otter Point. One mile N of the reef, high land begins and extends N to Cape Idak.

(493) The shore NE of Otter Bight to Cape Idak is composed of steep bluffs, with several rocky islets close to shore. It has no hidden dangers except very close to the land and the shore can be skirted at a distance of 0.5 mile.

(494) **Cape Idak,** the NE point of Umnak Island, is the N end of a long, flat ridge about 1,570 feet high, sloping gradually to the N. From the E this point appears as the N end of

the island as the land to the W is low, but Cape Tanak extends about 2.7 miles farther N.

(495) **Chart 16500.**–Between Cape Idak and Cape Tanak is a flat bight. The shore of the bight is regular and lined with sand, while inland the terrain is low and grassy except in the region about 1.5 miles W of Cape Idak, where a mountain slope terminates in bluffs near the beach. Depths of 20 to 30 fathoms are about 1 to 2 miles off the shore of the bight with the bottom shoaling gradually toward the beach.

(496) **Cape Tanak,** about 7 miles WNW from Cape Idak, is a low, rounding point with a number of hummocks about 50 feet high. Depths of over 100 fathoms are within 1 mile of Cape Tanak, though two narrow ledges with depths less than 100 fathoms extend into much greater depths and cause tide rips which may be mistaken for signs of a shoal. Good shelter from S weather can be found E of Cape Tanak.

(497) The flood currents, which set NE along either side of Umnak Island, unite in the vicinity of Cape Idak, causing tide rips. The ebb divides in the vicinity of Cape Tanak.

(498) **Ashishik Point** is a narrow point about 3 miles W of Cape Tanak. It is low and from offshore blends with the higher land in back of it. The point extends almost as far N as Cape Tanak and it should be given a berth of more than 0.5 mile. Landing can be made on this point except in N weather and there is a good supply of water nearby.

(499) The bight between Cape Tanak and Ashishik Point furnishes good anchorage in S weather. Since the prevailing winds in summer are SW there are frequently long intervals when this bight is comparatively smooth.

(500) From Ashishik Point the coast of Umnak Island trends SW. **Boiling Pinnacles,** with least depth of 3½ fathoms, are about 3 miles W of Ashishik Point, with the outer end of the point in range with the outer end of Cape Tanak. The shoal is about 1.5 miles from the shore of Reindeer Point. Deep water is found outside of this shoal. It is marked by kelp, and tide rips occur to the N of it. With the exception of this shoal, no indications of dangers have been found along the W coast of Umnak Island as far S as Cape Kigushimkada and vessels in general may approach 1 mile off the shore.

(501) **Reindeer Point** is 3 miles W of Ashishik Point.

(502) **Cape Chagak,** about 6 miles WSW of Ashishik Point, is not conspicuous. On the N side of the cape there is a bold bluff rising about 200 feet. SW of Cape Chagak the beach is about 3 miles in length and generally sandy.

(503) **Aguliuk Point** is 5 miles SW of Cape Chagak and 4.5 miles NE of Cape Aslik. NE of the point, for about 2 miles, the coast is broken and irregular with bluffs, sand beaches, lava outcrops, and off-lying rocks, the farthest of the latter being within 125 yards of the high waterline. Rocks are off the lava outcrops forming the foot of Aguliuk Point, and a long, narrow edge of rocks, 100 feet high, extends breakwaterlike for 225 yards into the sea on the S side of the point. A sand beach, beginning at this edge, extends SE for about 3 miles to Cape Aslik. Back of this beach, for about 3 miles, the terrain is a regular and fairly consistent slope.

(504) **Local magnetic disturbance.**–Differences from normal variations of as much as 4° have been observed at Aguliuk Point.

(505) **Bogoslof Island** (53°56'N., 168°02'W.) is in the Bering Sea about 22 miles N of Cape Tanak. It is of recent volcanic formation, and eruptions have completely changed the topographic features several times. Accordingly to existing records, eruptions have occurred in 1796, 1883, 1906, 1910, and 1923-27, but it is probable that there have been other eruptions of which there are no records. It now consists of one main island and a rocky islet known as Fire Island. Bogoslof Island forms a useful landfall on a course W from Cape Cheerful.

(506) Bogoslof Island is a Steller sea lion rookery site. There is a 3-mile vessel exclusionary buffer zone around the entire island. (See **50 CFR 227.12,** chapter 2, for limits and regulations.)

(507) The 500-fathom curve around Bogoslof Island approximates a circle about 5 miles in diameter.

(508) The main island, once known as **Castle Island** because of a castle-shaped rock on it, is about 1 mile long and 0.5 mile wide, and extends in a NW and SE direction. The S end terminates in a low, black sandspit which is now the haul-out place of a large number of sea lions. This point was found to shift its position during the season of 1935. On the NW part of the island is the volcano crater of recent time from which steam emits occasionally, and adjoining the crater is a pond that is 4 feet below high water; the crater is 141 feet high. The rocky portion of the island is the home of thousands of birds.

(509) **Castle Rock** on the SW part of the main island no longer resembles a castle. Its outline is ragged and consists of two main pinnacles, 333 feet high.

(510) **Fire Island,** 225 feet high, is 440 yards NW of the main island and practically connected with it by a rocky ledge which uncovers. It is a steep, rocky island, 220 yards long and 100 yards wide, and has three distinct summits, the middle one being square and resembling a castle. This summit is lower than the adjoining ones. A small islet, 190 feet high, adjoins Fire Island.

(511) Fair-weather anchorage can be had on the NE side of the island, offshore in 20 fathoms, sandy bottom, and on the NW side of the island, 800 yards offshore, in 10 fathoms.

(512) A current is often reported setting E in this vicinity; it is variously reported to set toward Cape Cheerful and toward Umnak Pass, with a velocity of 0.1 to 0.4 knot. It is inferred that with a barometric depression near Unimak Pass it sets toward Cape Cheerful, but with a depression in the Pacific Ocean S of Unalaska Island it sets toward Umnak Pass. Vessels coming from W often made Point Kadin ahead instead of to starboard. Maximum NW currents of 1.3 knots were found on the NE side of the island. There were also indications of a stronger E current on the N side of the island. A 1-knot current, setting continuously N for 21 hours, was observed at a location 0.5 mile W of Bogoslof Island.

(513) **Chart 16511.**–The shore of **Cape Aslik** is the face of an old lava flow. It is very precipitous and irregular, with numerous covered rocks that extend well offshore. Heavy kelp fringes the S side of the cape. The cape is prominent, with vertical cliffs 60 to 150 feet high. Back of the cape, about 2 miles inland, is a conspicuous, conical hill, 865 feet high. This hill is of a dark red color, with a distinct hole in the slope on its SW side. Farther inland, about 6 miles E of Cape Aslik, a distinctive peak rises to 3,310 feet (see chart 16500). It is very ragged with deep slopes and a shoulder 600 feet lower than the summit, that extends about 0.5 mile to the NW. Between Cape Aslik and Cape Kigunak the shore is a beach of fine black sand. Back of this beach is a large, flat valley bordered by mountain ridges on the N and S, and having a lone and prominent mountain in the middle. The valley, which extends to the Pacific Ocean side of Umnak Island, is a swamp land covered with a heavy growth of grass. A large stream flows through this valley.

(514) **Cape Kigunak,** about 5 miles S of Cape Aslik, is easily distinguishable and is a very prominent point on approaches from the N. It has a sharp, conical peak, 1,164 feet

high, near its outer end. Its shore consists of a steep beach of boulders and broken rocks, with steep, grass slopes rising directly behind. Two rocks about 15 feet high, 300 yards off the W part of the cape, and a third rock, same height, on the low-water line show up very conspicuously. Many boulders and rocks and a band of heavy kelp extend about 400 yards offshore around the cape. The bight N of Cape Kigunak affords some protection in S and E weather, but is not recommended in heavy weather.

(515) **Inanudak Bay,** between Capes Kigunak and Ilmalianuk, has depths of 10 to 40 fathoms and affords shelter except from the W and NW. The shore of the bay is rocky and precipitous except at the heads of the several coves and bights which form part of the bay. Sand and pebble beaches are found at the heads of these coves, and low bluffs, from 5 to 20 feet high, rise abruptly from the beaches. Beyond these bluffs are flat lands or valleys.

(516) From the westernmost point of Cape Kigunak, the shoreline curves sharply SE and E and the shore of the bay for about 2 miles is along the foot of a ridge almost straight up from the waterline. At the end of the ridge, and at the head of **Izhiga Cove,** is a sand beach that extends to Cinder Point. The water is shallow along the beach and several lines of breakers make small-boat landing difficult. Back of the beach, beyond the low bluff bordering it, is a flat valley.

(517) **Cinder Point** was formed by a lava flow and is about 150 feet high near the shore, except in the middle where there is a slight draw. A cinder cone 564 feet high is near the center of the point.

(518) **Stepanof Cove,** SE of Cinder Point, has a sandy beach about 1 mile in length at its head. Shoal water and several lines of breakers make small-boat landing difficult except on the N side of the cove where the water is usually quiet; fresh springs and seepages exist along the beach. A 70-foot pinnacle rock at the S end of the beach is conspicuous from all parts of this cove.

(519) A low, narrow valley with steep sides extends SE from the head of Stepanof Cove to the Pacific Ocean side of Umnak Island. The buildings on the S side of the valley are stocked and maintained for land-air rescue work. A road extends from Stepanof Cove to Fort Glenn, about 20 miles to the NE.

(520) **Steeple Point,** forming the S side of Stepanof Cove, has a very prominent, tall pinnacle projecting out of the side of its steep bank and numerous large rocks and boulders off its shore. The pinnacle resembles an inverted carrot and is 200 feet above the beach.

(521) **Hot Springs Cove** has about 1 mile of sand beach at its head with a small stream in the S part. Salmon spawn in a stream about 2 miles back of the beach beneath several small waterfalls. The steam from several small, hot springs at the head of this stream can be seen from the E side of Inanudak Bay.

(522) Between Hot Springs Cove and Cemetery Cove to the W are 1.5 miles of rocky shore. Near and W of the center of this shore, shoal water, marked by kelp, extends 0.4 mile offshore to the 10-fathom curve. Above the beach near the center is an overhanging cliff, 1,000 feet high. The beach in **Cemetery Cove** is rocky and bends N toward Broken Point. Water may be obtained from a small cliff stream on the N part of this beach.

(523) **Broken Point** is not conspicuous. It has a rocky beach with deep water off the point; the 20-fathom curve is about 0.3 mile offshore.

(524) **Geyser Bight,** W of Broken Point, indents the shoreline about 1.5 miles from a line tangent to Broken Point and Cape Ilmalianuk. Its beach is rounded and about 4 miles in length, with the E half sandy while the W half is rocky and bordered with kelp. There are 3 small rock islets 0.3 mile offshore in the center of the bight and another the same distance off the beach in the E part. Some protection may be found in Geyser Bight in S weather but it is not recommended in heavy weather.

(525) **Cape Ilmalianuk,** the S entrance point of Inanudak Bay, is about 500 feet high and conspicuous. It has a rounded shore, with a number of rocks and kelp that extend seaward for about 300 yards. A rock, 0.4 mile NW of the point is conspicuous at low tide. A shoal area that extends 1.5 miles off the cape is 10 fathoms deep 0.5 mile offshore and 20 fathoms about 1 mile farther off. Ships should keep 1.5 miles off the cape.

(526) Anchorage may be found in any part of Inanudak Bay about 0.4 mile from shore. By shifting, shelter may be had from all directions except the NW. No anchorage will give protection from severe NW weather. Good anchorage is available for large ships in 20 fathoms about 1.5 miles from the beaches at the heads of Stepanof Cove and Hot Springs Cove.

(527) Stepanof Cove affords the best shelter from SE around to NNW. Anchorage may be found in 8 fathoms with Cape Kigunak just open of Cinder Point. When the wind gets around to S or SW, this cove becomes uncomfortable.

(528) Hot Springs Cove affords shelter in S and E weather. Cemetery Cove affords shelter except from winds from the NW quadrant. Anchorage may be found in Izhiga Cove 0.3 mile from shore in 8 to 10 fathoms, but better shelter from N weather can be found in Stepanof Cove.

(529) **Chart 16500.**–Between Cape Ilmalianuk and Cape Kigushimkada, for nearly 13 miles, there are no known dangers to navigation; ships are advised to keep 1 mile offshore in order to hold a depth of 25 fathoms or more. Kelp extends from 200 to 300 yards off the rocky areas.

(530) The currents off the coast between Cape Ilmalianuk and Cape Kigushimkada are estimated to be from 2 to 3 knots, the strongest being opposite Kshaliuk Point. The current sets NE on the flood and SW on the ebb.

(531) The weather along this coast may change after passing Derby Point. When foggy, wet, windy weather prevails SW of the point, good or comparatively clear weather may be encountered to the NE and vice versa.

(532) Between Cape Ilmalianuk and Derby Point, for about 10 miles, the coast extends in a general SW direction. A practically straight sand beach about 3 miles in length begins on the SW side of Cape Ilmalianuk.

(533) **Kshaliuk Point** is a rounded, prominent point at the SW end of the beach. This point has grassy bluffs about 400 feet high, except on its N side which is practically straight up and down with prominent horizontal layers of stratified rock. SW of the point, the land back of the shore is low, the beach consisting of short stretches of sand, rock, and lava formation. The most conspicuous lava flow is at Twinlava Point, about 4 miles SW of Kshaliuk Point.

(534) S of Kshaliuk Point, between it and Mount Vsevidof, are three sharp prominent peaks about 2,000 feet high and about 0.5 mile apart. Less than 1 mile from the peak nearest the shore is another prominent peak of about the same elevation. It has a broad, rounded base, rising almost from the shore and has two points on the top; a low saddle connects the points.

(535) **Derby Point,** about 1.5 miles SW of Twinlava Point and 3 miles N of Cape Kigushimkada, has cliffs and rock outcroppings along its shore. The steep sides of the point are grass covered above the cliffs, but the top is bare and strewn with cinders and small lava boulders. The rounded hill on

the point resembles the crown of a derby hat when viewed from seaward, the rocky shoreline forming the brim of the hat. This point is a conspicuous feature of this coast, and also serves as a line of demarcation for different weather conditions.

(536) **Local magnetic disturbance.**–Differences from normal variation of as much as 4° have been observed at Derby Point.

(537) The coast between Derby Point and Cape Kigushimkada has a S direction and consists of a bold, rocky cliff at the base of Mount Vsevidof.

(538) **Mount Vsevidof** is an extinct volcano 6,920 feet high and the highest peak on Umnak Island. It is about halfway between Inanudak Bay and Nikolski Bay, and approximately 40 miles SW of Cape Idak.

(539) The upper reaches of this mountain are usually covered with snow the year round. The W side slopes gradually to the shore between Twinlava Point and the N end of the large open bight S of Cape Kigushimkada.

(540) The peak appears conical from the NW with a slightly flattened top, but the large crater so plainly visible from the Pacific side of Umnak Island, does not show at all. The two small glaciers on the N side of the extinct volcano are not prominent from offshore, but the valley that extends inland on this same side has many bare, cinder patches and lava outcrops visible from offshore. This valley goes back toward the large, jagged, saw-toothed mountain range, 6,510 feet high, to the NE of Mount Vsevidof.

(541) **Cape Kigushimkada** is the N point to a large open bight. This cape, at the base of Mount Vsevidof, is the outer end of a lava-flow which forms a rugged, rounded headland having precipitous, rocky bluffs, 80 to 90 feet high, with numerous jagged indentations. Many rocks and pinnacles are adjacent to the shore of this cape. The shelf on top of the cape is covered with many lava outcrops, cinder beds and fissures, and rises gradually inland to form part of the W slope of Mount Vsevidof.

(542) On the SE side of Cape Kigushimkada is a bold headland, prominent from seaward. A broad sand beach, about 1.5 miles S of this headland extends for about 2.5 miles SSW. Behind the beach is a broad, grassy valley with three prominent streams, the two northermost carrying the drainage from the S slopes of Mount Vsevidof.

(543) At the S end of the sand beach is a rocky headland with outlying ledges that are partially awash at high water. A rocky islet is about 0.6 mile W of the headland. About 0.5 mile S of this islet is a covered rock which breaks in heavy weather, and another islet is about 1 mile N of Okee Bay. From the headland the shore runs in a SW direction and is very irregular, with numerous indentations.

(544) From Cape Kigushimkada to the SW end of Umnak Island, the land is rolling, with numerous rounded hills. The bottom along the shoreline of both Umnak Island and Ananiuliak Island is very uneven and has some dangers to navigation.

(545) **Chart 16511.–Okee Bay** is a small, shallow cove on the E side of a small peninsula on the N side of Okee Point. This bay affords some shelter for small craft and has a sand beach where landings can be made in most any weather. Another small, shallow inlet is on the W side of the small peninsula.

(546) **Okee Point** is a headland on the N side of the entrance to Nikolski Bay. It has steep, rocky bluffs back of the high water line and rocky ledges extend offshore.

(547) **Anangula (Ananiuliak) Island,** on the N side of Nikolski Bay and off Okee Point, is a kite-shaped island about 1.4 miles in length and 301 feet high near the center. Bare rock ledges extend 50 to 60 yards from the grass line on the shore of the W side of the island. Passage between this island and Umnak Island through Seaweed Pass is not advisable as there are no natural ranges that can be recommended. During the summer, kelp may extend across the passage.

(548) **Nikolski Bay,** between Anangula Island and Cape Starr, is about 12 miles S of Mount Vsevidof. It is about 4.5 miles wide and 3 miles long, and is open from the W to the NNW. The shore of the bay consists mostly of gravel and rock beaches. It is fringed to varying distances offshore by reefs, large boulders and kelp. Many of these reefs actually are above high water but are covered by the heavy swell except on very calm days. The area bordering the reefs along the shore is foul, with numerous covered rocks. It should not be approached too closely.

(549) The bay is surrounded by rolling hills, that are covered with a thick mat of grass, and frequent, marshy areas. **High Hill,** 712 feet high, is near and N of the center of the bay and is a prominent landmark in approaching anchorage. It is cone shaped but flat topped, and the sides, except inland, are steep, rocky, and rugged.

(550) Except on very calm days there are few places where safe landings can be made. It is reported by the natives that in the winter when heavy northwesters are blowing, it may be impossible to land even in Nikolski in Mueller Cove. Landing is possible in most any weather in River Cove in the mouth of Sheep Creek.

(551) The currents are strong, especially around Anangula Island, but are not dangerous, as they generally run parallel to the shoreline.

(552) Anchorage with protection from W and N weather is found in the N end of Nikolski Bay behind Anangula Island in 10 to 25 fathoms with good holding ground. A good anchorage in E weather is off **Kelp Point** in 10 to 20 fathoms.

(553) **Eider Rock,** about 1 mile NW of High Hill, is a small island reef 600 yards offshore in the NE portion of Nikolski Bay.

(554) The head of Nikolski Bay S of Kelp Point is a rectangular-shaped bight with a large, rocky ledge along the shore at its head. The two coves in this bight are **River Cove** at the NE corner and Mueller Cove in the S. The large rocky ledge separating the two coves is almost covered at high water.

(555) **Sheep Creek** is the largest stream in the vicinity and empties into River Cove. The creek extends NE into a broad, marshy valley dotted with numerous ponds.

(556) **Mueller Cove,** the inner anchorage of Nikolski Bay, is the cove in which the village of Nikolski is situated. Only very small fishing boats attempt to enter this cove because of the constricted entrance caused by the reef in midchannel. With any kind of weather from the W or N, seas break across the entrance.

(557) **Rudisell Reef,** at the entrance to Mueller Cove, is practically covered at high water and in heavy weather the seas break over its narrow, outer ledge of rocks that are about 4 feet above high water. This ledge, however, serves as an excellent natural breakwater and protects the beach at the head of Mueller Cove except when heavy northwesters are blowing up the bay.

(558) A rock covered ¼ fathom, is 0.1 mile W of Rudisell Reef and in the entrance to the channel into Mueller Cove. The location of this rock nearly always can be determined by the breaker over it. At high water, in W weather, it may break very heavily and cause a dangerous surge across the channel toward Rudisell Reef.

(559) **Nikolski** is one of the most frequented places for small trading schooners W of Unalaska. Fishing, trapping,

and the harvesting of seals in the Pribilof Islands are the means of livelihood. A good shingle beach is in front of the village. The store and the church are painted white and are the most prominent buildings in the village. The church has two crosses, one of which is on the belfry tower. This tower is the most conspicuous point in the village. The store carries a few supplies, but is stocked only during the trapping season. Mail is delivered by airplane. The ranch buildings of the Harris Livestock Co. are about 0.3 mile SW of the village. The buildings of the company consist of living quarters, barns, and storehouses. The largest of these buildings is a landmark looming prominently on the skyline from the anchorage off Kelp Point. The wool-storage building, painted red, also makes a conspicuous landmark.

(560) **Cape Starr,** about 3 miles to the W of Nikolski, is a bold headland with steep rocky bluffs, 150 to 350 feet high, backed by rolling, grass-covered hills. The shoreline is bordered by rough, irregular, rocky ledges and reefs, numerous rocks and extensive kelp beds. Several small islets, reefs and rocks awash are from 0.5 to 3 miles off Cape Starr.

(561) S of Cape Starr is a wide, flat beach of fine white sand, back of which are low, grass-covered, sandy bluffs. Inland a broad valley that extends across the island, bends NE to the chain of lagoons S of Nikolski. The remainder of the Bering Sea coast of Umnak Island is mostly rocky and rugged. SW and W from the beach are numerous jagged, rocky projections, and rock pinnacles. The area outside the high water line is filled with rocks, small ledges and patches of kelp. The most prominent and highest place on the SW end of Umnak Island is **Elbow Hill,** 442 feet high, about 4 miles SW of Cape Starr. It is grass covered and prominent from seaward. **Idaliuk Point** is 2.4 miles W of Elbow Hill.

(562) **Pancake Rock,** about 2.5 miles W of Cape Starr, is a 22-foot islet which sometimes has, from a distance, the appearance of a flat pancake on the surface of the water. This islet is the E end of a low, flat, rocky reef about 500 yards in length.

(563) Several reefs and rocky islets are SE of Pancake Rock. The farthest from the shore of Umnak Island is a rocky islet, surrounded by ledges and rocks awash, about 1 mile SE of Pancake Rock and 1.5 miles offshore from Cape Starr.

(564) **Adugak Island,** about 7 miles W of Cape Starr and 4 miles off Idaliuk Point, is 160 feet high.

(565) Adugak Island is a Steller sea lion rookery site. There is a 3-mile vessel exclusionary buffer zone around the entire island. (See **50 CFR 227.12,** chapter 2, for limits and regulations.)

(566) **Chart 16500.–Cape Sagak,** the SW end of Umnak Island, is long and generally low with rolling grass-covered hills and short stretches of sand beaches.

(567) The passage between Cape Sagak and the NE point of Samalga Island is dangerous. Foul ground and extremely heavy tide rips extend between the two points of land and for a considerable distance N and S. There are impenetrable patches of kelp and the current goes through at a very high velocity, probably 7 knots.

(568) Vessels drawing more than 4 feet should avoid this passage. Boats of less draft may go through only during periods of slack water and in fair weather. Such craft should clear Cape Sagak by 0.25 mile on a course **160°**.

(569) **Samalga Island,** the long and narrow island about 2 miles SW of Cape Sagak, is 4 miles long and 0.5 mile wide at its widest part. The high water line is strewn with rocks and small boulders, and occasional stretches of sand beach are found around the island. Back of the shore the terrain rises abruptly in the form of grassy slopes. The interior is flat and entirely covered with grass. Foxes and sea lions are the only wild life on Samalga Island. It is not inhabited, except for 1 month during the winter when the trappers come to get fox pelts.

(570) The entire island is fringed with a rocky ledge, that uncovers, and extends from 100 yards to 0.5 mile offshore. On the SW end of the island this ledge becomes an extensive reef stretching WSW along the prolonged axis of the island for nearly 2 miles. In heavy weather there are breakers for a considerable distance over this area.

(571) Landings can be made at various places except in heavy weather when the island is almost surrounded with breakers. The best landing is in a small bight just N of a cabin on the N side of the N end of the island. Vessels may anchor in 10 to 15 fathoms on the bank that extends 160° from the middle of Samalga Island, or in not less than 15 fathoms, N of the SW end of the island. There is no protection in either of these anchorages.

(572) The currents are treacherous in the vicinity of Samalga Island.

(573) The SE coast of Umnak Island should be navigated with great caution. SW of Vsevidof Island, fog appears to be more prevalent than to the N. With W and SW weather the fog drifts across the low, SW part of Umnak Island while the high mountains NW of Mount Vsevidof form a barrier that may cause clear weather in their lee when all the area SW of Vsevidof Islands is in fog.

(574) W of Samalga Island currents of about 4 knots have been observed setting N when the tide at Dutch Harbor is rising and S when it is falling.

(575) Currents are weak over the bank inside the 100-fathom curve S of Umnak Island.

(576) NE from Cape Sagak, the Pacific side of Umnak Island is fringed with rocky ledges and kelp beds. The shallow bight 11 miles from the cape has a sandy beach above the ledges and is backed by low, grassy, bluffs about 100 yards inland. A chain of three lagoons are in the low valley that extends N from the bight to the village of Nikolski. On the NE side of the bight is a bold headland with steep, rock bluffs rising to 561 feet.

(577) **Driftwood Bay,** about 40 miles SW of Konets Head, Unalaska Island, is on the SE coast of Umnak Island opposite Nikolski. The bay is between Cape Udak and Black Cape. It is about 3.5 miles across the entrance and is divided into two arms by a headland about 435 feet high. Water may be obtained in either arm.

(578) The W arm is clear of dangers and shoals gradually. From its head a trail leads across the island to the village of Nikolski. Good anchorage may be found in 15 fathoms. In SW weather some shelter may be obtained in the lee of Cape Udak. In S or SE weather, there is no good anchorage, but in an emergency small boats might find some shelter in the E arm.

(579) The E arm, **Traders Cove,** is more or less foul and should not be entered without local knowledge. Small boats could be hauled out on the sandy beach in the NE corner of this arm. In this corner is a shack in which fuel and food supplies are kept for sheepherders.

(580) **Cape Udak,** on the W side of Driftwood Bay, appears as a flat plateau about 600 feet high and about 1.2 miles across its seaward face. All sides of the cape are precipitous, rocky cliffs.

(581) **Black Cape,** about 392 feet high, is on the E side of Driftwood Bay. The cape slopes gently down to the water's edge and has a group of rocky islets, about 135 feet high, 175 yards offshore.

(582) **Lookout Point** is 4 miles NE of Black Cape. From Lookout Point for 6 miles to the point opposite Kigul Island, the shore of Umnak Island trends ENE. Numerous rocky islets extend offshore for 1.5 miles. In addition to these visible objects, numerous kelp patches mark depths of 2 to 5 fathoms. The outermost of these is S of Kigul Island and has a depth of 4½ fathoms.

(583) **Amos Bay** is 8 miles NE of Black Cape and about 3 miles N of Vsevidof Island. It is about 0.7 mile wide and 1 mile long in a N-S direction. The W side of the bay is bordered by reefs that extend about 400 yards offshore, and the head is shoal. Anchorage with shelter from NE to W can be found 0.3 mile W of the E entrance point, in 7 fathoms.

(584) To approach this anchorage, from a position 0.8 mile W of Vsevidof Island steer 000° for 3.5 miles, passing 0.4 mile W of a rocky islet that is about 1 mile S of the E entrance point. Favor the E shore of the bay to avoid the reefs bordering the W shore. A trail leads from the head of the bay to Nikolski on the W coast. On the E side of the bay is a cabin in which food and fuel are kept for sheepherders.

(585) **Vsevidof Island,** 280 feet high and about 1 mile across, is the largest of the group of islands on the SE side of Umnak Island and is SE of Mount Vsevidof. A small bay indents the S shore of Vsevidof Island. Covered rocks at the entrance prevent anything larger than a small launch from entering and then only when no surf is running. Rocks extend SE 0.4 mile from the SE point of the island, terminating in a rocky islet about 30 feet high. Depths of more than 20 fathoms are 0.3 mile E of these rocks.

(586) **Ogchul Island,** 1.7 miles E of Vsevidof Island, is about 0.3 mile across, 180 feet high, and is surrounded by deep water. The island is flat topped. The channel between the two islands has depths of 35 fathoms or more.

(587) Ogchul Island is a Steller sea lion rookery site. There is a 3-mile vessel exclusionary buffer zone around the entire island which also encompasses Vsevidof Island. (See **50 CFR 227.12,** chapter 2, for limits and regulations.)

(588) **Kigul Island,** 3.5 miles N of Vsevidof Island and about 2 miles E of Amos Bay, is the largest of the inshore islands. It is about 0.5 mile in diameter and 219 feet high. The island is 0.5 mile off the coast of Umnak Island, and the channel in the passage between the island and the coast is restricted by shoals to a width of about 150 yards. N of Kigul Island, anchorage with shelter from S and W winds can be found in about 12 fathoms. Anchorage with shelter from E winds can be found W of the island in 7 fathoms. The approach to this anchorage is difficult without local knowledge.

(589) **Lone Rock,** 1.5 miles NE from Kigul Island and 42 feet high, is the northernmost of the group of rocks and islets in this vicinity.

(590) **Russian Bay,** near the middle of the Pacific Ocean side of Umnak Island, is about 1 mile wide and 2 miles long. A rocky ledge, 16 feet high, is about 1 mile E of the S entrance point. This ledge should be given a wide berth to the SW to avoid a rock that uncovers 425 yards SW of the ledge. The point on the NE side of the entrance should also be given a wide berth to avoid the foul area that extends SW of the point for about 0.3 mile. At the head of Russian Bay is a sandy beach where a stream of considerable size flows into the bay. This bay offers protection from N weather in 10 fathoms, sandy bottom. In SE weather the bay is not recommended except in an emergency.

(591) **The Pillars** are a pair of pinnacle rocks, the larger 130 feet high, about 3 miles off the shore of Umnak Island and 15 miles NE from Vsevidof Island. These rocks stand out prominently from all directions and may be seen many miles on clear days. From the N and S they have the appearance of a single pinnacle. From the E both rocks are visible. A rock awash at high water is about 175 yards E of The Pillars. Depths of more than 14 fathoms can be carried to within 0.3 mile all around these rocks.

(592) **Thumb Point,** about 3 miles W of The Pillars, is a long, narrow point, on the tip of which are three large pinnacles. Two of these, about 150 feet high, are on the beach. The third, 121 feet high, is about 150 yards offshore. From distances less than 5 miles these three pinnacles are very distinct; though several others of like size are in the vicinity, these cannot be mistaken, there being no other group of three.

(593) The broad bight between Thumb Point and Kettle Cape is fringed by off-lying ledges. Two valleys lead across Umnak Island toward Inanudak Bay from the head of this bight.

(594) **Chart 16501.–Islands of Four Mountains** are a group of five, treeless, volcanic islands W of Umnak Island. Their names are Uliaga, Kagamil, Chuginadak, Carlisle, and Herbert. The group is about 16 miles from Samalga Island and about 18 by 25 miles in extent.

(595) These islands are high and snowcapped, with some snow remaining throughout the year. Clouds obscure the peaks most of the time. Frequently in the summer, while low fog banks are over the adjacent waters, the peaks stand clear above and are visible away from the fog banks. Fog is often in patches that may be avoided by passing around one of the islands, or by moving out of the sweep of wind through a pass. The winds play about the islands with all the vagaries common to williwaws and may sometimes be avoided by making a move of 1 mile or so.

(596) Navigation among the islands is beset by frequent fogs, strong and treacherous currents, and tide rips that may be dangerous for small craft. Because of the frequent fogs and strong currents it is emphasized that navigation is safe only by frequent sounding and constant reference to the chart. All waters are clear for large ships beyond about 1 mile from the shores, and for small craft beyond 0.25 mile except where obstructions are charted. It is not safe to attempt passage inside any of the off-lying rocks.

(597) In **Samalga Pass,** between Samalga Island and the Four Mountains Group, the waters are deep and 15 miles in width; however, a good berth must be given the shoals that extend SW from Samalga Island.

(598) A bank, with a minimum depth of 13 fathoms, is about 5.5 miles S of Concord Point, Chuginadak Island. Apparently it is the high spot of a large shoal area rather than a pinnacle.

(599) Among the group, the passes are probably all clear, though they have not been swept with wire drags.

(600) It is strongly recommended that a vessel proceeding along the N side of the Aleutian Islands avoid anchorage in the Four Mountains Group in bad weather. With a heavy sea running in the Bering Sea, dangerous tide rips will be encountered among the islands, and any lee afforded by indentations on the islands' shores is offset by the sudden shifting of the wind that may necessitate shifting anchorage during thick fog through narrow passes subject to strong tide rips.

(601) **Uliaga Pass,** between Uliaga and Kagamil Islands, has 9 fathoms across almost its entire width, and a midchannel course clears all known dangers. In the middle of the pass is a light growth of kelp; it is towed under and difficult to see except during the periods of slack water.

(602) **Kagamil Pass,** between Kagamil and Chuginadak Islands, is wide and clear; no obstructions NW of Corwin

Rock. The least depth in the pass is 7 fathoms 1.2 miles N of Chuginadak Island.

(603) **In Carlisle Pass,** between Chuginadak and Carlisle Islands, a midchannel course will carry 28 to 32 fathoms in the shoalest part. The depths increase quickly to 80 and 90 fathoms at both ends of the narrowest part of the pass. On either side of midchannel the water shoals rapidly toward land, but no danger exists until about 550 yards from the shoreline. The currents in this channel are strong and the rips and swirls are of moderate intensity. Small boats should avoid the center of the pass to clear the worst of these.

(604) **Chuginadak Pass,** between Chuginadak and Herbert Islands, is about 3 miles wide, with depths of more than 100 fathoms.

(605) Between Herbert Island and Yunaska Island, to the W of the Four Mountains Group, the passage is 14 miles wide and very deep.

(606) **Current** observations among the Islands of Four Mountains have not been sufficiently detailed to serve as a basis for precise predictions. The best index to the times of flood and ebb appears to be the information for a location 1 mile E of Yunaska Island which is given in the Tidal Current Tables. Flood sets generally N and ebb S. The duration of slack is usually very short.

(607) Among the islands the water swirls and counters in a highly confused manner, so that rips and eddies may be encountered almost at random. Rips in some cases indicate bottom configurations, but often not. Particularly in bights along the shores, currents counter to those outside may be anticipated.

(608) Strong tidal currents set through all the passes. Velocities exceeding 4 knots have been noted and it is probable that they reach 5 and 6 knots at times. Heavy tide rips may be anticipated except at slack water. In Uliaga Pass and in Carlisle Pass, the flood sets NE. Between Herbert Island and Chuginadak Island flood is to the NW. In Kagamil Pass the currents are confused and the flood appears to enter the passage from the E, passing to the NW to mingle with the flood current from Carlisle Pass, and thence turns N along the W side of Kagamil Island. S of Chuginadak Island considerable differences in the direction and strength of the current over short distances may be noticed. Heavy rips, except in calm weather and at slack water, are about 1.5 miles SE of Concord Point, the SE point of Chuginadak Island. Current boils have been noted as far as 7 miles offshore. Inshore, the set appears to be to the E most of the time. Offshore, about the 500- to 1,000-fathom curves, it seems to be principally to the W.

(609) **Anchorages** in the group of Four Mountains Islands are few and inadequate. The principal one is in Applegate Cove, a bight on the N shore of Chuginadak Island. Protection from N weather may be found in South Cove on the opposite side of this island from Applegate Cove. About 3.5 miles to the E of South Cove is another anchorage, of small extent but offering excellent protection from the N. An anchorage giving protection from SW to NW weather is available in the bight at the NE corner of Chuginadak Island, about 0.9 mile S of Corwin Rock.

(610) A fair anchorage for medium-sized craft is in a cove on the N side of Kagamil Island. Another anchorage is in a bight on the S side of the extreme E end of Kagamil Island.

(611) No other anchorages about these islands can be recommended and none around Carlisle and Herbert Islands. Small craft may find bights here and there where the depths and swinging room are suitable for anchoring, but the prevalence of strong currents, heavy seas, and bad wind conditions make them unsafe. The bottom in and around this group of islands, where it is not rocky, is essentially cinders and volcanic ash mixed with sand and gravel.

(612) **Uliaga Island,** the northernmost and smallest of the Four Mountains Group, consists of one central mountain cone with a few prominent spurs. On the slopes are several spirelike rocks. The crest of the peak, 2,915 feet high, has two points, one sharp and the other flat, larger, and slightly lower. The NW side of the mountain is very steep and is greatly eroded. A serrated ridge protrudes from the S side of the mountain, and the S one of three peaks on this ridge is a good landmark.

(613) The cove on the N end of the island is filled with kelp and affords poor protection for small boats. The E side of this cove is a cape, formed by a rough, lava outcrop, with a sharp, narrow ridge leading down to it. The W side of the cove is a wall of rock 340 feet high. The largest stream is on the W side of the island. A sharp, needlelike pinnacle with two points, the higher 65 feet, is less than 0.5 mile from the NW shore and about 1.1 miles N of the westernmost point of the island. This point is comparatively long and consists of a narrow ribbon of lava that extends into the sea from one of the mountain ridges. On the S slope of this ridge and about 0.8 mile E of the W point of the island is a sharp spur, 956 feet high.

(614) A rock, which uncovers 3 feet, is about 0.2 mile from the E shore of the island and well outside the thick kelp line. The best landing site on the island is on the E side about 0.5 mile from the SE corner. This landing is on a boulder beach behind a barrier of kelp and near a trapper's cabin, which is occupied during some winters. A prominent scar is in the low, grass bluff bordering the shore in this vicinity. The small cove S of the landing is marked by a 40-foot pinnacle rock at the S end of a boulder beach.

(615) **Kagamil Island,** between Uliaga and Chuginadak Islands, has a large mountain in the center of its S half. The mountain is 2,930 feet high, and has a circular crater on its NW side. Its upper slopes are steep and rocky, while those nearing the base make a somewhat abrupt change to large, gently sloping or flat areas of grass or tundra which generally terminate in bluffs. Near the SE end of the island a number of fumaroles emit vapor near the tops of the cliffs, and at the S end is a strong steam jet in the cliff a few feet above the sea.

(616) The hills in the N part of the island culminate in a 1,640-foot peak, that is close to the N shore. The two largest valleys are on the E side of the island; the northernmost is quite flat, with some grass-covered bluffs, and is drained by two small streams. What is probably the best camp site on the island is in the valley at the head of **North Cove,** the largest of the coves on the N shore. This valley, circular in shape, and the smallest on the island, has one permanent stream. North Cove has the only sand beach on the island.

(617) **Candlestick Point,** on the W side of North Cove, has striking topographic features in a long, thin wall of rock with a 75-foot arch to form the point proper, and a group of 10 tall pinnacles close by. The wall of rock is 315 feet high and juts out N into the sea. The pinnacles, the tallest being 156 feet, are grouped slightly offshore about the outer end of the wall. The NW point of the island is a detached spur, 591 feet high, with a conspicuous smooth, red cliff, about 0.3 mile W of Candlestick Point.

(618) From the red cliff the coastline trends S. High cliffs with a series of gray pinnacles border the shore. S of these cliffs, the only valley on the W side of the island begins at the head of a small cove. This valley is narrow, about 2 miles in length, and is drained by the largest stream on the island. A small lake is reported to exist in this valley. To the S, the cliffs along the shore rise almost vertically from the

sea 300 to 500 feet, with no talus or ledge at the waterline. The cliffs at the SE end of the island are broken in many places by caves. The shore around the S end of the island is of very rough lava and boulders, the lava being most prominent at the SW corner of the island.

(619) A fair anchorage for medium-sized craft in 10 fathoms, rocky bottom, is on the N shore of Kagamil Island in North Cove. It is subject, however, to violent williwaws. Water may be found in the cove. Entrance is from due N of the center of the cove and well clear of the vicinity of the pinnacles on the W side. Another anchorage may be found in 16 fathoms in a bight just S of the E end of the island. The bottom is reported to be coarse, black sand and fine gravel. This bight is marked by a high ridge, that extends from the mountains, and a gablelike headland. There are a stream and a cabin in the bight. Williwaws may be encountered here, and the currents are troublesome; nevertheless good shelter from W weather may be had.

(620) **Chuginadak Island,** the largest of the Four Mountains Group, consists of two mountain masses divided by a low, wind-swept valley across a narrow neck of land. The low area of the valley has rolling grassland interspersed with areas of lava flow, cinder patches, and conical cinder hills.

(621) The E part of the island is an area of rugged terrain formed by a group of eroded volcanic peaks, the highest being 3,840 feet. Numerous valleys and ridges descend to the rocky bluffs bordering the shore. The peaks, almost constantly hidden by clouds, are covered with snow nearly the year round. The lower levels have a vegetation of thick grass, while the higher altitudes are of barren rocks and lava ash. Many prominent waterfalls may be seen around this part of the island. In about the middle of the E coast are several areas where steam escapes from the top of the shoreline cliffs. On the S side, **Concord Point,** the SE end of Chuginadak Island, is a high headland of rolling, grassy hills. Immediately to the NW of this headland, **Black Peak,** the remnant of a large crater, the W rim of which is a distinctive black crag, is a conspicuous landmark from the SE and SW. It is 1,525 feet high, and is usually visible when the higher peaks inland are hidden by clouds.

(622) The coastline of the E part of the island is indented by many coves and bights. Extensive kelp beds are found in the shoal areas and numerous large boulders and off-lying rocks along the shore. **Corwin Rock,** 56 feet high, stands prominently at the extremity of a submerged reef making out from the NE shore of the island. The outer limits of Corwin Rock are within about 0.7 mile from the nearest point of Chuginadak Island. Although this rock appears as a single island, it consists of two small islets, separated by a small, narrow strait. On the SW side of Corwin Rock the kelp extends well out toward the shore of the island. Currents, swirls, and tide rips indicate foul waters, and no passage exists between the rock and the island.

(623) The W part of Chuginadak Island consists of a tall, symmetrical cone, known as **Mount Cleveland,** 5,675 feet high. The sides of this volcano are streaked by series of lava flows, with intervening, grassy patches on the slopes, most of these patches being on the S side. Because of the heat of its active crater, Mount Cleveland loses its snow more rapidly than the other high peaks. A wisp of smoke or vapor issues most of the time from the small crater in the top of Mount Cleveland; a dim glow may be seen at night. An unusual condition consisting of a clear patch of sky in the lee of the volcano has been observed when all other places were heavily overcast. No waterfalls are on this part of the island and there may be water only after a rainfall, as the entire cone is apparently so porous that no stream of water from the melting snow reaches the shore. The coastline is more regular than around the E part of the island, and the kelp beds bordering the shores are less extensive. A few rocks awash are found close inshore along most of the beaches and cliffs.

(624) There are no good places to land on the island in unfavorable weather. However, in moderate weather landings may be made in some of the smaller coves indenting the point on the NE side of Applegate Cove. It is generally possible to land on the S side of the island in South Cove. The landing is on the E side of the cove, at the end of the sand beach or on the adjacent, rocky shore. The best place for a small boat to obtain water is in a small cove about 1 mile E of this landing, near a waterfall with a peculiar white deposit at the top. This deposit can be seen 20 miles offshore on clear days. A small boat can pass inside the 140-foot pinnacle near this waterfall.

(625) No houses are on the island but a large shallow cave is in the face of the cliff at the head of South Cove. With the exception of Corwin Rock no dangers are very far offshore, the farthest being about 500 yards. Rocks awash, and others bare at low water extend about 350 yards from the shore of the SE side of Concord Point. A 1¾-fathom spot is 0.3 mile off the S end of the point. The kelp around the island is not always visible because of the strong currents.

(626) The anchorages in **Applegate Cove,** the largest bight on the N shore of Chuginadak Island, and in **South Cove** on the opposite side of the narrow neck of land have a most unfavorable weather condition. The fog hangs frequently over them when the two main parts of the island are comparatively clear.

(627) Applegate Cove affords protection from all weather except from the NW to NE. However, winds of great intensity are almost constantly encountered. The valley across the narrow neck in the center of the island acts as a draw, causing the winds to be of much greater intensity than would be normally expected. Wind forces double those prevailing outside may be encountered in stormy weather. Bottom is of dark-colored sand and mud, but rocky patches may be found. The bottom holds fairly well in moderate weather but dragging may be expected during severe blows. Anchorage may be found in the center of the cove in 14 to 20 fathoms. Small craft should anchor well into the cove in 7 to 9 fathoms, from 600 to 800 yards offshore opposite the central part of the sand beach. Both the wind and fog may be avoided to some slight extent by anchoring near the W part of the cove, opposite a prominent, dark, rocky outcrop in the bluff.

(628) An anchorage with good protection from the NW to SW, is available in a bight about 0.9 mile S of Corwin Rock in about 14 fathoms, rocky bottom.

(629) Protection from N weather may be found in South Cove, the large cove on the S side of the valley between the two mountain masses. Conditions regarding fog and wind correspond exactly with those of Applegate Cove. South Cove is smaller and has a shoal in the W part. The bottom is rocky and anchors may be fouled. The best anchorage is in 9 fathoms NE from the shoal and it can be approached from the SE to SW bearing in mind the shoal in the W part. The nearest source of water is on the exposed coast, about 1.5 miles E, where small boats may obtain it in favorable weather.

(630) A small anchorage in a bight about 3.5 miles E of South Cove and 3 miles NW of Concord Point gives excellent protection from N winds. Because of the shielding effect of high cliffs, it may be free from fog when South Cove is not. Several waterfalls mark this bight. Anchorage is in 15 fathoms, with rocky bottom and very limited swinging room.

(631) **Carlisle Island,** about 1.2 miles NW of Chuginadak Island, is a mountain consisting of a single, extinct volcanic cone 5,283 feet high. The island is somewhat circular in shape, with a diameter of about 4 miles. The upper part of the mountain is snow covered. Below the snow line, the slopes are dark lava, while below 1,500 feet they are covered with grass or tundra. The lower slopes flatten out and generally terminate in rocky cliffs or steep bluffs. On the W and N sides are numerous seepages on the face of the bluffs. The westernmost point of the island is an almost flat, oblong plateau 1,000 by 1,400 yards, with an average elevation of about 160 feet. The only stream on the island that may be flowing continuously is on the SE side about 1 mile S of a shack.

(632) The most prominent features along the shore are: on the NE side of the island, a small peninsula 0.4 mile long, formed by a lava-flow jutting out NE into the sea; on the SE side, a knoll forming a rocky point; on the S, a peculiar, dragon-shaped, rock dike protrudes in the shape of a curving ridge and headland at the extremity forming **Dragon Point;** off the NW point, a rock has the appearance of a partly submerged ship when viewed from the E. Also a low, offshore rock is in this vicinity.

(633) **Herbert Island,** the southwesternmost of the Four Mountains Island, is separated from Chuginadak Island by 3-mile wide Chuginadak Pass. The mountain on the island may be likened to a truncated cone, the truncated section being the rim of a crater about 1 mile in diameter. The rim is lower on the N side, and from well offshore to the N the inside of the crater is partly visible. The highest part of the island, 4,235 feet, is the S rim of the crater. The N side of Herbert Island appears fairly flat when approached from the E or W. The N side of the mountain is deeply eroded and the most abrupt. The S and W sides of the island are marked by yellow scars on the cliffs. The island is tundra- and grass-covered, with snow from fall to early summer. The lower slopes are regular and in places gentle.

(634) Along the W part of the N side of the island is a low bluff, less than 50 feet high, which gives way on the E side to high, sheer bluffs of from 200 to 400 feet. Under these high bluffs, the shoreline is mainly a boulder beach, 10 to 20 yards wide, with kelp offshore. On the flat part of the N end, however, the beach is fairly wide, and reefs, with many rocks awash, extend well offshore, and beds of heavy kelp for some distance outside the reef and foul area line.

(635) E of the northernmost point of the island is a shallow bight which may be used for anchorage in calm weather, though it has a boulder bottom and in S weather is subject to heavy seas coming from the S around the NE corner of the island. Strong currents tend to form tide rips with any sea that might be running. A cabin, at the NW end of the bight, is occupied at frequent intervals by fox trappers.

(636) On the W side of the island, near the SW corner, is a cup-shaped valley, apparently the eroded remains of a crater. The shore at the foot of this valley is a boulder beach with moderate slopes behind it. NW of the valley, and about 0.5 mile offshore, is a 60-foot rock which stands out very prominently from both N and S. A small rock is about halfway between it and the shore.

(637) The S shore of the island consists of narrow beaches at the foot of cliffs of varying heights. All offshore rocks are within 200 yards of this shore except off the SE corner of the island, where a prominent pinnacle rock 135 feet high is about 0.3 mile off the beach. The passage inside this rock is not clear, because of a rock awash, and another pinnacle 2 feet high. Back of the pinnacle rock is a distinctive reddish headland.

(638) **Chart 16500.**–Yunaska, Amukta, and Chagulak Islands are a group of islands WSW of the Islands of Four Mountains. Yunaska, the nearest, is about 14 miles from Herbert Island while Chagulak and Amukta Islands are about 3 miles apart and about 10 and 14 miles, respectively, to the W of Yunaska. The pass between Herbert and Yunaska Islands and the pass to the W of the latter are deep and clear of dangers. Navigation about these islands requires caution and frequent soundings during poor visibility.

(639) Current observations taken 1 mile E of Yunaska Island indicate velocities of about 2 knots. The greatest velocity observed was nearly 4 knots. The flood sets N and the ebb S. (See the Tidal Current Tables for predictions.) The velocity of the current changes very rapidly around the times of slack water, and the current frequently runs near its maximum flood or ebb velocity for 4 or more hours. Strong currents and dangerous tide rips are reported in the vicinity of Amukta and Chagulak Islands. In a small gale and during spring tides, the tide rips are built up by an opposing swell. A strong ebb against a small swell is reported to cause 10-foot rips in a dead calm. Currents opposing the swell and a little wind may bring about such seas and rips that small vessels are forced to proceed slowly.

(640) **Yunaska Island** is a treeless volcanic island, divided into two parts by a generally flat valley, with gentle slopes from the bluff back of the shoreline to the base of the mountains. The island is mostly grass covered below 1,000 feet, especially in the lower flats where the grass is extremely thick and matted. Weather conditions are similar to those of the Islands of Four Mountains. Yunaska is a wildlife refuge; it has been stocked with blue foxes which are now quite plentiful and tame. Two cabins are on the island. In general, the landing facilities are poor and there are not many sources of drinking water.

(641) A large crater, about 2 miles in its greatest diameter, is in the E part of the island. The highest point of the crater's rim, 1,968 feet, is found on the NW side. This point appears as a lone peak from some directions. The crater is surrounded by various conical and ridgelike hills, interspersed with small craters and lava flows. Within the large crater is a small peak, 1,804 feet high, which has its own small crater. Eruptions in this part of the island have been known to occur. A prominent lava flow extends from the SW rim for about 1 mile to the S; it does not reach the shore. The cliffs along the S shore of this part of the island are honeycombed with caves and marked with many bridges and arches.

(642) Near the NE shore of Yunaska Island is a prominent saddle-shaped peak, 1,051 to 1,066 feet high. A bold promontory, 747 feet high, adjacent to the shore, is at the end of a ridge leading NW from the saddle-shaped peak. To the W of this ridge and N of the crater is a broad, smooth valley. The surface is composed of porous ash covered with a moderate growth of grass. The entire area is well drained by a few narrow ditches 4 to 6 feet deep. Through the middle of the valley is a long lava flow, about 20 feet high and very rough. The lava flow extends NNE to the shore where it spreads along the water's edge and where, under favorable conditions, landing might be made. A good supply of drinking water can be obtained from an underground stream about 150 yards E of and behind the westernmost corner of the lava flow. The stream flows below and around the boulders of the old beach.

(643) Along the E and N coast of this part of the island the shore is bordered, in general, by steep rocky cliffs that can be scaled in several places. The most important break in the cliffs is at the foot of the lava flow. **East Cove** is a broad indentation on the extreme E end of the island. Landing sites

are found in East Cove and at the head of a bight N of East Cove where some water can be had.

(644) The central valley of the island is composed of flats occasionally broken by hills and knolls, and is covered with tundra. No dependable permanent source of drinking water has been found in this valley.

(645) On the W part of the island is the highest peak, 3,119 feet. It is an apparently lifeless volcano, somewhat eroded, with remnants of craters on its side and about its base. From the W, the island appears as having grass-covered hills, with high bluffs on the N and S rising abruptly toward the summit of the two-pointed peak. The points stand out, particularly from the W, when they are not covered by clouds, which is seldom.

(646) A low bluff extends along most of the W coastline. N and S of it much higher bluffs begin and rise 300 to 600 feet in places. A 300-foot bluff, beginning about 1 mile from the NW corner of the island, extends S for about 0.5 mile. A black sand beach, about 40 yards wide and 600 yards long, is at the foot of the S half of this bluff.

(647) With the exception of this short stretch of sand beach, the W shore is rugged and has many reefs and rocks awash offshore. Many lava points extend outward from the general bluffline. The kelp is thick and extends from 50 to 200 yards outside the rocks. On the N and S ends of this shore, where the bluffline is higher, the beachline becomes a narrow, boulder shelf at the foot of the bluff, and boulders extend out into the water for some distance. A large reef extends offshore for over 300 yards from the SW point of the island. On the E side of the bold southernmost point of the island, for a short distance the cliffs drop immediately into the water without even a shelf at their foot. Several large offshore rocks exist in this locality. A large pinnacle, about 200 feet high, is about 150 yards offshore and about 1.2 miles NE from this point of the island.

(648) The shoreline around the island is rugged and has many off-lying rocks and pinnacles. Heavy kelp extends several hundred yards offshore, except off the sand beach in the middle of the S shore of the island and a few other places where there is deep water off vertical, lava cliffs. Heavy tide rips and strong currents are encountered off the points, especially those at the NE and SW ends of the island. All around the island the bottom breaks off fairly sharp, becoming more even as the 30-fathom curve is approached. Passing ships are advised to keep outside this curve.

(649) Dangerous shoals extend off the E shore of the island in the vicinity of an off-lying rock and on the S side of the island in South Anchorage.

(650) Ships should not approach within 1.5 miles of the island's shore except with extreme caution. Small craft may consider themselves safe at distances beyond 0.3 mile from shore, except where charted obstructions exist. A pinnacle rock 91 feet high is off the SE shore.

(651) Around Yunaska Island are three or four fair anchorages. **South Anchorage,** the largest bight on the S side of the island, affords protection from N as well as W weather, and to some extent also from the NE, in 13 to 15 fathoms with even bottom of rocks and cinders. The off-lying reef and low rocks in the W part of the bight must be avoided, as well as the shoal in the E part. A safe entrance may be made by heading for the middle of the long, conspicuous black cinder bluff along the head of the bight on a course **000°**. A tall shaft of rock, leaning slightly, is on the steep slope at the W end off the bight.

(652) **Local magnetic disturbance.**–Differences from the normal variation of as much as 3° have been observed at South Anchorage.

(653) **East Cove,** indenting the E side of the island, affords fair anchorage, for one ship, in about 10 fathoms with good holding ground of cinders and mud. The cove is small, with a dangerous off-lying ledge and rocks on the S side, and with troublesome currents. It affords fairly good protection from W weather; however, it is subject to violent williwaws during W storms, making it inadvisable to anchor there. Heavy swells reach this anchorage during SW storms. Launches may find good protection inside the kelp behind the rock reef in the S side of the cove.

(654) Protection may be found by small craft in a small but pronounced cove near the middle of the W shore of Yunaska Island, in 52°36'N., in about 3 fathoms, with a bottom of boulders. A narrow channel, about 100 yards wide, leads through the heavy kelp to the head of the cove.

(655) The best protection from S weather is found in a small cove on the N shore of the island in 170°41.5'W., in about 16 fathoms, with rock and mud bottom. A 6-fathom depth is at the E end of the cove. About 0.5 mile to the W is a smaller cove, where launches may find good protection from S weather in 3 fathoms, sandy bottom. A cabin is at the top of the high black bluff at the head of this cove.

(656) **Crater Anchorage,** a bight on the W side of the island, affords fair anchorage with some protection from E and S weather in 18 to 20 fathoms, cinder bottom. The bight is marked by a curved black bluff on its E side, the remnant of a crater. Rocks, covered 7 feet, are encountered a very short distance inside 15 fathoms in 170°46'W. which constitute a serious danger in this anchorage.

(657) **Chagulak Island** is a steep, volcanic mountain having a sharp peak, 3,750 feet high. Its rugged slopes, mainly a series of sharp, steep-descending rocky ridges marked by numerous pinnacles, terminate generally in rocky cliffs at or near the shore. It is uninhabited and has no good landing places. The island is steep-to on all sides and soundings give little indication of danger. It should be given a clearance of at least 1 mile. The cove on the W side formed by the SW point offers some protection and a possible landing for small craft during SE weather; its approach, however, is endangered by violent tide rips.

(658) Great caution should be exercised during thick weather while navigating in the vicinity of Chagulak Island. Very strong currents make it impracticable to use soundings as a guide in thick weather. The 200-fathom curve is dangerously close in places, barring the use of depth curves for rounding the island. There are no recommended ship anchorages near Chagulak. The island is small, steep-to, and affords no protection. The two principal exceptions to the general steepness of the slopes of the ridges are at the SW and SE points of the island.

(659) The SW point is a peninsula formed by a comparatively long and flat, grass-covered ridge some 300 feet high, and the upward continuation of the ridge toward the mountain summit which has a comparatively regular and moderate slope. By reason of its low elevation, the peninsula is generally not fog- or cloud-covered during the prevailing low visibility. A slight, rounded rise near the shoulder of the ridge at the NW extremity of the peninsula, and another on the S side of the peninsula, are distinctive as they alone project above the smooth appearing tabletop of the ridge. On the S face of the peninsula below the second rounded rise is a small white scar in the shore bluff.

(660) The SE point is the extremity of a moderately descending grass-covered ridge projecting seaward to form a peninsula. The rounded NE end of the island above the rocky cliffs along the shore is grass covered and also has a fairly moderate slope.

(661) On the N part of Chagulak Island, about halfway in distance and elevation along the ridge between the summit and northernmost point, is a pronounced saddle. On the N end of this saddle is a summit, with a pinnacle, 1,905 feet high. A second smaller and lower pinnacle is just to the N. From these pinnacles the ridge slopes in a general convex form to the N point of the island. On the next prominent descending ridge to the E, is a rounded thumblike protrusion, 1,120 feet high, that is visible along the line of the NE tangent of the island. A similar thumb, 1,495 feet high, is on the W descending ridge, that forms the S boundary of a deep valley on the W side of the island. It is seen along the line of the SW tangent of the island and particularly well when snow is in the locality, as the steep sides of the feature itself are generally bare.

(662) Chagulak Island is a nesting place for whalebirds and small gulls which fly in great numbers around the island within a radius of a few miles, and in foggy weather may indicate the proximity of the island.

(663) The shore is either of large boulders, vertical cliffs, or outcropping rock. There are several off-lying features. Off the NW side are two prominent rock ledges; the inshore ledge is 55 feet high. Off the E side is a small rocky islet, steep and roughly rounded in outline at the top and 150 feet high. About 0.6 mile to the N of the rocky islet and farther offshore is a very dangerous detached ledge, it shows 18 feet above the surface and seas sweep over it in moderate weather. Several rocky islets are off the S shore and there is a low, rocky ledge off the SW point.

(664) On the S shore is a prominent, smooth, narrow slide of snow and sediment which may be distinguished well out at sea.

(665) On the W side is a 225-foot pinnacle rock. A beach landing may be made on the S side of the pinnacle. About 400 yards N of the pinnacle is a 20-foot dike that extends about 20 yards outside the high water line. Many rocks, awash and covered, are off the point 250 yards N of the dike.

(666) The N shore is very rugged, with precipitous rocky bluffs. In general, the kelp near the shores is thickest along the W shore.

(667) A submerged pinnacle having only 2 fathoms over it is just within the 100-fathom curve, 0.5 mile NW from the SW point. In this vicinity are strong, erratic currents and heavy tide rips.

(668) The small, rocky islet close to the S side of the peninsula at the SW point affords some protection for making a landing on the island. The cove on the N side of the peninsula affords anchorage for small craft in S and E weather.

(669) **Chagulak Pass** is clear except for the 2-fathom shoal mentioned in the description of Chagulak Island. It is about 3 miles wide but passage should be attempted only with local knowledge or during very clear weather. The flood current sets NW and the ebb SE. The current is probably in excess of 3 knots. Tide rips were noted through the entire pass.

(670) **Amukta Island** has a volcanic mountain cone with a crater at the summit. The highest point of the rim of the crater is 3,463 feet at its W end. On its S end is an appreciable depression of the rim. The mountain is closest to the N shore of the island, where its slopes descend directly to the shore. The base of the mountain cone proper is at about the 1,000-foot level, and to the E and W the lower slopes reform into spurs, hills, and ridges.

(671) Near the NE shore a prominent, cinder hill, 1,486 feet high rises at the side of the cone.

(672) A group of fingerlike pinnacles mark approximately the flattened, 1,000-foot level that appears as a ridge bordering the E shore. This apparent ridge descends to the S and is linked with the prominent ridge forming the peninsula at the SE end of the island, a low saddle is between them. Rising on the slopes of the mountain halfway between its summit and the SE peninsula is a group of reddish knolls. A spur projecting from the mountain toward the NW shore is marked by two summits, the inner and higher one being a conical peak 1,036 feet high.

(673) A ridge of varying elevation borders practically the entire W coast and terminates in the peninsula forming the SW end of the island. On this ridge are some distinctive summits and a decided break occurs about halfway along the W shore. The E slopes of the S part of this ridge border the large cove indenting the S side of the island and the adjacent low lava fields.

(674) A very distinctive feature on the island is a massive rectangular outcrop of rock, crowning one of the summits of the peninsula ridge at the SE end. This 615-foot-high block-shaped landmark is the highest part of the ridge. Another massive outcrop of rock, peaked in shape, appears on the summit to the N. These remarkable features are dark, in contrast to the grassy surface of the remaining part of the ridge, and may sometimes be recognized well to seaward against the 3-mile distant mountain background of the island.

(675) Amukta Island is generally covered with lava and cinders, and is black in general appearance. However, some grassy areas are on the ridges along the W side of the island, in the area to the S of the cone, and on the ridge forming the SE peninsula.

(676) During low visibility the SW peninsula of the island may be recognized by a 130-foot rock detached from the headland at its S extremity; it appears as a pointed shaft of rock when viewed from the NW and the SE sectors. Against a shore background, the rock is not discernible at a distance.

(677) **High Rock,** off the deep cove indenting the S side of Amukta Island, is a prominent landmark. It appears as a columnar monument rising 68 feet from a rocky ledge base. The top of the column is a smooth, truncated surface facing seaward and with favorable light, has a light-gray appearance, making it partly discernible from offshore against the island background.

(678) The easternmost point of Amukta Island is formed by a projecting ledge, and directly off the ledge is a rocky islet, the inshore side rises vertically to 65 feet. In this locality the shore rises abruptly in steps and thence to a jagged, ascending ridge. A prominent rock pinnacle on the ridge about 200 feet above the water level is about 300 yards from the point.

(679) The NE shore of Amukta Island bordering Chagulak Pass is in general composed of lava bluffs or large boulder beaches. Along this shore are many detached rocks. A good landing place is in the small bight about 1 mile SE from the northernmost point of the island. A temporary small-boat anchorage and landing may be found in the small and deeply indented bight around the E side of the northernmost point.

(680) The W shore of the island is composed of high bluffs meeting the slopes of the nearby ridges.

(681) A trapper's cabin is on the shore of the bight on the S side of the island; some water is available in this locality.

(682) Almost the entire coast of Amukta Island is fringed with detached rocks and ledges of various description. Off the S coast of the island an area of broken bottom extends from the SW peninsula for over 1.5 miles in a SE direction; High Rock is in and near the middle of this area. The section between High Rock and the peninsula is extremely foul and passage across it should not be attempted. The outlying

section has a depth of 3½ fathoms about 0.5 mile SE of High Rock.

(683) An area of broken bottom also extends in a W direction from the SW peninsula for about 0.8 mile, in which a 2½-fathom depth was found 0.3 mile W from the S end of the peninsula.

(684) Along the W shore abrupt changes in depth occur within the 20-fathom curve, which approximately parallels the shore at a distance of about 0.5 mile.

(685) From the middle section of the NW shore an area of irregular bottom extends 0.8 mile to the 20-fathom curve, thence there is an abrupt deepening of several fathoms to seaward.

(686) From the northernmost point, an area of broken bottom with shallow depths less than 5 fathoms extends for about 0.6 mile in a NW direction. Off each of the several points along the NE shore are small detached shoals of 1½ to 3 fathoms. Along the E shore broken bottom is within the 20-fathom curve that is 0.8 mile from the shore near the middle of this section. From the SE peninsula of the island, a shallow area with depths less than 8 fathoms extends in a S direction for about 0.4 mile.

(687) As in the case of Chagulak Island no satisfactory anchorages are found in the vicinity of Amukta Island. During storms, the gales draw around its entire coastline to the lee side, causing violent gusts of wind successively from opposite directions along the shore. Also, no section of the coast is free of strong currents, tide rips, and seas that sweep around the island. The bottom, generally of gravel, affords only fair holding ground.

(688) The best anchorage for SW weather is in 18 to 20 fathoms, gravel bottom, about 1 mile E of the northernmost point of Amukta Island, off the cove in that locality. Attention is called to the detached 1- to 2-fathom shoals off the several points close to this anchorage. The strength of the current here is less than elsewhere along the NE coast.

(689) In SE weather anchor in 18 to 20 fathoms, gravel bottom, about 0.8 mile W of the northernmost point, or in 18 to 20 fathoms off the middle of the cove about 2 miles SE from the northernmost point. In coming to anchor at the latter location, a strong NE current may set the vessel toward the foul areas that extend from the point of the N end of the cove, and a range on the slope of the shore ridge should be selected and held in order to avoid this.

(690) In NW weather anchor in **Traders Cove,** in 24 fathoms about 0.8 mile E from the SE point of the island. Care must be taken to avoid the dangerous shoals just within the 20-fathom curve.

(691) **Local magnetic disturbance.**–Differences of as much as 6° from normal variation have been observed in Traders Cove.

(692) Overnight anchorage is not recommended in the large cove on the S side of Amukta Island. Strong winds from the SE may make up suddenly and the approach and anchorage are bordered by dangers.

(693) A remarkable bottom configuration has been noted in the area to the E of High Rock. With a general depth of some 35 fathoms 1 mile off the S side of the island, the depth may increase rapidly to 70 fathoms as the shore is approached. There is a considerable basin of about 50 fathoms, about 0.8 mile in length from E to W, this depth being found about 200 yards NE from High Rock. The 3½-fathom shoal in this vicinity is on the SW rim of this basin.

(694) As in all other parts of the Aleutian Islands, currents around Chagulak and Amukta Islands are strong and somewhat erratic in their nature. The general flood direction is to the N, and the ebb to the S. Tide rips make up swiftly and furously at times. While the channel between the two islands is clear, tide rips give the impression of heavy seas in shoal water. On the flood, the current seems to divide on the S side of Amukta Island near the 3½-fathom shoal previously mentioned where the seas are very confused. The currents rejoin near the N point of the island and the reverse action seems to take place on the ebb.

(695) Similarly, the strongest currents along Chagulak Island are found near the SW point of the island, the current dividing somewhere near the center of the S shore and rejoining on the N side of the island. The strong currents are particularly noticeable at times along the E side of this island where the general N trend of the current is unobstructed.

(696) The currents vary considerably in velocity, and they probably often exceed 3.5 knots.

(697) Tide rips are conspicuous off all points, their violence being somewhat in the following order: Strongest, along the W part of Chagulak Island and in the pass between the two islands; around the SW point of Amukta Island and near the 2½-fathom shoal; around the N point of Amukta Island; around the SE point of Amukta Island, and around the SE point of Chagulak Island.

(698) **Chart 16012.–Andreanof Islands** extend in a 310-mile chain from Amukta Pass to Amchitka Pass.

(699) **Chart 16480.–Amukta Pass,** often called the **Seventy-second Pass,** is a 35-mile-wide clear passage between Amukta and Seguam Islands; depths are from 55 to 300 fathoms. Both islands may be seen across the full width of the pass in fair weather; their shores should be given a clearance of not less than 1 mile.

(700) **Seguam Island** is rocky and cinder covered, has numerous lava flows, and is steep-to on all sides. It has, however, several good landing places and an abundant water supply. Irregular mountain masses are on both the E and W ends of the island and a saddle is in the E central section. The formation is volcanic and the peaks are rocky, extinct craters.

(701) The mountains on the W end are higher; **Pyre Peak,** 3,458 feet, in the W central part, is the highest on the island. The highest peak on the E end is a jagged pinnacle on a small crater within a larger crater and is 2,768 feet high. The mountains on the W end of the island are more ragged. The N coast is low rock and grass bluffs. The other coasts are steep and high, with the peaks close to the coast. The two good anchorages are Finch Cove on the N, and Lava Cove on the S. Numerous pinnacles are close to shore, the most prominent are those off the NW point, the highest 98 feet.

(702) The precipitious E end of the island, except for a small peninsula, is at the base of a volcanic mountain having a crater within a crater, 0.5 mile in diameter, at its summit. The summit has a confusing appearance; a pronounced rise along the N rim of the main crater is 1,930 feet high and appears as a sharp peak when viewed endwise. Also a pronounced rise is along the N rim of the inner crater which is 1,934 feet high. The S rim of the inner crater merges with that of the main crater and is 1,820 feet high.

(703) Relatively shoal-water areas extend off all the principal points of Seguam Island, and are usually marked by breakers in bad weather. Kelp grows profusely in most of these areas.

(704) Currents around Seguam Island are strong and very erratic. As around Amukta and Chagulak Islands, the general flood direction is N, with the ebb S. On the flood, the current seems to divide somewhere near Turf Point, and to

rejoin near Finch Point on the N. The reverse appears to take place on the ebb.

(705) Tide rips are severe off many points; they make up suddenly and furiously, and are dangerous to small craft. Passage through the rips by small boats should not be attempted unless the operator is familiar with the danger. The worst rips are found along the W end, with lesser ones off Moundhill Point and Finch Point. These are all conspicuous and while they seem to indicate shallow water by their whiteness, they make in deep water and so are no menace to navigation for the larger ship.

(706) Strong currents and tide rips occur around the E end of the island.

(707) On the S end of the E coast is **Moundhill Point,** a small, rounded peninsula that forms a very important landmark during the prevailing low visibility. The peninsula is a mound-shaped hill, 465 feet high, and has four, small, rounded protuberances at its summit. The easternmost of these is separated from the remainder of the group by an appreciable distance and by an apparent depression in the top. Rounded protuberances also characterize the slopes of the hill. The hill is separated from the mountainous mainland by a draw about 100 feet high at the neck of the peninsula. At the water's edge, the hill slopes descend to form almost vertical cliffs of rock. A fair landing is on the N side of the neck. Fair anchorage for small craft is in the cove on the S side, that is marked by three tall pinnacles near its SW end.

(708) Several lumps of about 3 fathoms are in the shallow area 0.2 to 0.5 mile E of Moundhill Point. It is advisable to round the cape by at least 1.5 miles.

(709) At the N end of the E coast the land projects to seaward forming prominent **Wharf Point,** which resembles a wharf or pier from a distance. The point has a more or less flat top, 50 feet high, and the bluffs on its three sides are approximately rectangular, forming two distinctive corners at the extremity.

(710) **Finch Cove** is an indentation 2 miles in extent along the NE side of Seguam Island; its N extremity is Finch Point. A long, rocky point formed by a spur divides the cove into two parts. At the head of the cove, N of the dividing point of land, is an 0.8-mile stretch of sand beach providing good landing. The approach to the middle section of this beach is apparently free of rocks and the depths decrease gradually, making this a favorable site for beaching a vessel in an extreme emergency. The N half of this part of the cove is foul with rocks of various description, among which is a 58-foot elevated, block-shaped rock. Along the shore of the cove E and W of the dividing point of land are stretches of high, prominent cliffs. The W stretch is about 0.3 mile long and 300 feet high, and the E rounding stretch of cliff is about 0.5 mile long and 500 feet high. To the E of the latter is a deep valley that extends inland. A cone-shaped peak, 1,447 feet high is 1.5 miles inland from the cove.

(711) Near the center of Finch Cove, an area of extremely broken bottom with shoal depths of about 4 fathoms extends out from the dividing point for more than 0.3 mile. In the S part of Finch Cove, along the shore E of the dividing point, are heavy kelp beds.

(712) Finch Cove offers good protection in SW weather. The survey ship EXPLORER remained at anchor in Finch Cove during a storm in 1952, with S winds up to force 12. The ship anchorage is in 14 to 17 fathoms off the center of the N bight. Enter on course **274°**, heading for the 58-foot elevated, block-shaped rock. Anchor on this bearing (a cross current may be experienced) and on cross bearing 191° to the left tangent of the dividing point of land. Tidal currents setting NW and SE have been observed. The NW current has a velocity of about 2 knots. The SE current has a velocity of about 0.5 knot. A 4-fathom spot is 0.3 mile S from this anchorage.

(713) **Local magnetic disturbance.**--Differences of as much as 7° from normal variation have been observed in Finch Cove.

(714) **Finch Point** is the dividing point between the N and NE sides of Seguam Island. It is formed by a broad, gently sloping ridge, the shore extremities of which break off into cliffs and ledges. Detached rocks of various descriptions lie about the point and these are particularly numerous at its N extremity. Directly at the N extremity, an 80-foot elevated, massive rock is a prominent landmark, when viewed along the line of the NE tangent. In this direction it appears vertical at the sides and its irregular top is roughly in the form of a gable. The outermost rock to the N is lime-covered but it is small and only a few feet high.

(715) At the northernmost part of Seguam Island just W of Finch Point a large area of broken bottom extends more than 1 mile offshore. Several lumpy spots of about 8 fathoms are well offshore in this area.

(716) The N shore of Seguam Island is irregular; the beaches are principally of lava or boulders and in general cliffs or grass-covered bluffs are directly back of the beaches. The cliffs are comparatively low. The slopes from the clifftops are covered with a heavy growth of grass and rise gently toward the high interior regions. Numerous gullies break up the terrain and are approximately normal to the general trend of the coast. Several waterfalls are along this coast.

(717) A dangerous 2½-fathom pinnacle rock with surrounding depths of 23 fathoms close-to, is about 1 mile off the N shore of Seguam Island. The danger is not marked by kelp.

(718) **Saddleridge Point** is the northwesternmost point of Seguam Island. The small rise directly inshore from the saddle, is a definite summit from all offshore directions, but not particularly prominent. A rocky islet 98 feet high, about 0.2 mile NE from the point, and several smaller intervening rocks obscure the extremity of the point when viewed from the NE. A narrow cliff 231 feet high, facing seaward and topped by a small grass-covered mound, rises at the inshore end of a long, narrow, projecting ledge 1.7 miles E from Saddleridge Point.

(719) A mound 80 feet high, resembling a haystack, is 3.7 miles NE from Saddleridge Point. The mound has the appearance of an island but is connected to the shore. A 1-mile stretch of sand and cinder beach extends to the SW from this vicinity, and there is a waterfall about 0.2 mile NE from the mound.

(720) From the N rock off Saddleridge Point, foul ground extends N for 0.2 mile.

(721) Very favorable anchorage for S weather may be had along the N central section of the coast of Seguam Island 1.5 to 3 miles E of Saddleridge Point. The ship anchorage is 0.5 to 0.6 mile offshore in 16 to 18 fathoms, sand and gravel bottom. In coming from the E care must be taken to avoid the 2½-fathom pinnacle 1 mile offshore; passage between the pinnacle and the shore is not recommended.

(722) An anchorage in 20 fathoms about 0.8 mile SW of Saddleridge Point was used by the survey vessel. The depth decreases rather abruptly toward the shore.

(723) **Camel Islet** is about 0.5 mile off the middle of the NW shore of Seguam Island. It is a massive rock, 53 feet high, and its top from the N or S resembles a camel's hump.

(724) The NW coast, from Saddleridge Point to the W end of the island, a stretch of 5.5 miles, is in general a boulder beach directly in front of irregular cliffs ranging from 200 to

600 feet high. In some places the cliffs rise abruptly from the water's edge. The slopes from the tops of the cliffs to the mountainous interior are decidedly steeper than those E of Saddleridge Point; also, the draws and valleys are steeper and occur at less frequent intervals. About 1.2 miles N from the westernmost point of the island, the slope is very steep and the cliffs are especially high. The waterfalls go dry in late summer. Numerous detached rocks are found off this coastal stretch.

(725) Between the westernmost point of Seguam Island and a high, dome-shaped, detached rock about 1 mile to the N is a deep valley, with gentle ascending lower slopes, that extend inland 1 or 2 miles.

(726) Along the W end of Seguam Island very irregular bottom is within the 20-fathom curve which follows the coast at a distance of about 0.5 mile. A reef is about 0.3 mile off this end, which is marked by a low rock, 4 feet high, discernible for some distance with a quiet sea. A depth of 3¾ fathoms was found 0.2 mile NW of the reef. Strong currents and tide rips occur in this locality.

(727) From the W end of the island the coast trends SE for about 1.5 miles to **Rue Ledge.** This offshore rocky ledge, 36 feet high, is conspicuous when viewed along the SW tangent of the island. The inshore side of the elevated part of the ledge has vertical corners; from here the top slopes to the offshore end. Halfway between this ledge and Turf Point, 2.6 miles to the E, is an off-lying rocky islet which is marked near its offshore end by a cylindrical pinnacle rounded at the top. A waterfall over the shore cliff is about 0.2 mile NE from this pinnacle.

(728) **Turf Point,** the southernmost point of Seguam Island, is a comparatively low, broad, and extensive grass-covered projection terminating in a rounding bluff. The top of the point is flat and then rises gently to the steeper inland slopes, which on either side of the point terminate in bold rocky bluffs, making the point conspicuously low by contrast. A foul area fringes the rounding point. W of Turf Point, the S shore of Seguam Island is high and precipitous. The cliffs are close to the rocky beach and in places overhang it. The bordering mountains are high; grass extends from the cliffs to about 1,100 feet.

(729) From Turf Point an area of broken bottom extends S for 0.7 mile to the 20-fathom curve, thence abruptly deepening to over 40 fathoms.

(730) On the south shore about 5 miles NE from Turf Point is **Lava Point,** a broad, jagged, and comparatively low point forming the terminus of an extensive lava flow. A narrow bight, but deep in extent, indents the middle of the extremity of the point. **Lava Cove,** immediately W of Lava Point, extends for 2.5 miles to a rounded gravel point fringed with covered and detached rocks. The gravel point is formed by a short broad spur 196 feet high, projecting from a regular, grass-covered mountain slope that descends to shore cliffs on either side of the point. At the head of Lava Cove is a decided indentation in which are several streams and a 0.8 mile stretch of sand beach. An ocean swell generally makes landing difficult. The remaining shore of the cove is composed mainly of jagged projections of rock or lava cliffs of moderate elevation. Curtains of waterfall at two places about 0.2 mile inland from the E end of the sand beach are visible from the cove. A row of pinnacle projections marks the near-shore ridge, 335 feet high, between Lava Point and the curtains of waterfall.

(731) From the point at the W end of Lava Cove an area of broken bottom extends SE for 0.7 mile, with a depth of only 1¾ fathoms 0.4 mile off the SE side of the point.

(732) On the S side of Seguam Island, Lava Cove and the next large cove to the W offer good protection in N weather. The anchorage in Lava Cove is in 14 to 17 fathoms, cinder and gravel bottom, off the indentation at the head of the cove. It has little or no current. Enter on the N course heading for the E half of the sand beach at the head. In coming from the W, the broad gravel point at the W end of the cove should be given a wide berth.

(733) The SE coast of Seguam Island from a point about 1 mile E of Lava Point for about 4 miles to Moundhill Point is dominated by a chain of three mountain peaks over 2,000 feet high and a very distinctive mountain 1,410 feet high, close to the shore in 172°23'W. The shore slopes of these mountains generally terminate in steep, rocky cliffs, and the coast has a bold appearance. A steep bluff rising to 690 feet marks the promontory near the three high pinnacles in the SE part of the cove at the E end of this mountainous stretch. The upper reach of this bluff overlooks the draw back of Moundhill Point.

(734) Off the middle part of this bold coastal stretch is a group of five rocky islets; the outer islet is 55 feet high near its inshore end where it drops almost vertically to form its NW side. The area between this group of islets and the shore is foul.

(735) The 1,410-foot peak, close to the shore about 1.5 miles W of the group of islets, has a steep and rugged seaward face and a definite peak. With N winds this mountain may be free of clouds while those in the background are covered. A small cave about 5 feet deep with an almost rectangular entrance is at the foot of this mountain near the shore. The cave is prominent when the light illuminates the surrounding yellow portion of the rocky cliff.

(736) About 0.2 mile SW from the cave, a chain of rocks extend offshore for a distance of about 230 yards. The inshore rock is 110 feet high while the offshore rocks are low in comparison.

(737) An area of broken bottom with shallow depths is within 0.3 mile of the section of the SE shore of the island 0.6 mile to 1.4 miles from Moundhill Point.

(738) **Seguam Pass** is between Seguam and Amlia Islands. It has been regarded with suspicion, and a sailing vessel has been lost on Agligadak Reefs, on the SW side. The pass is about 12 miles wide, and it is reported to have strong currents, rips and overfalls, but no offshore dangers.

(739) Vessels have reported high breaking seas in Seguam Pass. The bottom is irregular, the currents strong, and tide rips may be encountered at any place, but particularly near the shore. The flood current sets to the NNW and the ebb to the SSE; probable velocity exceeds 4 knots. The pass is not recommended.

(740) **Chart 16480.–Amlia Island,** on the W side of Seguam Pass, is 40 miles long and has a greatest width of about 8 miles. On the island are a few small lakes. A chain of sharp peaks extend the length of the island, but none is especially distinctive. The E end of the island is visible for a considerable distance and is a good landmark in fair weather; it has a straight profile at a moderate elevation and drops to the sea in a precipice. The point should be given a berth of several miles because of the rocks and reefs to the E and S. The unsurveyed areas around the island should be approached with caution.

(741) **Agligadak Reefs** extend about 4 miles from the E extremity of the island.

(742) **Agligadak Island, Tanadak Island,** and **Sagigik Island** are small islets off the E end of Amlia Island. Their only importance is as dangers to navigation.

(743) **Sviechnikof Harbor** is on the S shore of Amlia Island about 15 miles from the E point. The entrance is about 0.2

mile wide and is difficult to make out, and should be attempted only in clear weather. Sagigik Island, about 9 miles E, and the pyramid peak to the right of the entrance, may be recognized. The harbor extends about 2 miles in a NNW direction and has an average width of about 0.3 mile. It can be entered without difficulty, is well sheltered, and has good holding ground. Excellent anchorage is available in the N end of the harbor in 10 fathoms, soft bottom. The W side of the entrance should be favored until past the long island and the rocks and reefs on the E side.

(744) **Chalugas Bay,** just W of **Cape Idalug** on the N coast of Amlia Island, is a small harbor reported suitable for small boats only; however, the anchorage for small vessels in 20 to 22 feet is just off the entrance.

(745) The bight on the E side of Cape Idalug offers a lee in S weather for vessels of all sizes. The recommended anchorage for deep-draft vessels is in 9 fathoms, soft bottom, at the entrance to the inner basin.

(746) **Chart 16490.–Amlia Pass,** a 1-mile-wide strait between Amlia Island and Atka Island, has depths of 5 to 22 fathoms through a narrow 400-yard passage restricted by a reef that extends 1 mile off the Atka Island shore. The pass should be used only by small light-draft vessels at slack water because of the strong and complex currents.

(747) **Mid Reef,** a high part of the reef that extends from Atka Island shore, shows at all times, but is awash in extremely heavy weather. Other small areas may occasionally appear at extreme low water.

(748) The shores on both sides of Amlia Pass are steep, rock bluffs rising to low hills. Kelp grows along the shores. A ledge extends 100 yards outside the bluff line at **Eddy Point,** the westernmost point on Amlia Island. Deep water is outside this ledge and off the shore at **Swift Point,** Amlia Island. At **Pinnacle Point,** Amlia Island, is a prominent pinnacle on the shore with an 80-foot off-lying pinnacle immediately SE.

(749) A current of 10 knots has been observed in Amlia Pass; when the current is strong large tide rips usually occur. The current floods N and ebbs S. In general, tide rips exist in and outside of the N end of the pass during the flood, and in and outside of the S end during the ebb. When the current is running, small tide rips exist over the reef. During strong currents, heavy swirls exist in the pass and its approaches, the greatest intensity being near Eddy Point.

(750) N of Eddy Point the current floods NE and ebbs SW, setting a vessel off course just N of the pass. Duration of slack is about 10 minutes; however, there is often a period of 1 to 3 hours when the current is not strong, and there are practically no tide rips.

(751) Heavy tide rips that extend several miles NE of Amlia Pass have been observed with a moderately heavy swell from the NE. A pinnacle, covered 4½ fathoms, is 1.5 miles NE of Eddy Point, and 0.6 mile from the N shore of Amlia Island. There are probably other dangerous pinnacles in this area.

(752) In approaching Amlia Pass from S or N vessels should stay in the area of charted soundings to avoid reported dangers off the islands. Courses through Amlia Pass should pass 0.5 mile off Pinnacle Point, 200 yards off Swift Point, and 400 yards off Eddy Point to avoid the reef on the W side of the pass. Extreme caution is necessary to avoid the 2½-fathom reef 500 yards W of Swift Point.

(753) **Chart 16480.–Atka Island,** separated from Amlia Island by Amlia Pass, is 10 by 50 miles in extent and the largest of the Andreanof group. **Korovin Volcano,** 4,852 feet high, is 3 miles inland from the N end of the island. The formation of the island is volcanic and similar to the other islands of the Aleutian Chain. Many species of birds frequent the island, but the island and adjacent islets are reported to be overrun with rats.

(754) Several peaks varying in elevation to 3,200 feet extend along the interior of Atka Island. These peaks are seldom visible because of fog, mist, and low ceiling. A 1,100-foot-high peak at the W end of the island is frequently clear. Because of the prevalent weather conditions, extreme caution should be exercised in approaching the land. There is considerably less fog and mist during the colder months when the higher peaks show more frequently. Currents are weak, except at the passes E and W of the island.

(755) There are several anchorages along the S coast of Atka Island, but care should be exercised in approaching the coast because of the numerous rocks and shoals, and currents. A rock, 3.5 miles offshore and 18 miles from the W end, is covered ¾ fathom and breaks in moderate seas. Several shoals with least depth of 10 fathoms, as much as 5 miles offshore S of Vasilief and Kobakof Bays, show current boils, slicks, and tide rips during calm weather. Other shoals with lesser depths are farther inshore. Fairly strong E-W currents have been observed S of Sagchudak Island to S of Cape Tadluk.

(756) There is a suitable small-craft anchorage at the E end of Atka Island, 3 miles W of Amlia Pass in 52°06.7′N., 174°09.3′W., in 18 to 20 fathoms, sand and shell bottom, but the swinging room is limited and the water is quite deep. The off-lying islands and rocks give protection from SE seas but the anchorage is open to S and SW weather. To reach the anchorage from 52°05.0′N., 174°08.3′W., make good a course of **000°** for 1.7 miles, then change course to **270°** for 0.7 mile to anchorage.

(757) **Vasilief Bay,** on the S side of Atka Island 10 miles W of Amlia Pass, offers anchorage in 25 to 30 fathoms, fine sand with broken shell bottom, at 52°06.0′N., 174°20.0′W. The offshore islands offer some protection from S seas. This anchorage should be entered from the SE, keeping 0.5 mile E of the offshore islands. There is a rock awash in 52°02.4′N., 174°21.0′W.

(758) **Kobakof Bay,** 15 miles W of Amlia Pass, offers excellent anchorage in all but moderate to heavy seas. Anchorage in 25 to 30 fathoms, mud and sand bottom, is available at 52°03.7′N., 174°28.6′W. The NW arm of the bay offers protection from S seas in 20 to 30 fathoms, but is limited in swinging room. In entering the bay from a point midway between **Sagchudak Island** and **Amtagis Island,** steer a midchannel course of **347°** until the point of land ahead is 0.7 mile distant, thence a course of **293°** to the anchorage. Some fairly strong rotary currents may be encountered along the E side of Sagchudak Island.

(759) The pass on the N side of Sagchudak Island is generally foul, containing kelp and shoal areas which break in a moderate swell. Only small craft having local knowledge should use this pass.

(760) **Explorer Bay,** 18 miles W of Amlia Pass, offers a protected anchorage in any weather in 11 to 13 fathoms, fine sand bottom. However, there is limited swinging room and the entrance is through a narrow channel between dangerous rocks and shoals. In entering from a position at 52°00.0′N., 174°30.4′W., steer a course of **000°** until the N end of Sagchudak Island bears 090°, then shape course to **327°**, keeping 0.3 mile off the point of land on the W side of the bay, until the SE point of the W arm of the bay bears 216°, distant 0.5 mile, thence on course **277°** for 0.4 mile to the anchorage. This course passes over or just N of an 8-fathom shoal, 0.2 mile S of a 4-fathom shoal, and 0.1 mile N

of a 6-fathom shoal. The area outside the channel, on the W side of Sagchudak Island, is very broken with scattered rocks which generally are apparent to the navigator.

(761) **Beaver Bay,** 23 miles W of Amlia Pass, offers anchorage for small craft in the outer and W arm. Protection from all except SE seas is available in 15 to 20 fathoms, fine sand with broken shell bottom. Entrance to the anchorage must be made by keeping to the SW of the small islands in the entrance.

(762) The small bays between Explorer Bay and Beaver Bay offer some protection for small vessels, but the bottom is generally broken and the lee afforded from onshore winds in negligible.

(763) **Tillamook Cove,** 30 miles W of Amlia Pass, is of little value as an anchorage because it is open to the sea and has poor holding ground. A more comfortable anchorage is in 13 fathoms just outside the cove. A 40-foot pinnacle rock marks the seaward end of the W side. A shoal extends some distance seaward of the point of land marking the E side of the entrance. The W side of the cove is practically vertical to about 100 feet, then slopes steeply to over 1,000 feet. At the head of the bay is a black sand and volcanic ash beach. The E shore is characterized by rocky ledges; the land rises to about 300 feet from the water to a relatively level shelf before rising to the mountains farther inland. There is considerable surf with only a slight swell setting into the cove.

(764) **Sergief Bay,** 35 miles W of Amlia Pass and 13 miles E of Cape Kigun, is a suitable anchorage except during strong S winds; holding ground is probably poor. The gently sloping beach at the head of the bay is black sand or volcanic ash. In entering the bay from a position in 51°59'N., 175°00'W., hold a course of **000°** until the end of the W entrance point is abeam, then shape course to pass 300 yards off the rock awash in 52°01.6'N., and after passing this rock steer **315°** for the head of the bay.

(765) Anchorage in 20 fathoms, fine sand bottom, is near the center of the small bight 10 miles E of Cape Kigun, the W end of Atka Island. A point and off-lying reefs offer some protection from W seas. Vessels can also anchor in 17 to 20 fathoms, sand with broken shell bottom, 0.5 mile offshore near the center of a small bight 3 miles E of Cape Kigun.

(766) **Chart 16490.–Nazan Bay,** indenting the E coast of Atka Island N of Amlia Pass, provides good anchorage. The greater part of the outer harbor is partially protected, but strong winds draw through the low land between Nazan and Korovin Bays. The bay is subject to heavy swells and is at times unsafe for small boats.

(767) **Cape Kudugnak,** the N point of Nazan Bay entrance, is a 200-foot rounded, grassy knoll rising abruptly from the shore. The island behind the cape rises uniformly for 2.5 miles to a 2,687-foot mountain. **Uyak Island,** 3.5 miles WSW from Cape Kudugnak, is 100 feet high, rounded with grass top and rocky bluffs. Five silver-colored radio masts about 0.2 mile N of the cape are reported to be conspicuous landmarks.

(768) **Palisades Point,** 3.5 miles W of Cape Kudugnak, has rocky bluffs with a 375-foot plateau that extends inland to the mountains. A 60-foot-high rock is close to shore just W of the S end of the point. A T-head pier in poor condition is 0.8 mile NW of the point. The 400-foot face has depths of about 22 feet alongside.

(769) **Cone Island,** near the W part of Nazan Bay, is 83 feet high; the northernmost of the three islands has three remarkable pinnacles on it.

(770) **Bolshoi Islands** are a group of grass-covered islands along the S shore of Nazan Bay. The westernmost and largest forms the E side of the inner harbor at Atka. A waterfall on the S shore of the bay, 1.7 miles SE of Atka, is prominent.

(771) Anchorage for large vessels is available in the outer harbor W of Palisades Point in 35 to 17 fathoms; vessels can also anchor close to the N shore of the bay E of the point. Anchorage W of Bolshoi Islands in the inner harbor in 6 to 12 fathoms is sheltered, but is limited in area to only small vessels.

(772) The tide in Nazan Bay is chiefly diurnal, the range being 3.3 feet. The harbor in the W part of the bay will often be clear when there is fog in the entrance.

(773) **Local magnetic disturbance.**–Differences of as much as 5° from normal variation have been observed in Nazan Bay.

(774) Vessels proceeding to anchorage in the W part of Nazan Bay should pass N of Uyak Island taking care to avoid the 5-fathom rock 0.7 mile E of the island. Small vessels continuing to the inner anchorage should pass midway between the highest part of the S islet S of Cone Island and the high-water rocks at the NW point of Bolshoi Island.

(775) Trading vessels bound through Amlia Pass use a channel S of the Bolshoi Islands, but this route is not recommended without local knowledge because it is near many covered and uncovered rocks.

(776) **Atka,** at the W end of Nazan Bay behind Bolshoi Islands, is not visible until after the largest island is passed. Most of the village population is employed in fishing and sealing at Pribilof Islands. Mail is delivered by air from Anchorage. Water is available from a stream near the village. Small boats can be beached on a well-sheltered tide flat behind Bolshoi Islands, 0.4 mile SE of the village.

(777) **Chart 16480.**–The N coast of Atka Island is indented by numerous small bays. Most of the points are bold headlands rising to sheer 300- to 800-foot knobs or heads, and then rising more gradually to the peaks farther inland. The land area is treeless and is covered with tundra to about 1,000 feet, above which there is little vegetation. Bluffs generally extend into the bays and bights, but as a rule the heads of the bays are low, with sand, gravel, or small boulder beaches, back of which valleys carry into the interior. A low pass crosses the island between Nazan Bay and Korovin Bay. SW of the pass the island is lower and runs off to the narrow W end.

(778) A high conical peak is near **Cape Shaw,** the E extremity of Atka Island. The slopes of the Korovin Volcano mountain break off in a rocky escarpment at **North Cape,** the N end of the island.

(779) **Chart 16487.–Korovin Bay,** on the N side of Atka Island across a low pass from Nazan Bay, is a good anchorage except in heavy W weather. The shores are bold, sheer cliffs bordered by numerous pinnacles, except for the low gravel beach at the head and low land near a lagoon on the N shore. The entrance points, **Cape Korovin** on the N and **Egg Point** on the S, are bold headlands rising abruptly to mountain ranges. Egg Point terminates in a prominent 135-foot-high pinnacle rock at the shore.

(780) Korovin Bay has depths of 80 to 10 fathoms to within 0.6 mile of the shore, except for rocks about 2 miles from the E end. The higher of these two rocks bares 2 feet and can be used as a navigational aid. A prominent 100-foot-high pyramidal-shaped pinnacle rock is near the head of the bay about 0.2 mile off the S shore.

(781) Anchorage is available in the NE part of Korovin Bay in 40 to 10 fathoms with gray sand bottom, fair holding ground. The small coves on the S shore provide shelter for very small vessels, but the swinging room is limited. The bay

is not sheltered from the SE or SW because strong winds howl through the draws and ravines which cut the hogback on Atka Island; caution is necessary to avoid being forced onto the N shore. Oftentimes, when it seems as though the winds coming out of the draws in a SE direction are the prevailing winds, it will be found that outside the bay the general winds are SW.

(782) **Sarana Cove,** indenting the S shore of Korovin Bay 4 miles E of Egg Point, is foul and should not be attempted by any craft without local knowledge. **Martin Harbor,** 6 miles E of Egg Point, is small but offers good protection for small craft in all weather at the head in 11 fathoms with mud and sand bottom.

(783) **Egg Bay** is separated from Korovin Bay by the rugged cape that terminates in Egg Point. The shores of Egg Bay are mountainous, with humpy, grass-covered slopes. At the head of the bay is **Egg Island,** steep sided, round topped, and grass covered.

(784) **Starichkof Reef** is 1.5 miles W of Egg Point. The easternmost and largest islet is a vertical-sided block of rock 61 feet high. The second most conspicuous rock is a spurlike pinnacle about 0.5 mile NW of the block-like rock. There are several other rocky islets, as well as a number of reefs or shoals in this area.

(785) A dangerous 2½-fathom shoal is 0.3 mile N of the islets and 1.6 miles W of Egg Point.

(786) Two shoals SW of Starichkof Reef make it inadvisable to enter Egg Bay from the W side of the reef. One shoal, having a least depth of 2¼ fathoms, is 0.5 mile SW from the W group of islets. The other shoal, having a least depth of 3¾ fathoms, is 0.8 mile SW from the same islets.

(787) A 4½-fathom shoal is 0.3 mile offshore on the E side of the bay, 0.8 mile S of the entrance at Egg Point.

(788) Several other shoals having least depths of 8 to 12 fathoms are near or in the bay. They should be avoided.

(789) Numerous rocks and reefs border the shores of Egg Bay. The E shore for the first 2 miles S of Egg Point is especially dangerous and should not be approached closer than 0.3 mile.

(790) A pinnacle rock with a least depth of 3 feet is 250 yards off the NE shore of Egg Island.

(791) Approach Egg Bay on a course of **180°** to pass 0.5 mile E of the easternmost islet in Starichkof Reef. When this islet is slightly abaft the beam, change course to **134°,** heading for the left tangent of Egg Island. When 0.5 mile from Egg Island, haul to the left and round the island, keeping approximately in midchannel.

(792) Anchorage for medium-draft vessels is found NE of Egg Island in 20 to 25 fathoms. The bottom is soft, fine, green sand, with rather poor holding ground. The lower end of Egg Bay offers fair protection in both N and S weather. The least swell is found S of Egg Island.

(793) From Egg Bay to Banner Bay the shoreline is irregular and has several small bights. The bights, as well as the approaches to them, are foul. This area should be avoided.

(794) **Banner Point,** on the NE side of the entrance to Banner Bay, is lined by bluffs. Above the bluffs the land slopes upward to a 1,590-foot peak about 1 mile from the outer end of the point. A grass-covered islet, 165 feet high, is 0.3 mile NE of Banner Point.

(795) A rock that uncovers is 0.5 mile N of Banner Point; 0.1 mile N of the rock is a 3-fathom shoal; 0.2 mile NW of the rock is a 5-fathom shoal. Kelp grows on both shoals.

(796) **Banner Bay** is about 3 miles long and 0.8 mile wide. The trend of the bay is E and W. The shores are bold but free of dangers except for two groups of rocks, 2 and 25 feet high, in the NE half of the entrance, and for an 8-fathom spot 0.3 mile off the S shore, 1 mile inside the entrance. Anchorage is available 0.6 mile from the head of the bay in 33 fathoms, which is the general depth in this part of the bay. Strong winds pull through this bay and as a rule, are diverted to blow in or out of the bay.

(797) Approaching Banner Bay, a large group of rocks, from which a foul area extends 0.8 mile S, are about 1 mile N of the entrance and 0.6 mile off the shore of Atka Island. The highest of these rocks, 57 feet and grayish in color, serves as an aid in reaching the bay.

(798) To enter, from a position with the NE point of Salt Island bearing 290°, distant 0.5 mile, steer **156°,** heading for the highest bluff (also the highest nob on a ridge of low hills) at the S point of the entrance to Banner Bay. Hold this course until the group of rocks in the entrance to the bay bears 090°, then haul to the port into the bay on midchannel courses.

(799) **Salt Island,** about 2.5 miles W of Banner Point, is a valuable aid to the navigator in approaching Atka Island. This island is 1.3 miles long in a NE and SW direction and about 0.5 mile wide. The highest point of the island, 543 feet, is in the NE half. All shores are rocky and bold, the NW shore and NE and SW points being particularly so, with sheer cliffs over most of the shoreline, that is fringed by high pinnacle rocks. These pinnacles are particularly evident when the island is viewed from the SW or NE. The island is covered with grass and tundra. A small cabin is near the E end of the S shore.

(800) A group of bare rocks are 0.5 to 1 mile SE of Salt Island. The highest of these is a light-colored, gray pinnacle of 38 feet. A reef covered with heavy kelp obstructs the passage between Salt Island and these rocks and then continues SE. A small-boat passage is about 0.3 mile off the shore of Atka Island. It has a least depth of 6 fathoms, and scattered kelp over most of the passage. Foul ground extends 300 yards offshore, and heavy kelp may be encountered 0.5 mile off the Atka shore.

(801) A 2-fathom shoal is 1.3 miles S of Salt Island and 1.4 miles W by N from the nearby prominent point of Atka Island.

(802) Several reefs extend offshore from the N side of Salt Island, up to a distance of 0.3 mile.

(803) Anchorage in 22 to 24 fathoms, sand bottom, is available S of Salt Island, affording protection from N and E weather. Anchor with the trend of the E shore of Salt Island in range and bearing 020°, and the 38-foot pinnacle in the group of rocks off Salt Island bearing 090°. Small vessels may anchor close inshore. Considerable shelter is afforded by the reef and kelp patch that extend out from Salt Island.

(804) In W weather suitable anchorage is available in 20 fathoms, sand bottom, about 0.5 mile off the E shore of Salt Island, with the 38-foot pinnacle bearing 200°.

(805) Anchorage for large vessels is available in the bight of Atka Island to the S and SW of Salt Island, in 20 to 25 fathoms, hard bottom, with protection from E to SW weather. The approaches to the shores and anchorage are free of dangers except for scattered off-lying rocks which are well within the 20-fathom curve.

(806) **Deep Bay,** about 3 miles S of Salt Island, is about 2 miles long and averages 0.3 mile wide, making into Atka Island shore in a SE direction. General depths range from 20 to 26 fathoms. From the NW a long flat ridge can be seen at the S side of the entrance to the bay. The shores are bold but clear of dangers, except for several rocks at the middle of the entrance, and adjacent foul ground and rocks 100 to 200 yards off the entrance points. The most prominent rock in the middle of the entrance is 6 feet high. Anchorage in this bay is not suitable for large craft because of insufficient

swinging room. Medium-sized craft may anchor in 20 fathoms about 0.5 mile inside the entrance, or in suitable depths at the head of the bay. Bottom in the bay is hard. About 0.5 mile inside the entrance to the bay, a small inner bay makes into the S shore. This small bay is about 0.3 mile long, and depths range from 2 to 5 fathoms. It is suitable for small craft. To enter Deep Bay, pass 200 to 300 yards W to SW of the 6-foot rock in the middle of the entrance.

(807) **Island Point,** 4 miles SW of Salt Island, is an irregular-topped, grassy headland 515 feet high. Because of the low valley between the headland and the main shore, this point may appear as an island to ships approaching from the W. Rocks and reefs fringe Island Point from 200 to 500 yards offshore. A conspicuous rock 22 feet high is 0.2 mile NE of the point.

(808) The bight in the shoreline between Island Point and Kovurof Point is about 1.5 miles to its head. Three inner bays open into this bight.

(809) **Bluefox Bay** is the open bight that extends for several miles W of Island Point. Two arms extend to the E and the S. A conspicuous, rugged hill 1,495 feet high is west of these arms. The shoreline of Bluefox Bay, especially in the arms, is irregular and broken, with many inshore reefs and pinnacles.

(810) The E arm is open and easy to approach. It offers some protection from E weather. Anchorage is in 16 to 20 fathoms, the bottom irregular and rocky, and offering poor holding ground.

(811) A rock awash is at the entrance to the S arm, 0.2 mile W of the E shore. This S arm has a hard bottom and is an indifferent anchorage for shallow-draft craft. A 3½-fathom shoal is in the middle of the entrance to the bay, S of the rock awash. The W shore should be favored in entering the arm.

(812) A small unnamed bay about 2.5 miles W of Bluefox Bay is behind a chain of rocky islets making out from the shore in a NE direction. The larger and closer inshore islets are flat topped and grass covered; the outer islets are bare, black rock and of lesser height, the outermost being 20 feet high. A number of kelp patches on 3- to 5-fathom shoals are from 0.1 to 0.5 mile offshore NW of these rocks. The offshore point of these rocks should be given a berth of at least 0.8 mile.

(813) The shoreline between the chain of rock islets and Wall Bay has two indentations or inlets. At the head of these, as well as at the heads of the two first-mentioned arms, are small beaches where pulling boats can land.

(814) The bottom in the area between Bluefox Bay and Wall Bay is irregular and spotted with rocky patches.

(815) **Wall Bay** is on the E side of Kovurof Point. It is a small bay that may be used as an anchorage by medium-draft vessels. This bay is about 1.5 miles long in the N and S direction and about 0.3 mide wide. High hills and bluffs border the W side of the bay, and moderate hills are on the E side. A valley leads off to the S from the head of the bay. In S weather strong winds sweep out from this valley into the bay, making the bay an indifferent anchorage. The point on the E side of the bay appears as a long, broken, sloping ridge terminating in detached rock reefs at the waterline.

(816) A 9-fathom shoal is on the E side of the entrance to the bay, about 0.6 mile E of the Kovurof Point shoreline and about 0.3 mile N of the rocks on the E side of the bay entrance.

(817) A small dome-shaped, rocky islet 14 feet high is 0.1 mile off the W shore of the bay about 1 mile S of Kovurof Point. A 3-fathom shoal is 270 yards 115° from the rocky islet; a 2½-fathom shoal is 550 yards 175° from the islet.

(818) A reef that uncovers 1 foot is in the lower part of the bay 0.1 mile off the E shoreline and 0.5 mile SE from the islet. A covered reef, marked by kelp, extends 200 yards NW from the 1-foot reef. Because of these various shoals it is not advisable for vessels to proceed S of the islet.

(819) Approach Wall Bay on a heading of **180°**, passing the Kovurof Point shoreline at a distance of 0.3 mile. When the rocks on the E side of the entrance are 1 point forward of the port beam, anchor in 17 fathoms, gray sand bottom.

(820) Small boats can land on the sand beaches at the head of the bay.

(821) **Chart 16486.–Kovurof Point** is the most prominent point W of Salt Island along the N shore of Atka Island. It is a double point, both parts of which slope gradually to to a common peak 1,320 feet high. This peak is quite prominent on the few days out of the summer when it can be seen. The E point is the more prominent of the two and makes out farther to the N. It is distinguished by four flat-topped pinnacles directly off the point. Two of these pinnacles blend in together from certain directions and only three can be seen. The pinnacles identify this point.

(822) Between Kovurof and Bechevin Points is a bight 1 mile in depth. Two small inner bays open into this bight, Kovurof Bay and Podsopochni Bay. They are separated by a peak 1,225 feet high, which stands alone. The summit is a sloping ridge as seen from offshore; a sharp peak as seen from the E and W.

(823) **Kovurof Bay** is suitable as a small-boat refuge. There are numerous islands and rocky islets at its entrance. The passage W of these islands into the head of the bay is free of all dangers, except close alongshore. Anchorage for small craft is available in 4 to 10 fathoms, sand bottom.

(824) **Podsopochni Bay,** between Bechevin Point and **Podsopochni Point,** has a general depth greater than 10 fathoms and may be used as an emergency anchorage for small- and medium-sized craft in any but N weather. The bay is free of dangers to within 0.3 mile of the shore. Enter the bay midway between the small, grass-covered island, 40 feet high, off Podsopochni Point, and the kelp-marked 6-fathom shoal 0.7 mile NE of Bechevin Point.

(825) **Bechevin Point,** 5 miles SW of Kovurof Point, is also a double point, with a small bight in the shoreline between. The bluffs at the ends of these points rise to about 250 feet and are brown in color, streaked with gulleys and studded with pinnacles. The E part of the point rises abruptly to a sharp peak of 710 feet; the W part rises to a head of 615 feet, and then drops to a saddle before rising to the 1,000-foot-ridge behind.

(826) N of the W part of Bechevin Point at a distance of 0.7 mile is a rocky 14-foot islet that is the most conspicuous and dangerous menace to navigation in this locality. Matted kelp and submerged reefs make out from the point and surround this rocky islet for some distance. Passage between the islet and the point should not be attempted, except by small craft; a low, flat reef which uncovers 2 feet is 400 yards off the point.

(827) The deep bight between Bechevin Point and White Point contains two small inside bays. The bay to the E, **Portage Lagoon,** is marked by numerous bare, black, rocky islets at its entrance, and by a high, steep-sloped peak directly W of the entrance. This lagoon which extends from Bechevin Bay across Atka Island almost to the Pacific side of the island, when seen from the NW, appears as a low pass through Atka Island. Small boats can enter Portage Lagoon as heavy seas do not enter this lagoon because of the string of reefs and islets across the entrance that act as a breakwater. Passages between these reefs are narrow and dangerous,

especially in heavy weather, and should not be attempted by strangers. One passage is between the southwesternmost reef and the W shoreline. Several kelp-covered reefs are in this passage. A second passage is E of the grass-topped islets and about midway in the line of reefs. This passage is about 50 yards wide and has covered rocks on both sides.

(828) **Bechevin Bay,** when approached from the N, is identified by the aforementioned low pass or valley cutting through the mountainous coast of Atka Island to the Pacific. The rocky islet 0.7 mile off Bechevin Point helps to identify the bay. The SW side of the entrance to the bay is marked by a rugged hill with deeply eroded scars and slides. The base of the hill is fringed with whitish-gray rock along the shore. Farther in, a low, grassy headland is rounded when entering the inner part of the bay.

(829) Bechevin Bay is about 4 miles long and 1 mile wide. It is fairly open and exposed. Strong, gusty winds drawing through the mountain passes are common. Large ships anchoring in the outer bay will find less wind in the lee of the prominent 1,510-foot hill just SW of Portage Lagoon. The survey ship frequently anchored 0.5 mile off the shore under this hill in 20 fathoms, with the N tangent of the hill bearing 090° and the low, grassy headland on the N side of the entrance to the inner bay bearing 250°. The bottom is even and consists of coarse, dark sand with broken shell.

(830) The inner bay offers good anchorage to shallow-draft craft. The N side is shoal and has a boulder bottom; it should be avoided. A broad, sandy beach stretches across the head of this bay. Anchorage in 3 to 5 fathoms with sandy bottom is found off this beach, which is a good landing place for small boats.

(831) Medium-draft vessels will find anchorage in 11 fathoms at the entrance to the inner bay midway between the S shore and the low, grassy headland on the N side. This grassy headland and the whitish, gray cape beyond should be on range. The bottom is sand and is fair holding ground.

(832) The peninsula to the N and W of Bechevin Bay consists of two rounding points, White Point and Stripe Point. Between the E and W points is a low valley where there is a lake, the overflow of which empties into the Bering Sea at a waterfall. This waterfall can be distinguished well offshore. To the E, **White Point,** which is the W shore in approaching Bechevin Bay, is identified by light-colored gray bluffs. **Stripe Point** consists of two ridges that rise gradually to a common peak. Conspicuous gray-colored rock slides mark this point with a striped effect that identifies it. Between the two heads at Stripe Point, is a light-colored boulder beach.

(833) **Crescent Bay,** SW from Stripe Point, is a bight in the shoreline of 1 mile depth. The head of this bight shows a low pass across the island. The shores are rocky except at the W end of the head of the bight which is sand and gravel. Two inner bays are suitable for small craft. One, at the E end of the head of the bay, is 0.5 mile long and 0.2 mile wide with anchorage in 3 fathoms and is open to the W. The other is a small lagoon, at the middle of the head of the bay, suitable only for the smallest launches.

(834) **Slope Point,** the W side of Crescent Bay, is a grassy sloping ridge, rising gradually to a hill 865 feet high. Several rocky islets 1 to 5 feet high extend from the end of this point.

(835) **Kigun Bay,** the bight between Slope Point and Cape Kigun, is backed by low hills appearing as a low pass through the island. Depths of 10 to 15 fathoms are in the outer part of the bay, decreasing to about 3 fathoms within 0.2 mile of the shore. The head of the bay is light-colored sand which is evident from seaward. In the E half of the bight, a low point of scattered, rocky islets makes out from the shore; the point is surrounded by kelp. Foul ground is near the shore around most of the bay.

(836) **Cape Kigun,** the W extremity of Atka Island, is a bold point of brownish cliff with close, alongshore reefs. The ridges making up from the several small points converge on a round-topped peak, about 1,130 feet high, that is prominent in clear weather. It is a single peak 0.6 mile E from the extreme W end of the island.

(837) **Koniuji Island,** 14 miles NE from Cape Kigun, is volcanic, and all sides, except the S and SE, are sheer and precipitous, rising to two sharp summits of 896 feet and 790 feet. The S side of the island, above lower bluffs at the shore, slopes gradually to a ridge about 0.2 mile N and drops off again into a ravine that passes through the island at some elevation. The slope up from the S side is grass covered. The NW end of the island is a low, flat, rocky point about 200 yards long. About 75 yards off the N shore is a detached rock, 8 feet high, that is distinguishable from certain directions. An extensive kelp patch makes out to the S of the island. Also, in the summer, heavy kelp is found along and well off the W shore. The island is clear of dangers at a distance of 0.5 mile from the shoreline.

(838) This island is the nesting place of thousands of sea fowl, that make their nests among the grass-covered, volcanic boulders that cover many parts of the island.

(839) **Local magnetic disturbance.**–Differences of as much as 10° from the normal variation have been observed on Koniuji Island and as much as 7° at a distance of 2 miles in all directions around the island.

(840) **Kasatochi Island,** 10 miles NW from Cape Kigun, is an extinct volcanic crater rising to 1,038 feet. The S and SE sides are grassy slopes; the W and SW sides are high, rocky bluffs. There is a small islet adjacent to the SW side. As seen from the S and SW, the sides are gradual slopes, and the summit (rim of the crater) shown as a ridge with several nobs of varying heights. The N side, as seen from the E and W, appears abrupt and sheer, with the N part of the crater rim showing as a sharp nob. As one proceeds to the N or S of the island, these nobs, being parts of the crater rim, change to ridges.

(841) The island can be approached by deep-draft vessels to within 1 mile. An exposed anchorage is available in an emergency on the S side in 15 to 20 fathoms, hard bottom. A trapper's cabin is on the slope on this side.

(842) **Chart 16484.–Oglodak Island** is about 4.5 miles SW of Cape Kigun, the W extremity of Atka Island. It is about 1.3 miles long and 0.7 mile wide and is steep and mountainous. The shores are precipitous and rocky, and fringed with off-lying islets and rocks.

(843) **Atka Pass,** 4 miles wide between Atka Island and Oglodak Island, has depths of 10 fathoms or more to within 0.5 mile of each shore. A shoal with a least depth of 2 fathoms is 0.5 mile N of Oglodak Island; broken ground with depths of 7 to 9 fathoms extends 0.8 mile SE of the island. There are heavy tide rips and strong currents in the pass. Atka Pass is one of the best passages in the Andreanof Islands between the Bering Sea and the Pacific.

(844) **Ikiginak Island,** 1 mile W of Oglodak Island, consists of an almost cone-shaped mountain, 872 feet high. The island is 700 yards in diameter with detached islets at the E and W ends. The shores are steep, rocky, and fringed in places by off-lying rocks.

(845) The pass between Oglodak Island and Ikiginak Island has rocks that extend from both shores; it is not recommended without local knowledge.

(846) **Fenimore Rock** is 1.7 miles W of Ikiginak Island and 1.6 miles NE of the easternmost of the rocky islets that extend E of Tagalak Island. The rock is about 300 yards long and 220 feet high. There are several off-lying rocks covered 2 to 4 fathoms.

(847) **Fenimore Pass,** W of Fenimore Rock, has depths of 13 to 27 fathoms. Tide rips are found in several parts of the pass, and currents in excess of 4 knots have been observed.

(848) **Tagalak Island,** about 6 miles W of Ikiginak Island, is mountainous, roughly triangular in shape, and about 3.2 miles long and 2.5 miles wide. From the E point of Tagalak Island, a chain of small rocky islets, fringed by foul ground, extends to the E about 2.7 miles. The highest peak on Tagalak Island is 1,761 feet. The shores in general are steep and rocky with a few small beaches. The shoreline in most places is fringed by detached rocks.

(849) On the N side of the island chain is a bight that affords temporary anchorage in good weather with fair protection from the S and W in 10 to 15 fathoms, sand bottom; holding ground is fair. Currents are quite strong.

(850) **Tagalak Pass,** 1 mile wide in its narrowest part between Tagalak Island and Chugul Island, has depths of 5 fathoms or more to within 0.3 mile of the shores. The pass has the strongest tide rips and overfalls encountered in the Andreanof area. The pass is not highly recommended, but if used, midpass courses should be followed.

(851) **Chart 16478.–Chugul Island** is 4.5 miles long from NW to SE and 2.5 miles wide from N to S. The highest summit reaches 1,668 feet. There are several small lakes and streams on the island. The coast is generally steep and rocky, but there are indentations with sandy beaches at the heads. **Cape Kagalus** marks the SE extremity of the island.

(852) **Igitkin Island,** about 1 mile NW of Chugul Island, is 5.5 miles long and quite narrow. It is divided into two parts, connected by a low isthmus about 0.3 mile wide. Aside from this isthmus, the island is mountainous and rocky. N of this isthmus is a small cove, Igitkin Bight, and to the S is a somewhat larger indentation, Shelter Cove. The coast of Igitkin Island is in general steep and rocky and fringed with islets and detached rocks.

(853) **Igitkin Bank,** with depths of 1 to 10 fathoms, extends 2 miles W of **Igitkin Point,** the W extremity of the island.

(854) **Shelter Cove** is a small cove opening on Igitkin Pass. It is not recommended as an anchorage due to its size, rock bottom, and its exposure to draw winds from N and S.

(855) **Igitkin Bight** probably affords partly sheltered anchorage for small vessels; it is presumably subject to the same draw winds that prevail at Shelter Cove. It is about 0.8 mile long and has an entrance about 0.3 mile wide with black sand bottom. Depths inside range from 6 to 2 fathoms, but there are rocks and foul ground varying distances offshore. The bight is open to the N.

(856) **Igitkin Pass,** separating Chugul and Igitkin Islands, is clear and deep and perhaps the best pass from the N and E to Kuluk Bay. It is 3.5 miles long and the navigable channel is about 0.5 mile wide at the narrowest point at the W end. A midchannel course of **248°** leads directly into the pass N of Umak Island through which entrance into Kuluk Bay can easily be made. Tide rips have been reported between **Kingfisher Point,** on Igitkin Island, and the NW point of Tagalak Island, between Kingfisher Point and the E end of Chugul Island, and at the W end of Igitkin Pass. When the current is setting W through Igitkin Pass there is a strong S set near the W end of the pass.

(857) **Chugul Pass** (see also chart 16460), between Chugul Island on the E and Anagaksik and Umak Islands on the W, is about 4 miles wide, and is deep and clear.

(858) Next to Atka Pass, Chugul Pass, in combination with Asuksak Pass, is considered the best passage from the Bering Sea to the Pacific between Seguam Pass and Adak Strait. It is the best passage to Kuluk Bay from the SE. Prominent landmarks that can be used during the approach from S and E are the island of Anagaksik; Cape Azamis, the SE tip of Little Tanaga; the prominent, two-fingered pinnacle near the SE end of Chugul; and the conical-shaped island of Ikiginak. From a position 3 miles E of Anagaksik, a course made good of **303°** will pass Cape Ruin, the NE tip of Umak, at a distance of 1 mile. From this point, making good a course of **263°** will lead down the middle of Asuksak Pass, passing 1.5 miles off Cape Chakik, the W tip of Umak. Throughout Chugul Pass are strong tidal currents. In thick weather, dead reckoning is difficult because of these currents. (See the Tidal Current Tables for predictions for Chugul Pass.)

(859) **Chart 16471.–Great Sitkin Island,** about 24 miles W of Atka Island, is about 10 miles long and 8 miles wide. It is volcanic and extremely mountainous, the highest summit, an active volcano, is 5,710 feet. Much of the shore is steep and rocky, but with considerable stretches of sandy beach. It has some off-lying rocks both exposed and covered. Two large indentations are Sand Bay, on the SW side, and Yoke Bay, on the SE side.

(860) **Teapot Rock** is a large teapot-shaped rock about 150 yards off the NE extremity of Great Sitkin Island.

(861) **Chart 16478.–Ulak Island** is about 2.3 miles E of Bugle Point, the E extremity of Great Sitkin Island, and about 2.5 miles N of Igitkin Island. It is a barren rock, about 0.9 mile long, 0.2 mile wide, and 675 feet high. Deep water is close to the island on all sides, except the SW point where rocks extend out 300 yards.

(862) Yoke Bay, on the SE coast of Great Sitkin Island, has three arms. The best anchorage of the three is the middle or **West Arm;** it is about 1,500 yards in extent and affords anchorage in about 20 fathoms. The bottom is sticky hard mud, affording good holding ground. Limited anchorage space is available in both **North Arm** and **South Arm.** The bay is subject to williwaws, but their effect is not serious on ships equipped with good ground tackle. Yoke Bay is open to swells from the Pacific Ocean from the SW, although they are somewhat broken in their approach by nearby islands; it is entirely open in a NE direction to the Bering Sea.

(863) **Great Sitkin Pass** is between the S peninsula of Great Sitkin Island and the islands of Igitkin, Tagadak, Kanu, and Tanaklak. The pass has depths of 7 fathoms or more. Between **Zaliva Point** and **Passage Point** currents of 2.5 knots have been observed and greater velocities are to be expected. **Yoke Pass** is at the N entrance to Great Sitkin Pass, between Igitkin Bank and Rip Point. Because of tide rips, currents, and the frequent changes of course required, Great Sitkin Pass is not recommended, but if used, clear Rip Point by 0.6 mile and Igitkin Point by 1.2 miles to avoid the covered rocks that extend from the points; thence change course to pass 0.2 mile N of Box Island, thence a midchannel course between Tanaklak Island and Great Sitkin Island.

(864) **Tagadak Island,** about 2 miles SW of Igitkin Island, is small and roughly triangular in shape. The island is very rugged; the shores are steep and rocky except part of the W side which has a sandy beach. The coast in most places is fringed with reefs or shoals. It has been reported that Tagadak Island is used as a breeding ground by geese and ducks.

(865) **Kanu Island,** 1,055 feet high, is about 0.5 mile SW of Tagadak Island. The island is rocky and mountainous and about 1.5 miles long and 1 mile wide. The shores in general are steep and rocky, except on the W side where there is a sand or gravel landing beach about 0.5 mile long protected by other islands from all except SW winds. The coasts are mostly fringed with reefs and exposed and covered rocks. A relatively shoal area extends to the N for nearly 0.7 mile. Near the N end of this area is **Box Island,** a small rocky islet about 40 feet high. A small cove on the E side of Kanu Island might afford some shelter for small craft.

(866) **Tanaklak Island,** about 1.5 miles W of Kanu Island, is about 1.8 miles long and 0.5 mile wide and is rocky and rugged. The island is one of low relief and rolling hills.

(867) The channels between Tanaklak Island and Kanu Island and between Tanaklak Island and Asuksak Island are deep and clear.

(868) **Asuksak Island,** 0.5 mile S of Tanaklak Island, is steep and rocky and consists mainly of one mountain 955 feet high. The island is about 0.7 mile long and about 0.5 mile wide. On the NE end of the island is a low point with a gravel beach on each side.

(869) **Aziak Island,** 765 feet high, 0.5 mile W of Tanaklak Island, is about 1 mile long and 0.6 mile wide and is rocky and hilly.

(870) **Sand Bay,** on the SW coast of Great Sitkin Island, provides suitable anchorage in 12 to 15 fathoms about 1,000 yards offshore. The bay is protected on the N and E but is subject to heavy seas during a W gale. Strong tidal currents run in the bay.

(871) In 1964, the outer section of the long pier in **Northeast Cove,** Sand Bay, was reported uprooted and washed ashore; the inshore section was in poor condition.

(872) **Chart 16477.–Anagaksik Island** is about 2 miles E of the E end of Umak Island and on the S side of the entrance to Chugul Pass. The islet is a precipitous rock about 1 mile long, 0.5 mile wide, and 890 feet high. It has a few off-lying rocks, but in most places deep water extends close to the shore.

(873) **Umak Island,** about 5 miles SW of Chugul Island, is a mountainous, irregularly shaped island about 6 miles long and 3 miles wide with a deep bight indenting the NE coast. From this bight a low pass extends to the opposite side of the island. The shores are in general steep and rocky with occasional stretches of sandy beach. The N coast is foul, with many detached rocks, exposed and submerged. A number of islets are off the E coast. The S coast is in general clear, with few off-lying rocks, except toward **Cape Chakik,** the W extremity, where there are stretches of fringing reefs. Birds of many species frequent the island, there are also seals on the island.

(874) **Umak Bight** is about 2 miles in extent and its principal arm is about 0.6 mile wide at its entrance. The bight is open on the E to Chugul Pass, and considerable swell from the ocean may be expected in heavy E weather. In all other weather the bight is one of the better anchorages in this area, with depths of 26 fathoms and excellent holding ground of green mud near the head of the bight. Stray winds sweep over the bight from the low pass to the W of Umak Bight. A sand beach is at the head of the bight.

(875) **Asuksak Pass,** separating Umak Island from Kanu and Asuksak Islands, is 1.3 miles wide at its narrowest point and is deep and clear, but the currents are strong between Kanu and Umak Islands. It is inadvisable to attempt the pass in thick weather.

(876) **Umak Pass,** between Umak Island and Little Tanaga Island is 0.6 mile wide at its narrowest point and 7 miles long with depths of 7½ to over 50 fathoms. Currents of 3 knots have been observed in the pass and greater velocities probably occur. The changes of current are accompanied by erratic movements and tide rips. (See the Tidal Current Tables for predictions for Umak Pass.) A rock awash is 0.5 mile SE of Cape Chakik and 500 yards offshore. In clear weather a midpass course can be taken through the pass. In thick weather the N side should be favored, entering the pass from E, until W of the narrows, then it is best to favor the S side.

(877) **Little Tanaga Island** is about 8 miles long and has a greatest width of about 7 miles. The island is extremely irregular in form. Two long bays, separated by a narrow isthmus, nearly cut it into two parts. The island is very rocky and mountainous; the highest peak is 1,747 feet. The shores in general are steep and rocky, and the coast generally is fringed with reefs, islets, and detached rocks. Several streams and small lakes are on the island.

(878) **Scripps Bay,** on the N coast of Little Tanaga Island, is a well-protected anchorage though subject to williwaws. The bottom is coarse sand with pebbles, but appears to hold fairly well. A sandy beach, intersected by a stream is at the head of the bay. Scripps Bay is subject to fog and reduced visibility; it is frequently thick here when the W and N sections of Kuluk Bay (Adak Island) are clear. In entering the bay, pass 400 yards off the rocky islet 0.3 mile inside the E shore to avoid the 2¼-fathom spot off the W point at the entrance. Anchor in 18 fathoms 750 yards SW of the islet. Small vessels can anchor in shallow water near the shore.

(879) **Chisak Bay,** on the S coast of Little Tanaga Island, is about 2.5 miles long and 0.8 mile wide. Depths are suitable for anchorage, but only small vessels may find swinging room which is reduced by numerous small islands. A 3-fathom depth is 0.4 mile SE and a 2¾-fathom shoal is 0.2 mile E of Chisak Island. The upper end of the bay is clear, but the channel, close W of Chisak Island, leading to it is very narrow. The bay is almost landlocked, but is reported to be exposed to swells and seas from the Pacific Ocean. A stream enters at the head of the cove. The shores of Chisak Bay consist of narrow rocky beaches.

(880) **Azamis Cove,** on the S coast of Little Tanaga Island, is about 2 miles long and 1 mile wide at the entrance. Depths are suitable for anchorage, but it is not recommended. The bay provides shelter from the N and W but is open to seas and swells from the Pacific Ocean.

(881) **Round Cove,** E of Azamis Cove, is about 1 mile in diameter, open to the S and SW, and moderately subject to heavy seas and ground swells. The depths are not too great; therefore anchorage is not recommended.

(882) **Chart 16475.–Little Tanaga Strait,** between Little Tanaga and Kagalaska Islands, is about 7 miles long and at its narrowest point about 1.2 miles wide; however, the navigable channel between Little Tanaga and Silak Islands has a width at one point of less than 0.5 mile. Tidal currents attain a maximum velocity of 5 knots through the pass E of Silak Island, producing swirls and heavy tide rips N and S of the island. The heaviest rips observed were in the middle of the pass about 1 mile N of Silak Island.

(883) The waters W of Silak Island are foul except for a passage about 0.2 mile wide along the shore of Kagalaska Island, which is recommended only for small boats. Large vessels must pass E of Silak Island. **Rip Rock,** at the SE end of the strait, covered 1½ fathoms, is marked by breakers in moderate swells.

(884) To pass through the strait from a position 2.8 miles 270° from Cape Chisak, make good a course of 000°, keeping Silak Island a little on the port bow and heading for Tana

Point on Little Tanaga Island. Hold the N course until abeam of Silak Island, then change to **330°** and pass through the channel. When abeam of Cemetery Point, a course of **000°** may be shaped to pass clear of the strait.

(885) **Piper Cove,** on the W side of Little Tanaga Island, about 1.8 miles N of Cape Chisak, is open to the W and SW, but affords temporary anchorage for small vessels.

(886) **Tana Bight,** an indentation on the W coast of Little Tanaga Island about 1 mile N of Tana Point, affords temporary anchorage for medium-sized vessels and fair shelter in S weather. The bottom is rocky and irregular. Currents in the bight are slight and usually flow in a direction opposite to that of the mainstream current through the strait.

(887) **Kagalaska Island,** 8 miles long and 5 miles wide, is extremely rugged and mountainous; the highest peak, 2,331 feet, is in the NW part. The shores are, in general, steep and rocky except on the W coast, where they have a more gradual slope, becoming steeper inland. The S shore consists of jagged cliffs. The E and N coasts are also steep in many places. The brief stretches of sand or gravel beach are often backed by vertical cliffs. The coasts are generally clear except the S and SE coasts and part of the N coast, which are fringed by islets and detached rocks. Several lakes and streams are on the island.

(888) **Cabin Cove,** opening into Little Tanaga Strait, is a two-armed bay which indents the E coast of Kagalaska Island for 2.5 miles. **Upper Arm,** 1.5 miles long and 0.5 miles wide, is bordered by steep, sloping hills on all sides; it is free of dangers. Approaching the entrance, the 10-fathom curve makes out from the N shore 200 yards, and 100 yards off the low gravel point on the N shore at the entrance. Anchorage can be had in 30 to 40 fathoms in the upper part of the arm. The shores are free of off-lying rocks and shoals. **Lower Arm,** 1 mile long with an entrance width of 800 yards, is smaller than Upper Arm, but most of it is suitable for anchorage. The surrounding terrain, especially at the head, rises in gentler slopes than in Upper Arm, but the summits are over 1,000 feet high. A stream flows into the head of the arm.

(889) **Crater Cove,** on the E shore of Kagalaska Island and 1.7 miles N of Ragged Point, affords temporary anchorage in 30 fathoms, sand and gravel bottom. High bluffs and hills on the nearby shore provide good shelter from N and W winds.

(890) **Quail Bay,** on the S coast of Kagalaska Island, is fringed by steep cliffs to E and W with many rocks along the beach. The bay is deep and clear of dangers to a point about 1.2 miles NW of Ragged Point. Temporary anchorage for small vessels may be had in 20 fathoms, sand bottom.

(891) **Kagalaska Strait** separates Adak and Kagalaska Islands. Although narrow, it can be navigated by moderate-sized vessels without difficulty at or near slack water. An 8¾-fathom shoal is in midchannel 1.6 miles inside the S entrance. S winds with ebb currents cause heavy tide rips from the S entrance N as far as Adak Bight, and are apt to cause a vessel approaching from the S to yaw badly. Because of strong currents, rips and whirlpools are encountered in the narrow parts of the strait except at slack water.

(892) Both N and S entrances are clear, with deep water close to the shores. Care must be taken not to mistake Blind Cove for the N entrance since the former is about 1 mile W of the strait, and has a much wider appearance. The shores of the N entrance are bold and precipitous while those of the S entrance are relatively low, with outlying rocks. Navigators not familiar with the area are cautioned against attempting an entrance in any but clear weather.

(893) **Local magnetic disturbance.**–Differences of as much as 11° from normal variation have been observed in Kagalaska Strait near the N entrance.

(894) **Ragged Point,** the SE extremity of Kagalaska Island, is 4.5 miles E of Kagalaska Strait and is an unmistakable landmark for the S approaches to the strait because of its serrated ridge forming the summit of the point. A natural arch in the tip of Ragged Point is noticeable when the point bears 017°.

(895) **Adak Bight,** about 2 miles from the S entrance to Kagalaska Strait, affords good shelter for vessels up to about 100 feet in length. A 3-fathom shoal, marked with kelp, is 0.3 mile SE from the N point of the bight. Vessels approaching from the N should clear this shoal 0.3 mile before turning to enter. Either arm of the bight is suitable for anchoring, but the northernmost affords more swinging room. A shoal is just off the the point between the two arms. In entering either arm, a vessel should keep in midchannel.

(896) **Campers Cove,** just N of Adak Bight, is suitable only for small boats because of the narrow, shallow entrance. Relatively small vessels can anchor in about 10 fathoms in the indentation just N of **Campers Point** and thus avoid currents and rips in the strait.

(897) **Laska Cove,** on the E side of Kagalaska Strait, is deep and well protected. Small vessels usually anchor in the NE portion of the cove.

(898) **Chart 16471.–Adak Island,** the most important of the Andreanof Group, is about 30 miles long and 20 miles wide at its widest part. The island is rugged and mountainous and has numerous small bays and indentations. **Mount Moffett,** 3,900 feet high, near the NW end, is the highest point of the island; it is snow covered the greater part of the year. The island is grass covered on the lower levels; the higher levels have a heavy growth of moss. Small lakes are numerous and there are many small streams.

(899) The Commanding Officer, Naval Air Station, Adak, Alaska, advises that **Sweeper Cove** is within the boundaries of a U.S. Naval Air Station, and only U.S. government vessels or specific contract vessels are permitted to enter. Emergency entrance for bonafide vessels in distress will be allowed.

(900) All fishing, commercial, and other vessels desiring to enter U.S. waters contiguous to Adak Island, N of 51°50'N., are required to provide a 24-hour or maximum reasonable advance notice of arrival. Such advance notice of arrival should be addressed to the Commanding Officer, Naval Air Station, Adak, Alaska, and include information concerning the vessel's name, homeport, owner, and the number of non-United States nationals aboard. Entry into Lake Andrew, Clam Lagoon, Kuluk Bay and Sweepers Cove is restricted. Adak is a closed military reservation and access will be granted only in actual emergency situations in which life is at risk.

(901) **Chart 16475.–Boot Bay** is on the S coast of Adak Island about 3 miles W of Kagalaska Strait. The inner harbor has depths of 11 to 35 fathoms over bottom varying from rock to mud; the mud bottom is in the deeper water. Seas and swells from the Pacific Ocean are broken up by the islands in the bay; however, the islands offer little protection from S winds. As the land to the N is mountainous there is a probability of williwaws with N winds.

(902) **Blind Cove,** indenting Adak Island just W of the N entrance to Kagalaska Strait, is suitable for temporary anchorage only; it is exposed to the N and is subject to williwaws from the S. A midchannel course is clear for small vessels to an anchorage in 16 fathoms in the S end of the

cove. Caution is necessary to avoid the shoal spots covered 1½ to 6 fathoms off the entrance points.

(903) **Kuluk Bay,** on the NE side of Adak Island, is about 4 miles long and 4 miles wide, and is one of the best natural harbors in the Aleutians. It is entered between Zeto Point on the N and **Thunder Point** on the S, and includes Kuluk Bay proper, Clam Lagoon, Sweeper Cove, Finger Bay and Scabbard Bay. Tidal currents in the bay are weak and the flow appears to depend mainly upon the winds.

(904) **Zeto Point** is a prominent butte rising well above the surrounding land and has several jagged pinnacles along its S face. About 1.5 miles NE of the point is **Head Rock,** which is large and bare.

(905) **Kuluk Shoal,** consisting of several rocks covered 1¼ to 9 fathoms and marked by kelp, is about 0.8 mile S of Head Rock and 1 mile E of Zeto Point. A lighted bell buoy is about 0.6 mile E of the shoal.

(906) A 9-fathom shoal with rocky bottom is 0.5 mile 012° from the Head Rock (see chart 16471); a 17-fathom bank with rocky bottom is 2 miles 096° from the rock.

(907) **Clam Lagoon,** 0.5 mile NW of Zeto Point, can be entered only by small boats. In the S part of the lagoon and outside the entrance are mudflats. The ruins of a long pier are 0.5 mile W of the lagoon entrance.

(908) A **naval restricted area** is in the NW part of Kuluk Bay beginning at Zeto Point. (See **334.1320,** chapter 2, for limits and regulations.)

(909) **Chart 16476.–Sweeper Cove,** on the SW side of Kuluk Bay, provides good shelter in 7 to 20 fathoms inside a breakwater, marked by a light on the outer end, that extends from the N side of the entrance; bottom is gray sand. A fuel tank at the W end of the cove is prominent.

(910) **Sweeper Cove Entrance Light 5** (51°51′33″N., 176°35′22″W.), on the NW side of Lucky Point, is shown from a steel structure with a square green daymark.

(911) **Gannet Rocks,** on the N side of the entrance to Sweeper Cove, are bare and surrounded by shoal water. A detached shoal, covered 3½ fathoms, and a group of small islets, surrounded by shoals, are between Gannet Rocks and the shore. **Gannet Rocks Light 4** (51°52.1′N., 176°36.4′W.), 45 feet above the water, is shown from a skeleton tower with a triangular red daymark on the S end of the largest rock. Two water tanks, red and blue are on the high ground at the head of Kuluk Bay about 1.2 miles NW of Gannet Rocks Light 4.

(912) **Pit Rock,** the southernmost of the two large rocks on the SE side of the entrance to Sweeper Cove, is bare and surrounded by foul ground. **Finger Shoal,** 0.4 mile E of Pit Rock, has a rock that uncovers in the detached shoal area. A lighted bell buoy is about 300 yards NE of the shoal.

(913) The diurnal range is 3.7 feet in Sweeper Cove. (See the Tide Tables for daily predictions for Sweeper Cove.) During severe weather, a surge may be experienced inside the cove, making it difficult at times to remain alongside any of the piers. Heavy float fenders should be used, and vessels should be prepared to get underway.

(914) **Harbor regulations.**–Sweeper Cove is part of a U.S. naval air station. Permission to enter or move about the cove must be obtained from the Commanding Officer who can be contacted by calling ADAK CONTROL on 4125 kHz or VHF-FM channel 16. Vessels entering the Port of Adak will request channel clearance from and give an accurate estimated time of arrival to Adak Port Control on 4125 kHz or other designated frequency at least 2 hours prior to arrival. The Port Services Officer will assign a berth and provide advisory pilotage service and tug if needed. The pilot advisor will board from a tug in the vicinity of Gannet Rocks. Two 2,000-hp tugs and salvage equipment are available at port services.

(915) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(916) The Aleutian Islands are served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(917) Vessels using Southwest Alaska Pilots Association pilots and en route to Adak can meet the pilot boat about 2 miles E of Gannet Rocks Light 4 (51°52.1′N., 176°36.4′W.).

(918) The pilot boat can be contacted by calling "ADAK PILOT BOAT" on VHF-FM channel 16 (156.80 MHz) or on a prearranged frequency between pilot and agent/vessel.

(919) **Wharves.**– Piers 3 and 5, on the N side of Sweeper Cove, are used by vessels drawing up to 30 feet. A short barge pier is E of Pier 3; 30 feet is reported alongside. Pier 10 is a T-head fuel pier at the extreme W end of Sweeper Cove with a least depth of 35 feet alongside. A black tank with a red light on top is inshore of Pier 10. Water and telephone connections are available at Piers 3 and 5.

(920) A small-boat basin is at the SW end of the cove. In 1978, most of the piers in the basin were reported to be in poor condition. In August 1983, it was reported that the entrance channel to the basin was marked by private buoys, had a depth of 4 feet, and kelp along the S side. In May 1984, a submerged obstruction was reported in the NW end of the basin in about 51°51′06″N., 176°39′14″W.

(921) **Hammerhead Cove,** on the S side of Sweeper Cove, has depths of 6 to 24 feet.

(922) **Finger Bay,** on the S side of Kuluk Bay, is about 1 mile long and 1 mile wide and has two narrow arms that extend in S and SW directions. Both arms are open to the NE but no sea penetrates their narrow entrances. In the outer part of the bay depths are generally too deep for suitable anchorage, although temporary anchorage may be found in about 30 fathoms 400 yards SW of Lucky Point and in 24 fathoms off the entrances to the two arms.

(923) The SW arm is narrow but clear in midchannel, with a least depth of 5 fathoms. Submerged pier ruins and pilings extend up to about 180 yards from the N shore between 51°50′04″N., 176°37′14″W and 51°49′53″N., 176°37′36″W. Holding ground near the head of the arm is good. Winds through Finger Bay tend to be very strong because of the high bluffs on each side. Wind direction is along the axis of the piers, and vessels should have little trouble holding alongside. Surge in Finger Bay is at a minimum.

(924) **Scabbard Bay,** just E of Finger Bay, is open to the N. Anchorage can be had near the entrance in 20 fathoms, gray sand and broken shell bottom. At the S end of the bay is good shelter in 15 to 20 fathoms, brown mud bottom. Water is obtainable. Midchannel courses will avoid all dangers.

(925) **Chart 16471.–Cape Adagdak,** the northernmost point of Adak Island, is a bold headland 2,072 feet high. From Cape Adagdak, the coast trends SW and then curves W to form 3-mile-wide Andrew Bay. A 20-foot-high rocky dike separates the head of the bay from freshwater Andrew Lake.

(926) **Acorn Rock** is 0.2 mile off the N coast of Adak Island, 5.5 miles SW of Cape Adagdak. A shoal covered 1 fathom is 0.4 mile offshore 0.6 mile W of the rock.

(927) **Cape Moffett,** 8 miles SW of Cape Adagdak, is a cliff 600 feet high behind which the land rises gradually to Mount Moffett. The cape is the NW headland of Adak Island and is prominent for entering Adak Strait. **Cape Kiguga,** 2 miles S of Cape Moffett, is the westernmost projection of Adak Island at the N entrance to Adak Strait; it is a very steep eroded slope rising abruptly from the water.

The 30-fathom curve extends about 1 mile off Cape Moffett and Cape Kiguga; there are no off-lying dangers.

(928) **Adak Strait,** between Adak Island and Kanaga Island, is 16 miles long and from 6 to 8 miles wide; depths are from 30 to over 100 fathoms. The only dangers are the rocks and reefs off **Eddy Island** and **Argonne Point** on the E side and **Shoal Point** and **Naga Point** on the W side. Vessels should clear both shores of the strait by not less than 1 mile. Since the current velocity may reach 4 knots, passage in heavy fog without radar is not recommended. (See the Tidal Current Tables for predictions for Adak Strait.)

(929) The coast of Adak Island along the E side of Adak Strait is bordered by steep bluffs and rocky cliffs; islands, rocks, and reefs are close to shore. Eddy Island, at the N entrance, is prominent. **Whirlpool Rock,** 1 mile E of Eddy Island, is small, flat on top, and awash at extreme high tides; kelp grows close to it. Currents are strong and erratic in this area. **Wedge Point,** a rocky bluff 7.5 miles S of Eddy Island, is prominent. A good anchorage for small vessels in S weather is 0.8 mile E of Wedge Point, 0.3 mile offshore in 17 fathoms, sand bottom. The point 9.5 miles S of Eddy Island resembles the head of a huge gorilla.

(930) The coast of Kanaga Island along the W side of Adak Strait is fringed by kelp beds, islets, and rocks. There are several anchorages that provide protection from W weather. One is in the cove between **Round Head** and Shoal Point; another is midway between Shoal Point and Naga Point in 17 fathoms, gray sand bottom. A reef covered 6 fathoms is 1 mile NE of Naga Point and 0.8 mile offshore; another reef covered 13 fathoms is 0.7 mile E of the point. When the current is ebbing heavy tide rips occur on these reefs in S weather.

(931) **Cape Chlanak,** on the W side of the S entrance to Adak Strait, is low and rocky. Shallow water marked by kelp is close to the shoreline. Currents are strong and medium tide rips occur off the point.

(932) **Shagak Bay,** 3 miles SE of Cape Kiguga, has depths of 20 fathoms or more, but only 4 feet can be carried through the 400-yard-wide entrance between grass-covered sandspits. A band of very heavy kelp extends across the entrance; the bar is relatively smooth rock. The bay is well protected from swells; the bottom is mud and probably fair holding ground. Violent williwaws and gales are encountered in E and SE weather. A good weather anchorage is indicated 1 mile NW of the entrance and 0.7 mile offshore in 17 fathoms, flat sand bottom.

(933) **Chart 16474.–Bay of Islands,** on the NW side of Adak Island, is protected by the many islands at the entrance; wire-drag depths of 34 feet or more are in the main passages. The bay is about 6 miles in a SE direction and varies in width from 3 miles at the entrance to less than 1 mile at the SE end. Although the bay is protected from sea swells, violent and severe gales occur, especially with winds from E and S.

(934) The approaches to Bay of Islands are clear to within 500 yards of **North Island** on the E and **Careful Point** on the W. Currents are strong near Careful Point. **Cascade Rock,** in about the middle of the entrance, is only 2 feet high and breaks in heavy weather; shoal water surrounds the rock.

(935) The preferred passage to **Expedition Harbor,** in the SE part of Bay of Islands, is W of **Green Island** through **The Race** between the W end of **Ringgold Island** and **Plum Island Rocks,** thence through **Ringgold Sound** and **Hell Gate.**

(936) The Race is dangerous because vessels must pass close to Plum Island Rocks. A speed of 8 to 10 knots is essential for a large single-screw vessel to make the necessary changes in course.

(937) Hell Gate narrows to about 70 yards and is dangerous for a large vessel in case of strong beam winds or mechanical failure.

(938) At the E end of Hell Gate, the kelp-covered rocks on the S side and **Eaglet Rocks** on the N narrow side of the channel, makes it particularly difficult for an outgoing vessel because it is necessary to head for Eaglet Rocks, and, when the rocks are close at hand, make a sharp turn in order to pass through the deep and narrow part of Hell Gate.

(939) Expedition Harbor can be reached through **Argonne Channel,** N of Ringgold Island, but this passage is dangerous because the reefs at the turn N of **Black Island** narrow the channel width to 90 yards.

(940) Vessels can anchor in the W or E parts of Expedition Harbor. The main part of the harbor, with depths of 30 to 85 fathoms, is too deep for anchorage. Anchorage areas: **Unalga Bight,** at the W end, in 16 to 25 fathoms, mud bottom; **Gannet Cove,** at the E end, in 16 to 25 fathoms, mud bottom; and **Beverly Cove,** N of Gannet Cove, in 10 to 18 fathoms.

(941) An excellent anchorage for small vessels is in **Fisherman Cove,** on the S side of Ringgold Sound, in 10 to 22 fathoms, mud bottom.

(942) Anchorage can also be had on the S side of North Island in 20 fathoms or more, mud and rock bottom. The area can be reached by passing W of North Island until past **North Rocks,** thence a **110°** course between shoal spots of 3¾ fathoms on the N and 4 fathoms on the S to the anchorage.

(943) Water can be obtained from several waterfalls in the Bay of Islands. The waterfall 0.3 mile SE of **Vincennes Point** has the most accessible natural water supply in the bay.

(944) **Chart 16471.–Three Arm Bay,** on the W side of Adak Island, has depths of 19 fathoms or more in the outer part, but the depths decrease to less than 5 fathoms in the arms. Most of the covered dangers are within 300 yards of the shore. In S weather small vessels can anchor 0.3 mile E of **Three Sisters Island** in 17 fathoms, sandy bottom. **North Arm,** 0.2 mile wide with steep sides, extends 2 miles inshore to a low draw. A short overland trail leads from the upper end of the arm to the S shore of Unalga Bight in the Bay of Islands. In SW and W weather, swells from Adak Strait enter North Arm; in E or W weather, winds draw through this arm. Anchorage is suitable only for small craft in good weather. A fair anchorage for small vessels is in **Middle Arm,** 0.5 mile N of **Split Point,** and rock bottom is poor holding ground. **South Arm** is well sheltered, but the holding ground was reported poor in 1973. It is entered from Middle Arm through a 6-fathom passage between the W shore of the small island off Split Point and the shoreline to the W. The passage is foul between Split Point and the island off the point.

(945) **Bay of Waterfalls,** on the S side of Adak Island just E of Adak Strait, is 8 miles long and 5 miles wide at the entrance but narrows to 0.5 mile at the N end. Depths of 10 fathoms or more are within 0.3 mile of the shore, except for a pinnacle rock, covered 1½ fathoms, 5.5 miles inside the bay at a point 0.5 mile W of **Low Point.** Most of the bay is too deep for anchorage; it is exposed to the seas and swells of the Pacific Ocean and to heavy gusts sweeping through the mountain passes of Adak Island. Vessels can anchor in 16 fathoms within 0.5 mile of the head.

(946) **Cape Yakak,** on the W side of the entrance to Bay of Waterfalls, is a long, flat tableland, well defined and easily recognized because it has no high peaks on it.

(947) **Chapel Roads,** the E arm of Bay of Waterfalls, offers anchorage in 20 fathoms, rocky bottom, but is also exposed. **Chapel Cove,** the inner bight of Chapel Roads, affords temporary anchorage in 10 fathoms, hard to soft gray sand bottom. The entrance is narrow, being restricted by **McCulloch Rock,** a pinnacle covered 2½ fathoms, on the N side of the cove. **Pulpit Rocks,** inside the cove, are a ledge of bare rocks.

(948) **Cataract Bight,** on the E side of Bay of Waterfalls near its head, affords anchorage in 24 fathoms 200 yards off the beach; water can be obtained. A perceptible swell reaches the bight with S winds.

(949) **Hidden Bay,** 12 miles NE of Cape Yakak, is a 0.1-mile-wide inlet 1.2 miles long with depths of 10 fathoms or more in midchannel; high hills are on both sides. Small boats will find good shelter in the W arm at the N end of the bay in 11 fathoms, mud bottom. A 6-foot-high rock, 0.6 mile S of the entrance, marks a foul ground area with deep channels on either side; boats should keep well clear of the E entrance point.

(950) **Chart 16460.–Kanaga Island,** across Adak Strait from Adak Island, is roughly right-angled and extends 18 miles N and S, 28 miles E and W, and has a maximum width of 7 miles. **Kanaga Volcano** (chart 16471), at the N end of the island, is cone shaped, rising directly from the water to 4,416 feet; steam may emit near the summit. In clear weather this excellent landmark is visible from all directions. There are several lesser peaks S of the volcano from which the land slopes down abruptly to rolling tundra-covered hills, 600 to 100 feet high, interspersed with numerous streams and lakes.

(951) The Bering Sea Aerological Unit stationed at Kanaga Bay found that the Kanaga Volcano could be utilized as a means for forecasting bad weather. The volcano peak is seldom absolutely clear of clouds. During April 1934, it was observed that invariably the day or night before a gale the peak made its appearance, shorn of all clouds and with wisps of steam around the crater. During the summer of 1953, the phenomenon was noted on several occasions, but it is not infallible, as evidenced at other times when bad weather did not follow clear visibility of the peak.

(952) **Chart 16471.**–Most of the N coast of Kanaga Island between **Cape Miga** and Round Head is fringed by kelp beds, islets, and rocks. Depths of 100 fathoms reach within 0.5 mile of shore from Cape Miga for 2 miles E, where the shoreline trends SE for 4 miles to Round Head, and depths of 30 fathoms reach within 1 mile of shore. The water over this relatively shoal area appears much disturbed and currents are strong and erratic.

(953) **False Bay** (51°43'N., 177°09'W.), 0.5 mile N of Cape Chlanak, has landing places protected from all but heavy SE swells on the sand beaches at the head of its two arms. The bay may be used as an emergency anchorage for very small vessels, in 8 fathoms, sand bottom, and affords protection from W and N winds.

(954) **Kanaga Bay,** on the S coast of Kanaga Island 2 miles W of Cape Chlanak, is 2 miles long and 0.4 mile wide with depths of 10 to 3 fathoms, except for the shallow N part which nearly dries in places. The hazardous entrance channel is only 130 yards wide between reefs plainly marked by kelp.

(955) The shoreline of Kanaga Bay consists of rocky cliffs or steep grassy bluffs, with a sand beach and low ground at the head. Good anchorage is afforded medium-sized vessels in shallow water, with excellent holding ground of sticky mud mixed with black sand. The anchorage is protected from all winds except SE, and the bay is apparently not subject to williwaws, the heaviest gusts coming from NE. With heavy swells from S through SE, the entrance is impassable, and it should never be attempted without good visibility.

(956) The wreck of the USS SWALLOW on the W side of the entrance to Kanaga Bay is prominent and appears red in color from offshore. If any appreciable swell is running, the sea breaks on both sides of the entrance channel near the wreck.

(957) In 1954, the outer part of the dock at the abandoned site, 1.4 miles above the entrance of Kanaga Bay, was in fair condition; small vessels could berth along its face where the depth is 13 feet. The dock has been gutted by fire near the beach end and buildings along the waterfront have been burned. A prominent radio mast on a hill 175 yards NE of the inner end of the dock is visible throughout the bay. A cabin is across the bay NW of the dock.

(958) **Chart 16460.**–The S coast of Kanaga Island is low, rocky, and very broken with numerous offshore rocks and reefs marked by kelp fringing the shore. The coast should be cleared by at least 2 miles to avoid the dangers.

(959) The waters off **Cape Tusik,** 3 miles W of Kanaga Bay, appear much disturbed with strong currents. A dangerous shoal extends SSW for 2 miles off the prominent headland 2 miles NW of Cape Tusik. Depths of 16 fathoms are on the outer part, decreasing to much shoaler depths closer inshore.

(960) **Chart 16463.–Sentry Rock,** 9 miles W of Cape Tusik and 1 mile off the S coast of Kanaga Island, is 94 feet high and prominent. Passage between the rock and the shore should not be attempted.

(961) **Cape Chunu,** the SW end of Kanaga Island, has grassy bluffs and rocky cliffs 100 to 200 feet high; rolling grassland is in the interior with hills up to 345 feet high. The shoreline is ragged and rocky; rocky reefs and prominent rock islets and pinnacles fringe the shore. **Castle Island,** a small grass-covered rocky islet off **West Chunu Point,** is 165 feet high and prominent from the SE and NW. Vessels are cautioned to pass at least 1.5 miles off Cape Chunu to avoid the shoal area of very irregular rocky bottom with depths of 2 to 6 fathoms. The waters for several miles S of the cape are usually much disturbed, indicating strong currents.

(962) **Kanaga Pass,** between Kanaga Island and Tanaga Island, is 3.8 miles wide at its narrowest part, but it is full of small rock islets, dangerous reefs, and strong currents; passage is not recommended except during periods of good visibility and calm seas.

(963) Foul ground extends into Kanaga Pass for over 1 mile from the W side of Cape Chunu to more than 3 miles off **Western Point,** Kanaga Island, thence over 1.5 miles offshore along the N coast of Kanaga Island. **Eddy Rock, Goose Rocks,** and **Annoy Rock,** a part of the foul ground, are prominent. A dangerous reef, covered 5 feet to 3 fathoms, is 0.4 mile N of Annoy Rock. The dangerous area from this reef E to Kanaga Island is rocky and very irregular; many underwater pinnacles exist. The kelp that marks the area during the summer is towed under by the current except at slack water and cannot be relied upon to indicate the shoals.

(964) **Cape Sasmik,** the S end of Tanaga Island on the W side of Kanaga Pass, is a relatively flat grassland with steep grassy bluffs and rock cliffs rising abruptly from the shoreline to 100 feet. Rocky islets and reefs border the coast close inshore. **Herd Rock** (chart 16462), a 20-foot detached black rock on the SW side of the cape, is conspicuous from the SE and NW. The cape should be cleared by at least 1 mile.

(965) Foul ground extends up to 1 mile off the Tanaga Island shore on the W side of Kanaga Pass, except in the approach to Twin Bays. The bottom is very broken and irregular, and the shoreline is made up of low cliffs.

(966) A good anchorage in W weather is 3 miles N of Cape Sasmik and 0.8 mile offshore in 18 fathoms, sand bottom; Twin Bay is also a good anchorage.

(967) **Trunk Point,** 11 miles NE of Cape Sasmik, shows as a low rounded knoll.

(968) **Cape Sudak,** the long finger-shaped easternmost point of Tanaga Island on the N side of the N entrance to Kanaga Pass, terminates in a small flat-topped, steep-sided 70-foot-high promontory that appears detached from offshore. A dangerous shoal, with bare rocks, extensive heavy kelp, and underwater pinnacles, extends 2 miles NE from the cape. The waters from the shoal to the 100-fathom curve appear greatly disturbed. The cape should be cleared by over 2 miles.

(969) Anchorage protected from W and N swells is 1 mile SE of the end of Cape Sudak in 20 fathoms, flat cinder bottom.

(970) The current velocity may reach 4 knots in the narrow part of Kanaga Pass. In calm weather, tide rips are visible among the covered reefs between Annoy Rock and Kanaga Island. With a heavy S swell and the current ebbing S, seas break across the entire pass. (See the Tidal Current Tables for predictions for Kanaga Pass.)

(971) The recommended routes through Kanaga Pass with depths of 10 fathoms or more are through **Explorer Passage,** between Annoy Rock and **Hazard Point,** Tanaga Island, thence either midchannel between Kanaga Island and Tanaga Island, or the 0.3-mile-wide passage through **The Ditch** between dangerous **Eider Reef,** awash in places at half tide, and Trunk Point, Tanaga Island.

(972) **Twin Bays,** 5 miles N of Cape Sasmik, is a good small-boat anchorage in W and N weather; larger vessels may anchor just off the entrance. A 75-foot-high distinctive rock resembling a Christmas tree in profile outline, undercut by surf action to balance on a small pedestal, is on the beach at **Christmas Tree Point,** on the W side of the entrance. The shores on both sides of the entrance to the bay are 100-foot-high vertical cliffs with reefs that extend more than 0.1 mile into the bay; the surrounding country is rolling grassland. Foul ground extends 0.7 mile S of Christmas Tree Point.

(973) A boulder beach, with a very shallow valley beyond, is at the head of the NE arm of Twin Bays; a sand beach backed by a narrow, deep valley is at the head of the NW arm. A trapper's cabin is near the beach in the NW arm, and a stream empties into this arm about 150 yards E of the cabin.

(974) Small vessels can anchor in Twin Bays in 8 fathoms, flat sand bottom, when the Christmas tree rock bears 242°. Larger vessels should anchor in 16 fathoms, flat sand bottom, 0.6 mile off the rock when it bears 310°.

(975) **Hot Springs Bay,** on the Tanaga shore of Kanaga Pass 12 miles N of Cape Sasmik, is small but offers good protection from W weather. Low bluffs line the S shore with a rise at the head to a high ridge. Warm springs are along the central part of the S shore. The N shore is lined by steep bluffs rising toward the mountains; a prominent waterfall is 0.3 mile from the head. A good sand beach is at the foot of a low valley; a stream enters the bay at the S end of the beach. Two cabins are just in back of the beach near its N end.

(976) The only off-lying danger in Hot Springs Bay is **Village Reef,** 600 yards off the S shore 1 mile NW of Trunk Point. Good anchorage is found in 13 to 17 fathoms, sand bottom; small craft may anchor in shoaler water close to the beach.

(977) **Charts 16460, 16471, 16463.**–The N coast of Kanaga Island W of Cape Miga trends S for 7 miles, then SW for 20 miles to Kanaga Pass. From Cape Miga for 7 miles S to **Belleview Beach,** the coast is steep-to with off-lying dangers within 0.5 mile of the shore. The 2-mile sand beach is backed by low ground and dunes. Good anchorage is afforded in SE weather off the beach; avoid the several detached offshore rocks. Landings can be made on the beach.

(978) The coast between Belleview Beach and Kanaga Pass is generally rocky and irregular, with a wide band of kelp and rocks parallel to the shore. Most of the points of land are low rocky cliffs; steep grass bluffs between the points rise to the relatively flat and rolling interior. The coast should be given a clearance of 1.5 miles to avoid the dangers.

(979) **Ship Rock,** 1 mile offshore and 5 miles W of Belleview Beach, is 49 feet high and resembles a ship; foul ground is between the rocky islet and the shore. Good anchorage in S weather can be had 4.5 miles W of Ship Rock in the cove W of **Cabin Point** in 18 fathoms, smooth sand bottom; approach with caution to avoid the covered rocks and pinnacles off Cabin Point and Pincer Point. A trapper's cabin is on the W side of Cabin Point. A group of pinnacles, covered 7 to 25 feet and marked by kelp, is 0.4 mile off double-ended **Pincer Point,** 5.2 miles W of Ship Rock.

(980) **Hive Rock,** 7.5 miles W of Ship Rock and 0.4 mile offshore, is an 80-foot-high hive-shaped pinnacle. Heavy kelp is between the rock and the shore. Good anchorage is afforded in S weather 0.6 mile NE of the rock in 20 fathoms, smooth sand bottom; approach should be made from the N. A rock that uncovers and marked by kelp is 1.3 miles offshore, 8.7 miles W of Ship Rock; foul ground is between the rock and the shore.

(981) **The Signals,** a prominent 60-foot-high twin-pinnacled rock is 0.3 mile off **Northwest Point,** 10.2 miles W of Ship Rock. **Coolie Hat,** 1.3 miles SE of Northwest Point, is a prominent 284-foot black cinder hill shaped like the crown of a coolie hat.

(982) **Chart 16463.–Bobrof Island,** 6 miles NE of Cape Sudak, Tanaga Island, is more than 2 miles long and almost 2 miles wide. The shoreline on all sides except the N is rocky and precipitous, with steep slopes rising abruptly to 2,419-foot **Bobrof Volcano.** The N point of the island, connected by a low grassy area to the base of the volcano, consists of a very prominent flat-topped 402-foot-high cylinder-shaped peak of black lava having bare vertical sides. It appears to be separated from the rest of the island when viewed offshore from the E or W.

(983) Currents are strong on all sides of Bobrof Island and the waters appear disturbed for 1 mile offshore. Dangers are within 0.2 mile of the shore; the 10-fathom curve is less than 0.5 mile offshore. A band of impenetrable kelp parallels the NW coast to 0.3 mile offshore.

(984) **Chart 16460.–Tanaga Island,** across Kanaga Pass from Kanaga Island, is irregular in shape with greatest N-S length of 20 miles and E-W width of 23 miles. The N part of the island is high and mountainous, while the S part is low with many streams and small lakes or ponds. The N shore has precipitous rocky cliffs or very steep slopes which rise to the interior mountains. The other shores are rocky cliffs or reefs with numerous along shore pinnacles, except for beaches in Tanaga Bay and a few other places. The S coast and much of the E coast of Tanaga Island is fringed with detached rocks, reefs, and foul ground. Extensive kelp patches are in the foul areas. The dangers can be avoided by clearing the coast by over 2 miles.

(985) **Chart 16463.**–The first 12 miles of the N coast of Tanaga Island between Cape Sudak and **Gage Point** is indented with coves that provide anchorage. The 30-fathom curve is 1 mile or less offshore; all dangers are within 0.5 mile of the shore.

(986) **Portage Bight,** 5 miles W of Cape Sudak, affords a good weather anchorage in 18 fathoms, sandy bottom.

(987) **Rough Bay,** 8 miles W of Cape Sudak, is not recommended as an anchorage because of violent williwaws in S and W weather. A dangerous rock, 0.4 mile NE of the W entrance point, is awash at low water. A large shoal area, marked by kelp, makes out from the SE shore to the middle of the bay. A sand beach is at the head and a deep valley extends inland.

(988) **Gusty Bay,** 10 miles W of Cape Sudak, affords good anchorage in S weather. The gusty winds frequently encountered do not, as a rule, impair safe anchorage. Two shallow valleys, separated by a bold headland, are at the head of the bay; a trapper's cabin is in the SE corner at the mouth of a large stream.

(989) **Pillbox Rock,** 0.1 mile off the steep-sided, square-faced E entrance point to Gusty Bay, is a 150-foot-high conspicuous dome-shaped pinnacle with grass on top; a 50-foot-high sharp-pointed pinnacle is just N of it. All dangers are within 0.5 mile of the shore. Anchor in the center of the bay with the sharp pinnacle bearing 118°, in 16 fathoms, sand bottom.

(990) **Chart 16462.**–The N coast of Tanaga Island between Gage Point and **Cape Sajaka** is very irregular with many vertical lava cliffs. A large waterfall, 2.5 miles W of **Bumpy Point,** is 348 feet high and pours from the top of a vertical cliff. Dangers are within 0.5 mile of the shore. Currents are strong along this stretch of coast.

(991) The two prominent peaks in the interior are connected by a saddle; the E one is about 4,600 feet high and the W, **Tanaga Volcano,** is 5,925 feet high.

(992) From Cape Sajaka SE to Tanaga Bay several shallow valleys with black sand or gravel beaches across them indent the otherwise mountainous interior. **Blackface Point,** 7 miles SE of Cape Sajaka, is a prominent headland with black rock cliffs near the top of steep grassy bluffs. Dangers are within 0.5 mile of the shore. In good weather vessels may anchor 3 miles NW of **Cape Agamsik,** 0.8 mile off the sand beach, in 15 fathoms, flat sand bottom.

(993) **Tanaga Bay,** on the W side of Tanaga Island, affords protection from all except W weather. The bay is a good anchorage for large and small vessels; depths and places can be selected as desired. The bottom is uniformly fine, black, hard sand with only fair holding qualities in heavy weather. The head of the bay shoals gradually from 2 miles out to a sand beach. The S shore is irregular with reefs and kelp beds. Dangers are within 0.7 mile of the bay shore. Several visible rocks on **Middle Ledge,** that extend almost 0.5 mile offshore at the head of the bay, are of some assistance when anchoring near the head.

(994) **Cable Bay,** a small cove on the N side of Tanaga Bay E of prominent Cape Agamsik, affords protection to small craft in W weather. Water is available at the head of the bay.

(995) **Cape Amagalik,** on the S side of the entrance to Tanaga Bay, is low but backed by higher grassy hills. A shoal extends 1.5 miles W of the cape. A dangerous reef, marked with heavy kelp and rocks, is inside the shoal area. Tide rips are severe off the cape. All vessels should clear the cape by at least 4 miles when a moderate swell is running against the current. Small vessels should not attempt passage with a heavy swell running. Seas 12 to 14 feet high have been encountered in the area in moderate weather. A flood current of 3 knots has been observed; larger velocities probably occur. The flood sets N and the ebb S.

(996) Tide rips have been observed on the 26-fathom bank 4 miles NW of Cape Amaglik.

(997) A skeleton tower on top of a 145-foot bluff on the S side of Cape Amagalik and **Harem Rock,** 0.6 mile SW of the tower and usually marked by heavy breakers, are prominent.

(998) **Lash Bay,** 3 miles E by S of Cape Amagalik, is the site of an abandoned World War II military installation. Only small craft should enter the bay, and then with caution under favorable weather conditions. The inshore part of a 600-foot wharf remains at the head of the bay; a depth of 8 feet is off its outer end. Broken piling of the outer section of the wharf is covered and constitutes a real danger. Two diamond-shaped targets set on a hill just W of the wharf form an entrance range on course **002°.** A shoal covered less than 3 fathoms is in the approach on the range line extended; dangerous covered rocks are near both sides of the range line approaching the head. The bay is useful only as a temporary anchorage because of limited swinging room and shoal water.

(999) **Scarab Rock,** 0.6 mile WSW of **Tidgituk Island,** is 50 feet high and prominent.

(1000) **South Bay,** on the S coast of Tanaga Island just W of Cape Sasmik, affords anchorage during N and E weather. A reef that uncovers extends 0.5 mile S from the center of the head of the bay; a shoal with depths of 7 to 2 fathoms continues S for another 0.5 mile. A trapper's cabin is near the mouth of a stream NE of the reef. Anchor in the E half of the bay, 0.5 mile off the E shore, in 12 fathoms, flat sand bottom.

(1001) **Chart 16460.–Tanaga Pass,** between Tanaga Island and the Delarof Islands, is 13 miles wide at its narrowest part. Depths of 50 fathoms or more can be carried through the pass by keeping 6 miles off Cape Amagalik, Tanaga Island, and 3 miles off the Delarof Islands.

(1002) **Currents.**–The direction and velocity of the current is radically affected by the land areas and the banks. It appears that the flood is diverted by the chain of islands - Skagul to Unalga - and the relatively shoal water between them to an E and W direction in moving around this chain. It was observed that S of Skagul Island the flood sets about NE, E of this island it sets N, and N of the island it sets N to NW.

(1003) With erratic currents of this nature, dead reckoning cannot be depended on and the navigator may find his vessel 1 mile or more off his reckoning after a run of 1 hour.

(1004) During observations made 4.5 miles SW of Cape Amagalik, the current was rotary, turning clockwise, and followed a definite pattern. A minimum current averaging about 0.8 knot sets N to NE. As the current turned through E to S the velocity built up rapidly until it reached 3 knots. The velocity decreased to about 2 knots and at time of low water set WSW. The current turned NW, and the velocity increased to a maximum of 3 knots. The current continued NW to N until the velocity averaged about 0.8 knot. The current then set NW at a velocity of 2 knots. The current turned through N to NE and decreased in velocity to a minimum of 0.8 knot.

(1005) On the opposite side of the pass, 4 miles E of Ugidak Island, velocities of over 3 knots were observed.

(1006) Between Kavalga and Ulak Islands, the flood was observed to set to the NW.

(1007) Tide rips and swirls may be encountered in any part of this area, except well off the land areas in deep water. Generally they will be encountered where a radical change

in depth deflects the natural flow of the current or where land masses affect this flow. The ebb appears to produce the heaviest rips and they are most pronounced during the greatest range of tides. Also, strong winds and heavy seas, opposing the flow of the current, cause large rips.

(1008) Rips and swirls were observed by survey vessels to be particularly heavy to a distance of approximately 4 miles W of Cape Amagalik. This area is dangerous to small craft except in favorable weather and should be avoided by medium-sized craft under adverse conditions of current and sea or swell. Under unfavorable weather conditions, it is advisable to round this cape outside the 50-fathom curve.

(1009) Heavy tide rips have been observed off Cape Sajaka; on the bank between Skagul and Ilak Islands; and on the shoal that extends W from Unalga Island.

(1010) (See the Tidal Current Tables for predictions.)

(1011) The **Delarof Islands,** between Tanaga Pass and Amchitka Pass, are a group of nine islands and several small islets and rocks covering an area of 38 miles N-S and 33 miles E-W.

(1012) **Ilak Island,** the easternmost in the Delarof group, is 188 feet high on a ridge near the NE shore. The highest bluffs are on the N and E sides. From offshore the island appears tablelike; the top slopes gently from E toward the W shore. The shoreline is broken and surrounded by detached islets, rocks, and reefs up to 2 miles W of the island and 0.5 mile on the other sides. **Gramp Rock,** 1.5 miles W of Ilak Island, is the breeding ground for sea lions. The 15-foot-high pinnacle 0.5 mile off the N shore of the island is prominent. Strong currents and tide rips are near the island.

(1013) **Ugidak Island,** the easternmost of a chain of four islands in the central part of the Delarof group, is 75 feet high, small, and rocky. The waters around the island are deep; currents are strong and tide rips, dangerous to small boats, may be encountered.

(1014) **Skagul Island** and **Ogliuga Island,** 2.5 to 7 miles W of Ugidak Island, are surrounded by numerous rocks, reefs, and kelp beds. An emergency landing field and buildings are on Ogliuga Island; a tower near the N shore is prominent.

(1015) **Skagul Pass,** between Skagul and Ogliuga Islands, is only for small craft. Currents in the pass are very strong and tide rips develop when sea and current are opposed. Kelp in the pass is towed under when the current is running.

(1016) A good anchorage from N weather is 1.2 miles S of Skagul Pass in 17 fathoms, sand and gravel bottom.

(1017) **Tag Islands,** a group of rocky islets 3 miles SW of Ugidak Island, are the breeding grounds for sea lions; the highest point is 75 feet. Several rocky islets are between these islets and Skagul Island.

(1018) **Kavalga Island,** 10 miles W of Ugidak Island, is 5 miles long with greatest width of 1.5 miles; the highest point is 315 feet. The 1-mile-long prominent headland at the W end of the island is 180 feet high and connected to the mainland by a low gravel beach. Most of the island is covered with tundra. The shores are fringed with prominent rocks and reefs.

(1019) There are several reefs and rocks, large kelp beds, and winding channels 2 to 5 fathoms deep between Ogliuga Island and Kavalga Island. Large numbers of sea otter have been seen in this area. **Ogliuga Pass,** close to Ogliuga Island, is only for small craft.

(1020) **Sea Otter Pass,** 0.7 mile NE of Kavalga Island, has depths of 5 fathoms in the 0.4 mile-wide channel. The pass is fringed with heavy kelp and prominent 3-foot-high rocky islets; some kelp grows in the channel. Currents in the pass are moderate.

(1021) A good anchorage during S gales is 1-mile N of Kavalga Island in 22 fathoms, sand and gravel bottom.

(1022) A bank with a least depth of 18 fathoms is between Kavalga Island and Unalga Island. Currents in this area are very strong; dangerous tide rips develop when the sea or wind and current are opposed. The waters are extremely dangerous for small boats; under extreme conditions the area may also be dangerous for larger vessels. Vessels using the pass should clear Kavalga Island and Unalga Island by not less than 2 miles.

(1023) **Unalga Island,** the westernmost of the central Delarof group, is 240 feet high, grass covered, rimmed with steep bluffs, and flat on top. The shore is fringed by rocks and reefs. Prominent are a 50-foot-high rock 0.5 mile NW of the island and **Dinkum Rocks,** 0.8 mile SW of the island.

(1024) **Gareloi Island,** the northernmost of the Delarof group and 20 miles W of Tanaga Island, is almost circular and about 5 miles in diameter. **Mount Gareloi,** a 5,160-foot active volcanic crater, is near the center at the summit of the island; a smaller peak is S of the summit. The land slopes steeply to the summit, except near the NW side where the slopes are more gradual. The island consists of lava rock, black lava, eroded lava, and ashes; the lower slopes and valleys are covered with grass and tundra in many places. The shores have steep cliffs with rocks and boulders at the base; boulders, pinnacles, and rocks awash extend around the shoreline. Heavy kelp surrounds most of the island, and extends offshore to 10 fathoms. Depths of 10 fathoms or more are within 0.5 mile of the island.

(1025) A trapper's hut is on the beach above the N shore of Gareloi Island. In moderate weather the survey ship anchored off the lee shore in the bight on the SE side, 800 to 1,000 yards offshore, in 25 to 35 fathoms. The current velocity is about 0.5 knot off the SE shore and sets NE and SW.

(1026) **Local magnetic disturbance.**–Differences of as much as 7° from normal variation have been observed on Gareloi Island SE of Mount Gareloi.

(1027) **Ulak Island** and **Amatignak Island,** 3 miles apart, are the southernmost of the Delarof group.

(1028) Ulak Island is irregular in shape, 6 miles long, and over 3 miles wide at the center. There are two high points on the island, one on the ridge near the N shore and the other toward the S part of the island. Numerous rocks and islets border the island; several reefs are close to shore and near the off-lying rocky islets. Strong currents and tide rips have been observed as far as 3 miles SE of the island. **Pratt Cove,** on the W side of the island, can be used as an emergency anchorage; currents are noticeable and the bottom is rocky. **Patton Cove,** on the S coast, is a good anchorage for N and NW weather; there is very little current and the bottom is sandy.

(1029) **Tanadak Island,** 1 mile off the W coast of Ulak Island, is low and not prominent. A prominent 30-foot rock is 0.2 mile NW of the island. The survey ship used an anchorage 0.7 mile E of the island.

(1030) **Ulak Pass,** between Ulak and Amatignak Islands, is 3 miles wide and has depths of 35 fathoms or more. The current velocity is over 2 knots in the pass and sets NW and SE. A midchannel course should be followed to avoid the rocks and islets near the shores of the islands.

(1031) **Amatignak Island,** the southernmost of the Aleutian Chain, is within 40 miles of the Seattle-Yokohama composite course. The rugged island is 5 miles long and 3 miles wide; the high tundra-covered hills and bare ridges and mountains of the interior rise to a height of 1,875 feet. The shores are generally steep and fringed with rocks; the W and NW coasts are steep-to.

(1032) **Knob Point,** a peninsula with a conspicuous knob-shaped hill, is on the E side of Amatignak Island. **Ulva Cove,** just N of Knob Point, is used as a small-boat

anchorage. The survey ship anchored off the entrance in 25 fathoms. Protection is fair from W and SW gales except when there is a S and SE swell from the Pacific. A boulder beach is in back of the cove and a trapper's cabin is on the small flat area at the head. A prominent waterfall is 1 mile N of the cove.

(1033) **Nitrof Point,** a rocky peninsula at the S end of Amatignak Island, is narrow and steep with conspicuous off-lying pinnacles. A rock awash with frequent breakers is 0.5 mile SSW of the most S pinnacle rocks. A foul area extends 0.6 mile offshore midway between Nitrof and Knob Points.

(1034) The W coast of Amatignak Island is very broken with prominent pinnacle rocks, steep cliffs, and small coves; rocks awash fringe the shore. A prominent 170-foot dome-shaped pinnacle off the NW coast makes a good landmark. A small deep cove on the NW coast affords the best protection for landings on the W side of the island.

(1035) **Amchitka Pass,** between the Delarof Islands and the Rat Islands, has a least width of 50 miles and depths of 49 to over 1,000 fathoms. The islands on both sides of the pass should be cleared by at least 5 miles. Heavy tide rips have been observed off the E end of Amchitka Island. The pass is dangerous in heavy weather, particularly for small and medium craft; currents appear erratic in direction and velocities may be strong. This may account for reports of very large seas and strong tide rips.

(1036) **Chart 16440.**–The **Rat Islands,** between Amchitka Pass and **Buldir Island,** are a group of six large islands and several smaller ones covering an area of 60 miles N-S and almost 150 miles E-W. Strong williwaws frequently occur on the leeward sides of the N islands during periods of light to moderate breezes on the windward sides. Areas of clear weather are often found on the leeward sides during periods of heavy fog.

(1037) **Chart 16460.–Semisopochnoi Island,** the northeasternmost of the Rat group, has a N-S length of 9.5 miles and an E-W width of 11 miles. The numerous rugged ridges and peaks, 1,200 to over 4,000 feet high, surround an interior valley with a small lake 300 feet above sea level. Most of the peaks or cones have deep craters and appear flat-topped from offshore. The shore is almost entirely steep cliffs or bluffs fringed with a narrow, rough, boulder beach; kelp is alongshore. Dangers are within 400 yards of the shore, but the island should be cleared 1 mile or more. The W current velocity is about 1 knot and the E current about 1.5 knots, but a 3-knot current may be encountered at times. The currents are usually accompanied by tide rips off the points.

(1038) **Sugarloaf Head,** at the S end of Semisopochnoi Island, is a rounding, low, irregular, rocky point forming the S base of a 2,870-foot snow-capped conical peak which has a prominent secondary conical crater 1,620 feet high on its S slope. The small bight just E of the head has a section of sloping sand beach which is fronted by several lines of breakers. Two small bights with sloping boulder beaches are about 1 and 2 miles W of the head.

(1039) The valley drains to the SE coast of the island between Sugarloaf Head and a jagged ridge with twin pinnacles more than 3,000 feet high to the NE. E from the lake area, a low pass 600 to 800 feet high leads between steep cliffs to a broad grass-covered valley at the head of a small bight S of **Pochnoi Point,** the E end of the island. The point is broad, somewhat flat, and terminates in sheer rock cliffs about 300 feet high. A small stretch of sloping sand beach at the head of the bight is the best landing place on the island, but it is fronted by a small sand bar about 25 yards offshore.

(1040) **Petrel Point,** the N end of the island, has a prominent waterfall on its NW tip that makes a sheer drop from the top of the bluff. Two small bights with sloping boulder beaches are about 2 and 4 miles along the shore SE of Petrel Point.

(1041) NW of the lake area, the old crater wall rises steeply to a ridge with two prominent cones. **Tuman Point,** at the W end of the island, is faced with steep bluffs. A prominent triangular-shaped face of a 1,200-foot peak that drops steeply to the shore is 1.5 miles E along the N shore of the point. A sloping boulder beach is about 2 miles E of the point. In the broad but slight bight just S of Tuman Point are small stretches of sloping sand beach, but they must be approached through heavy kelp growing on large boulder rocks.

(1042) The best anchorage at Semisopochnoi Island is 1 mile offshore between Tuman Point and Petrel Point in 18 to 22 fathoms, sand and gravel bottom. This is inshore of the strength of the current, the approach is unrestricted, and it is well protected from most directions. Good anchorage is available in the center of the bight S of Pochnoi Point in 15 to 22 fathoms, sand bottom; it is free of tide rips and the current that prevails around the point. A fair anchorage is 1 mile offshore midway between Pochnoi Point and Petrel Point in 27 fathoms, sand bottom; current is about 1.5 knots. Another fair anchorage is 2 miles W of Sugarloaf Head in 25 to 30 fathoms, sand and gravel bottom.

(1043) **Local magnetic disturbance.**–Differences of as much as 7° from normal variation have been observed near Sugarloaf Head on Semisopochnoi Island.

(1044) **Petrel Bank,** that extends about 30 miles NE from Semisopochnoi Island, is 16 to 20 miles wide within the 100 fathom curve. The high point on the ridge, covered 21 fathoms, is 15 miles NE of the island. A narrow ridge that extends 30 miles NE of Petrel Bank has ridges of 38 and 48 fathoms. The tidal current on Petrel Bank is rotary, turning clockwise. (See the Tidal Current Tables for predictions for Petrel Bank.)

(1045) **Chart 16012.–Bowers Ridge** extends N and W from Petrel Bank in a circular direction for nearly 250 miles. The ridge between the 1,000 fathom curves is 30 to 35 miles wide and contains several well-defined ridges. **Bowers Bank,** about midway along the ridge, had a least depth of 6 fathoms reported in 1971.

(1046) **Chart 16440.–Amchitka Island,** 27 miles SW of Semisopochnoi Island, has a NW-SE length of 34 miles and a greatest width of 4.5 miles. The SE part is very low, the highest point being 351 feet. The NW section is hilly and much higher, with peaks rising to 1,200 feet. The high land levels out toward the middle of the island to a low, rolling tundra and flat tableland. Many lakes and ponds are on the S half and a portion of the N half of the island. Most of the coast is fringed with reefs and extensive kelp beds. The shores are generally steep with many off-lying covered rocks, especially on the N shore and the E part of the S shore. Vessels should stay outside the 50-fathom curve, up to 4 miles off the N shore and 7 miles off the S shore, unless proceeding to anchorage. Weak tidal currents have been observed along the S side of the island.

(1047) In December 1986, Amchitka Island and the nearby surrounding waters were closed to the public. The island is a military reservation. (See **50 CFR 36.39**; not carried in this Coast Pilot.)

(1048) **Local magnetic disturbance.**–Differences of as much as 5° from the normal variation have been observed on Amchitka Island.

(1049) **South Bight,** 3 miles W of **East Cape,** is an excellent anchorage on the S coast of Amchitka Island, offering shelter during N weather.

(1050) **Chart 16446.–Constantine Harbor,** on the N side of Amchitka Island 6 miles W of East Cape, provides a fair anchorage. Because there are no prominent features on the island, caution is necessary to avoid mistaking other indentations for Constantine Harbor.

(1051) The S side of Constantine Harbor entrance is foul for 0.5 mile offshore. On the N side a reef, covered less than 2 fathoms in places and marked by heavy kelp, extends almost 1.5 miles E of **Kirilof Point.** The head of the harbor is a sand beach; other shores are rocky bluffs.

(1052) Currents in the entrance to Constantine Harbor are strong and set across the narrow entrance channel. N to NE gales may force vessels anchored in the harbor out to sea. The harbor is reported free of williwaws.

(1053) **Local magnetic disturbance.**–Differences of as much as 5° from the normal variation have been observed in Constantine Harbor.

(1054) The 0.2-mile-wide channel between the reefs at the entrance can be made on course **235°**; depths are 20 to 30 fathoms. Once inside anchorage is available in 6 to 20 fathoms, fair holding ground in sand and shell bottom.

(1055) **Kirilof Wharf,** on the N side of the harbor, has nearly 900 feet of berthing space with 42 feet or more alongside. Vessels at the wharf are likely to surge when N swells are running in the Bering Sea. The wharf is untenable when a heavy swell is entering the harbor from the NE. The piers at the head of the harbor are in ruins. Two mooring buoys, for cargo barges and small vessels awaiting berthing space at the wharf, have been established in Constantine Harbor; one about 525 yards E of Kirilof Wharf and the other in the SW part of the harbor.

(1056) **Chart 16440.–Kirilof Bay,** on the N side of Amchitka Island 8.5 miles W of East Cape, is suitable only for small boats. Breakers have been reported to run across the entire entrance to the bay.

(1057) **Chitka Cove,** 24 miles NW of East Cape, affords good protection from S and W weather. The approach is clear except for a 3-fathom shoal 0.7 mile NW of **Chitka Point.** Anchor 0.7 mile offshore in 18 to 20 fathoms with good holding ground in sand bottom.

(1058) Good protection from S winds can be had 0.7 mile offshore 1.5 miles E of **Bird Cape,** the NW end of the island. The anchorage is midway between a kelp patch off the E side of the cape and a rock awash off the first small point to the E of the cape in 20 to 23 fathoms, sand bottom Enter on course **170°**, heading for a prominent 50-foot-high pinnacle rock.

(1059) Protection from N and NE winds can be had about 1 mile offshore 12 miles along the S coast of Amchitka Island from **Aleut Point,** the W end of the island. The anchorage is midway between two prominent rocks in 17 to 20 fathoms, sand bottom. Enter on a N course.

(1060) **Oglala Pass,** between Amchitka Island and Rat Island, is almost 10 miles wide; depths of 21 to over 30 fathoms can be carried through the middle of the pass. The current is somewhat rotary, turning clockwise. A 4-knot current has been measured in the middle of the pass; greater velocities may be experienced. Currents exceeding 7 knots have been encountered 1.5 miles NW of Amchitka Island. (See the Tidal Current Tables for predictions for Oglala Pass.) During moderately heavy S weather, heavy tide rips extend across the pass at maximum ebb and attain heights of 30 to 40 feet under storm conditions. The pass should not be attempted by small vessels during S weather when the current is ebbing strongly.

(1061) **Little Sitkin Island,** 32.5 miles W of Semisopochnoi Island, has a N-S length of 5.5 miles and an E-W width of the same distance. The interior is extremely rugged and mountainous; only the lower slopes are grass covered. There are two prominent peaks, one 3,897 feet high in the NE part, and the other 1,960 feet high in the S part. Numerous streams are on the island but no lakes or ponds. The coast is generally bold, rocky, and precipitous, with a fringe of kelp 200 to 400 yards wide. A bank with a least depth of 10 fathoms extends about 1 mile off the N shore. No dangers are more than 600 yards from the beach. (See the Tidal Current Tables for predictions.)

(1062) The sloping beach in the bight 1 mile E of **Prokhoda Point,** the S end of the island, is abrupt and composed of large, irregular boulders. Temporary anchorage, protected from W and NW winds, can be had 0.5 mile offshore 1.5 miles NE of Prokhoda Point in 22 to 25 fathoms, sand bottom.

(1063) A good anchorage in SW weather is 600 yards offshore 2 miles NW of **Pratt Point,** the E end of the island, in 20 fathoms, sandy bottom.

(1064) An anchorage protected from S swells in 0.7 to 1 mile offshore just E of **Patterson Point,** the N end of the island, in 20 to 25 fathoms, sand bottom. However, the williwaws off the island reach gale force with only a moderate SW wind and currents setting around the island cause tide rips.

(1065) Anchorage in **Williwaw Cove,** just W of Patterson Point, is not recommended. The beach at the head is flat and sandy, but bordered by several lines of breakers.

(1066) The sloping beach at the head of **William Cove,** 2 miles W of Patterson Point, is abrupt and composed of large, irregular boulders. Small steam jets and hot springs are in the valley at the head of the cove.

(1067) Small craft can anchor in the bight just N of **Sitkin Point,** the W end of the island, but strong williwaws are prevalent in E or NE weather. A large prominent tan-colored bluff is at the head of the bight.

(1068) Anchorage protected from the NE is 0.5 mile offshore in 25 to 30 fathoms, 0.7 mile SE of a prominent 100-foot islet about 1 mile S of Sitkin Point. The anchorage is fair in moderate NW and E winds.

(1069) **Little Sitkin Pass,** between Little Sitkin Island and Davidof Island, is 3 miles wide with depths of 48 fathoms or more in the middle part. Moderately heavy tide rips occur in the pass during the strength of the tidal current.

(1070) **Rat Island Pass,** between Rat Island and the group of islands to the N, is 8 miles wide and has depths of more than 50 fathoms through a 4-mile middle width. Currents in the pass are moderate; some set may be expected opposite Little Sitkin Pass and Khvostof Pass. (See the Tidal Current Tables for predictions.)

(1071) **Chart 16441.–Rat Island,** 12 miles NW of Amchitka Island, is 8 miles long with a greatest width of 2 miles. The interior is rugged and mountainous, and the shores are rocky. Most of the N coast is precipitous and fringed with reefs; small islets and a reef extend 2 miles SE from **Ayugadak Point,** the E end of the island.

(1072) **Gunners Cove,** about midway along the N side of Rat Island, has depths of 1 to 12 fathoms, but is not suitable for anchorage. The bottom is smooth rock and the wind funnels through the cove. A prominent 50-foot cataract is at the head of the cove.

(1073) Protection for small vessels in W weather is available off the entrance to Gunners Cove in 17 fathoms. Rocks and reefs on both sides of the cove restrict the swinging room.

Larger vessels can anchor farther off the cove in 28 fathoms, sand bottom. The anchorage on the SW coast of Little Sitkin Island offers protection from NE weather.

(1074) Fair anchorage during S weather can be had 2 miles E of **Krysi Point,** the W end of Rat Island, in 28 fathoms. The slope between the 20- and 30-fathom curves is less abrupt at this anchorage than elsewhere along the N coast; however, the bottom is irregular inside the 20-fathom curve.

(1075) A good anchorage in N and E weather is 1.2 miles offshore midway along the S coast of Rat Island in 17 to 25 fathoms. The anchorage is 0.8 mile NW of the offshore group of rocky islets, 20 feet high, that is the dominant feature along this coast. Approach the anchorage from the SW, passing 0.6 mile W of the islets.

(1076) **Davidof Island,** 7.5 miles N of Rat Island, is irregular in shape with a N-S length of 2 miles and a greatest width of 0.7 mile. The high point in the S part is 1,074 feet and the summit in the N part is 922 feet high. The projecting E point of the island is marked by a prominent cone-shaped grayish-tan summit. An islet and a knife-edged pinnacle are close off the N end of the island.

(1077) **Khvostof Island,** 1 mile NW of Davidof Island, is 1.5 miles long and 0.8 mile wide. The interior is rugged and mountainous; the highest peak of 870 feet is in the W part. Prominent twin rock pinnacles are close off the N end of the island, and a low flat rock is 700 yards off the NW shore. A 1½-fathom shoal is 0.4 mile off the N point of the island.

(1078) The passage between Davidof Island and Khvostof Island is partially blocked by small and rugged **Pyramid Island.** The openings on either side of Pyramid Island are narrow and foul, and have extremely heavy kelp. The blocked passage helps protect **Crater Bay,** NE of Pyramid Island from SE to SW weather. Use of Crater Bay is restricted by a 2½-fathom shoal 0.6 mile N of Pyramid Island. The part of the bay between Pyramid Island and Davidof Island is clear but too deep for anchorage except close under the shore of Davidof Island, where small craft can find excellent protection. Small craft can also anchor, with limited swinging room, close under the NE shore of Khvostof Island. Large vessels can anchor, free from tidal current, just inside the 30-fathom curve midway between the N end of Khvostof Island and the knife-edged pinnacle off the N end of Davidof Island.

(1079) **Khvostof Pass,** between Khvostof Island and Segula Island, is deep and clear and may be navigated without difficulty. The pass is subject to heavy tide rips at strength of spring currents, especially with moderate breezes from any direction.

(1080) **Segula Island,** 10 miles NW of Rat Island and the most W of the group on the N side of Rat Island Pass, has a N-S length of 4 miles and an E-W width of 3.6 miles. The island is a lone crater-topped mountain, rising to 3,784 feet. A prominent deep fissure is on the S face of the mountain. Just W of the break is a broad, grassy slope that extends to the rocky bluff midway along the S shore.

(1081) **Iron Point,** on the SE corner of the island, is a narrow, grass-covered, rock bluff 72 feet high; foul ground, marked by kelp and a breaker, extends 500 yards from the point. **Gula Point,** the northernmost tip of the island, is low, narrow, and grass covered. A distinctive dark, round-topped hill is at the end of the long ridge E of the small cove on the N side of the island, W of Gula Point. The cove entrance is nearly closed by reefs.

(1082) On the S side of **Zapad Head,** at the NW corner of the island, a prominent grass-covered slope rises gradually from the gravel beach of a small bight; protected anchorage for small craft is afforded in the bight during moderate NE to SW weather.

(1083) A line of high, steep pinnacles extends W from **Chugul Point,** at the SW corner of the island. Between Zapad Head and Chugul Point irregular bottom, marked by heavy kelp, extends 800 yards offshore.

(1084) **Segula Pass,** between Segula Island and McArthur Reef, is wide, deep, and clear. Courses through the pass should be shaped to clear Segula Island by at least 1 mile and McArthur Reef by at least 2 miles.

(1085) **McArthur Reef,** 8 miles W of Segula Island and about the same distance E of Kiska Island, is a **menace to navigation.** The reef is about 0.8 mile in diameter, it does not uncover, and it does not break continuously even in a moderate swell at low water. The reef is not readily visible except close aboard, and then can be identified only by a small area of slick water surrounding kelp.

(1086) **McArthur Pass,** between McArthur Reef and Kiska Island, is deep and clear and can be navigated without difficulty.

(1087) **Krysi Pass,** between Rat Island and Sea Lion Rock, has a jagged ridge covered in some places with only 2 to 4 fathoms that extends across it. (See the Tidal Current Tables for predictions.) The pass is not recommended.

(1088) **Sea Lion Rock,** 9 miles WNW of Rat Island and 8 miles ESE of Tanadak Island, is less than 200 yards in extent and is about 10 feet high. A thick kelp bed around the rock extends 2 miles E and the same distance W.

(1089) **Sea Lion Pass,** between Sea Lion Rock and Tanadak Island, has depths of more than 20 fathoms over a 2-mile width near the middle. Sea Lion Rock is an uncertain target except in calm weather. Tide rips dangerous to small vessels may occur in the pass during spring tides. Tidal currents of 4 knots have been observed. (See the Tidal Current Tables for predictions.)

(1090) **Kiska Island** is about 600 miles W of Unalaska Bay and is the most important of the Rat Islands because of its well-sheltered anchorage. It is about 22 miles long and varies in width from 1.5 to 6 miles. The island is very rugged and mountainous, the N end being dominated by **Kiska Volcano.** The crater of the volcano has two tips, the W and slightly higher being 4,004 feet high. Immediately S of the volcano is a low valley about 2 miles wide in which are several salt water lakes. The valley extends nearly across the island from a long, low stretch of shoreline on the W coast, and a narrow draw leads over a low ridge at the head of the valley to a small steep-to sand beach on the E coast.

(1091) Flat-topped, boulder-strewn ridges rise to over 1,000 feet between the lake area and Kiska Harbor. A low, narrow pass cuts across the island from the SW corner of Kiska Harbor to a small, foul bight on the W coast. S of this pass, sharp, rugged ridges 1,500 to 1,700 feet high extend to the SW corner of the island. These ridges are precipitous on their W sides, but slope gradually on their E sides to the shore of Vega Bay. The valleys and lower slopes of the island are covered with tundra and grass, while the higher parts are generally bare and strewn with boulders, especially the ridges N of Kiska Harbor.

(1092) The shores of Kiska Island are mostly rocky and steep and bordered in many places by covered and uncovered rocks. Kelp fringes most of the island. Kiska Harbor and Vega Bay are the two principal indentations of the coast.

(1093) **Naval Defensive Sea Area and Airspace Reservation.**–Under the authority of Executive Orders 8680 of February 14, 1941 and 8729 of April 2, 1941, Kiska Island is a designated Naval Defensive Sea Area and Airspace Reservation. Restrictions imposed under the authority of the above

executive orders have been suspended subject to reinstatement without notice at any time that the interests of national defense may require such action.

(1094) **Sirius Point** is a jutting rock ledge at the N tip of Kiska Island, and the coast for more than 2 miles in either direction is formed of irregular, steep, rock cliffs and minor points. Deep water extends to within 0.5 mile of the shore. The sharp rocky point at the NE corner of the island is topped by a grass-covered hill conspicuous from the NW and SE.

(1095) In 1965, a volcanic outgrowth was observed making out from shore for a distance of 0.3 mile on the west side of Sirius Point.

(1096) **Pillar Rock,** 118 feet high, is a perpendicular rock of remarkable form 9 miles W of Sirius Point and 6.6 miles from the nearest part of the island. **Sturdevant Rock,** covered about 7 fathoms, is 3 miles 282° from Pillar Rock.

(1097) **Northeast Rocks,** with a high point of 115 feet, and **Haycock Rock,** a lone 113-foot pinnacle 1 mile to the S, are 0.4 mile off the coast E of the volcano. These rocks mark the outer limits of an extensive foul area and are excellent landmarks for visual or radar navigation. Behind Northeast Rocks is a prominent red bluff which is frequently visible when the other parts of the island are obscured by low clouds or fog.

(1098) Between Haycock Rock and Sredni Point, 2.5 miles to the SW, is **Sredni Bight,** an open bight that affords good shelter from NW weather in 15 to 20 fathoms, sandy bottom, 0.7 to 0.9 mile from the beach. The anchorage may be entered on a course of **285°,** heading for the end of the bluff that marks the S side of the small, sandy beach at the head of the bight. Moderate williwaws may be expected, and swells enter the anchorage after a storm in the Bering Sea.

(1099) **Sredni Point** is sharp, sheer, and high. SW from the point to Reynard Cove and Salmon Lagoon, the high cliffs are bordered by detached pinnacles, rocks awash, and submerged rocks. This section of coast should not be approached closer than 1 mile.

(1100) **Reynard Cove,** 2 miles SW of Sredni Point, is blocked by a reef that extends nearly the entire width just inside the entrance.

(1101) **Salmon Lagoon,** 2 miles SW of Reynard Cove and the same distance N of Kiska Harbor, can be entered with a pulling boat at high water, but the channel through the low, sand, outer beach is sometimes closed and often shifts position.

(1102) Kiska Harbor and Little Kiska Island are discussed later in connection with chart 16442.

(1103) In general, the waters adjacent to the Pacific side of Kiska Island, from Little Kiska Island to Cape St. Stephen, are irregular in depth. Broken bottom, within the 30-fathom curve, extends 1.5 to 2 miles offshore. Submerged pinnacles rise in deep water in Vega Bay, off Sobaka Rock, and off Cape St. Stephen. The several small bays and coves between South Pass and Vega Bay are unsuitable for anchorage.

(1104) **Vega Bay** is a broad indentation between **Bukhti Point** and **Vega Point.** The W part of the bay has irregular bottom, with a 2¼-fathom shoal 1 mile 070° from Vega Point. The rest of the bay is clear except for inshore rocks. In N or W weather, good anchorage can be found in 22 to 30 fathoms, sand bottom, off the entrance to **Gertrude Cove** in the NE corner of the bay. A pair of gray pinnacles on the shore W of the cove bears 000° from the anchorage. The cove is a good anchorage for small vessels in all except SW weather.

(1105) **Sobaka Rock** is 1.4 miles 155° from Vega Point. About 2.4 miles due W of the rock is a 2½-fathom shoal. Because of possible set by currents, particular care is necessary to avoid this shoal in rounding the S end of Kiska Island. Heavy tide rips occur in this area.

(1106) **Dark Cove,** small and shallow, is on the SW side of Kiska Island just E of Cape St. Stephen. When the weather is rough outside, small boats have been able to land safely in the NE corner of the cove. Landing is impracticable with a swell from the SSW.

(1107) **Cape St. Stephen,** the southwesternmost point of Kiska Island, should be passed no closer than 3.5 miles to avoid broken ground in the area of the 8-fathom shoal 1.8 miles 230° from the S tip of the cape. Heavy tide rips occur in this area at strength of current.

(1108) From Cape St. Stephen, the shoreline, that extends about 15 miles in a NE direction to Witchcraft Point, is in general steep and rocky and indented by several small bights. Deep water extends to within 0.5 to 0.8 mile of the shore for the first 12 miles. Several pinnacle rocks and rocks awash fringe this part of the coast.

(1109) A prominent line of high rock pinnacles extends 700 yards offshore from **Witchcraft Point** on the NW side of Kiska Island. S of Witchcraft Point low grass-topped bluffs, interrupted by the valleys of two stream beds, extend 2.7 miles to **Conquer Point,** a sharp and sheer rocky point at the foot of a razorbacked hill about 965 feet high. A 2¾-fathom shoal is about 0.5 mile WNW, and two reefs with depths of 4 and 6 fathoms are about 1 mile off the latter point.

(1110) Temporary anchorage for small boats can be had in the small bight on the S side of the razorback, having due regard for charted dangers. The bight has a sand beach.

(1111) Anchorage, protected from moderate NE to SE breezes and swells, can be found in 25 fathoms, sand bottom, 0.8 mile off the coast 1.1 miles S of Witchcraft Point. The anchorage should be approached on a course of **110°,** heading for the small valley about midway between Witchcraft Point and the razorback to the S. In this anchorage Witchcraft Point is on range with Vulcan Point.

(1112) A low sand and gravel beach, with a prominent grass-topped knoll about midway of its length, extends 2.5 miles NE from Witchcraft Point. Then begins a rock cliff coast that extends 1 mile N to **Vulcan Point.** NE from Vulcan Point to Sirius Point, a distance of 3 miles, the coast is rocky and steep with deep water close to shore.

(1113) A reef, covered 5 fathoms, extends NW from Witchcraft Point for 2 miles toward Pillar Rock, then E to a point inshore about 2 miles S of Vulcan Point. Heavy kelp marks the reef in the summer, and extremely large tide rips occur in the area at strength of current, especially during spring tides. It is not advisable to approach the reef closer than the 30-fathom curve. Small craft passing between the reef and Pillar Rock should do so when the currents are near slack, which periods occur approximately at the same time as in Krysi Pass.

(1114) **Chart 16442.–Kiska Harbor,** midway along the E shore of Kiska Island, is formed by a small peninsula to the N which terminates at **North Head,** and a broad peninsula to the S which is separated from Little Kiska Island by South Pass; **South Head** is the NE point of the lower peninsula. The harbor proper is roughly circular with a 1.3-mile diameter, although anchoring depths extend an additional 0.5 mile to E. The NE and S sides are rocky cliffs; the entire W side of the harbor is low and sandy except for several ridges that extend to the water's edge. A low valley opening out at about the middle of the W shore extends well back into Kiska Island. A low ridge parallels the N shore at a distance of about 0.5 mile.

(1115) Depths do not exceed 17 fathoms inside a line between North and South Heads. The 10-fathom curve is 0.3

to 0.5 mile off the shores. Caution is necessary in anchoring to avoid fouling with the many wrecks and other obstructions in the harbor. The masts of one derelict show above water in 15 fathoms near the center of the harbor, and a 2¾-fathom obstruction is just inside the 10-fathom curve off the W shore.

(1116) **Anchorage** is recommended in the central part of the harbor in 13 fathoms 0.7 mile 185° from North Head. Shelter from NE to NW weather can be found in 15 fathoms 700 yards 150° from the outer end of the main wharf. The bottom is hard sand with fair holding qualities.

(1117) The diurnal range of **tide** is 3.6 feet in Kiska Harbor. (See the Tide Tables for predictions.)

(1118) The shortest **route** to Kiska Harbor from Seattle with the best visibility is via Unimak Pass and the Bering Sea. From San Francisco the shortest distance is via Chugul Pass and Asuksak Pass, 20 miles E of Adak Island, thence N of the Aleutian Islands to Kiska Harbor; however, a direct route through Amchitka Pass and Rat Island Pass is only a few miles farther. Oglala Pass can also be used for the approach from the S. Offshore dangers in the approach to Kiska Harbor are McArthur Reef and the 4-fathom rock 1.3 miles N of Tanadak Island.

(1119) A ship pier and a small-craft pier are on the N side of Kiska Harbor. The ship pier extends 500 yards out from the shore in a SE direction and can berth a large vessel on either side of the outer end. Depths along this part of the pier decrease from 36 feet at the offshore end to 28 feet at a point 400 feet inshore. As depths shoal gradually, smaller craft may berth inshore of the ship's berth.

(1120) The small-craft pier NE of the ship pier is 450 feet long and will berth medium-sized craft up to 12 feet in draft. Depths of 15 feet are at the outer end and 12 feet about 100 feet inshore.

(1121) **Little Kiska Island,** 0.5 mile E of South Head on Kiska Island, is 3.2 miles long and 1 mile wide. The island is low and rocky, the highest point being 430 feet. The shores are, in general, rocky and often precipitous, although there is a small stretch of low beach facing on South Pass. The coasts in most places are fringed by covered and uncovered rocks; a group of islets or rocks extend about 700 yards from the W end of the island.

(1122) Anchorage with fair protection from the N can be found in 20 fathoms, irregular rocky bottom, S of the center of Little Kiska Island. The highest peak, with two knobs at the summit, should bear due N.

(1123) **South Pass,** between Kiska and Little Kiska Islands, is a narrow approach to Kiska Harbor from the SE. **Twin Rocks** is a group of small islets on the W side of the S entrance. A 2-fathom rock that breaks in rough weather, 1.2 miles NE of Twin Rocks, is a danger to vessels approaching the pass from the S.

(1124) A 100-yard wide channel with a swept depth of 24 feet is between a pinnacle covered 11 feet 230 yards NE of South Head and the near shore. E of this narrow channel, kelp patches show across South Pass to Little Kiska Island during slack water. Only light-draft vessels with local knowledge should use South Pass.

(1125) The current velocity is 4 knots in South Pass, the flood setting N and the ebb S. The ebb current is particularly strong S of the pass.

(1126) **Tanadak Island,** 2.7 miles E of Little Kiska Island and 8 miles W of Sea Lion Rock, is a small grass-covered plateau; cliffs rise from the water's edge or close behind it. Foul ground extends for more than 0.5 mile from the shores; irregular depths of less than 10 fathoms extend 4 miles SE of the island.

(1127) **Tanadak Pass,** between Tanadak and Little Kiska Islands, is 2.5 miles wide but is full of shoals with depths of 2 to 9 fathoms. A 225-yard-wide channel with a least depth of 12 fathoms is 0.6 mile W of a prominent 20-foot rock, the most W of those off Tanadak Island. A current velocity of 2.8 knots has been measured in the pass. Tanadak Pass is not recommended for deep-draft vessels.

(1128) **Caution.**–Heavy seasonal growth of kelp completely fills Tanadak Pass and surrounds Little Kiska Island.

(1129) **Chart 16440.–Buldir Island** is an isolated island between Kiska Island and the Semichi Islands. This island forms an excellent landmark for the W Aleutians. The island is about 4 miles long and 2 miles wide, rugged and mountainous. The highest summit 2,150 feet, is on the S part of the island. Two lesser summits 2,013 and 1,768 feet, are on the NE end. High, steep landslides are along the E end and on the SW side. The shores, in general, consist of cliffs either rising from the water's edge or backing, narrow rock and sand beaches. The island is a bird refuge.

(1130) A chain of bold rocks and conspicuous islets extends 1.2 miles NW from Buldir Island. The outermost of the three islets is 442 feet high, dome shaped, and an excellent landmark. It can often be seen by vessels passing to the N when Buldir Island is obscured by fog or thick weather. Tide rips are generally in evidence along the submerged ridge that extends 1.8 miles NW from the islet, but no dangerous shoals or reefs are on the ridge.

(1131) At the E end of the island are several groups of rocks, the farthest being about 0.3 mile offshore. The S coast is foul alongshore and should be approached with caution. Other shores are less rocky. Heavy kelp nearly encircles the island and probably marks all inshore dangers. Vessels passing Buldir Island on any course should stay outside the 50-fathom curve.

(1132) The anchorage on the NW side of Buldir Island is the shallow bight formed by the island and the chain of rocks and small islets that extend to the NW. With the exception of the narrow valley opposite the anchorage, the slopes rise precipitously from the shoreline to the peaks. The sandy beach at the mouth of the valley affords the best landing on the island and a small stream empties into the bight at this point. Good anchorage, free from strong currents, can be found in 15 fathoms, sand bottom, with the middle of the beach bearing 170°. The anchorage affords adequate protection in fresh SE to SW weather but not in severe storms from any direction. Anchorage suitable for moderate E weather can be found in 15 to 20 fathoms 1 mile from shore just S of the chain of rocks and islets.

(1133) Extending SE from Buldir Island to Kiska Island is a submerged ridge which is marked by heavy tide rips. **Buldir Reef,** 18 miles along the ridge from Buldir Island, is about 5 miles long and 0.5 mile wide. The dangerous part of the reef includes two areas where breakers can be observed. The E area is estimated to have depths of 2 to 3 fathoms over it. The W area, covered 3 fathoms, is of considerable extent and marked by heavy kelp beds.

(1134) A depth of 2½ fathoms is about 14.5 miles ESE of Buldir Reef in 52°06.5'N., 176°45.0'E. Breakers 8 to 10 feet high and seaweed have been sighted in the vicinity of the 2½-fathom spot. In 1975, soundings of 13 fathoms were recorded within 100 yards of the 2½-fathom spot. A sonar evaluation indicated that this area may be a seamount about 300 to 500 yards wide. Mariners are urged to exercise caution in the area.

(1135) In June 1981, a 14-fathom spot was reported about 9.4 miles SSW of the 2½-fathom spot, in about 51°57'35"N., 176°39'48"E.

(1136) Currents up to 5 knots were encountered in the area of shoals between Kiska and Buldir Islands. The set was to the N or NE on the flood. NW of Buldir Island the set was always N. Currents are believed to be moderate except near shoals or islands.

(1137) **Middle Reef,** a rocky shoal covered 3 fathoms, is 22 miles S of Buldir Island; it is not marked by kelp. Thin kelp extends for 1 mile S of the reef and from the appearance of the area on the swell, depths of less than 3 fathoms probably exist.

(1138) **Tahoma Reef,** upon which the cutter TAHOMA was lost in 1914, is 33 miles S of Buldir Island. The main reef, which has an E-W length of 1.3 miles, breaks at the E end in a light swell, and for its entire length in a moderate swell. Kelp beds extend 1 to 3 miles from all sides of the reef. A current velocity of 1.5 knots was observed in the vicinity of the reef. (See the Tidal Current Tables for predictions.)

(1139) **Charts 16421, 16423.**–The **Near Islands** include the Semichi Islands and Attu and Agattu Islands.

(1140) The **Semichi Islands** are Shemya, Nizki and Alaid. Shemya Island, the easternmost of the group, is about 65 miles WNW from Buldir Island. Alaid Island, the westernmost, is about 16 miles E by S from Attu. The group trends WNW over a distance of 11.5 miles. The islands have numerous lakes, are covered with tundra, and are treeless. The shores are fringed with reefs and rocks, some as far as 1 mile offshore.

(1141) Currents estimated to exceed 1 knot occur E and W of the Semichi Islands and in the passes between them. S currents have been reported in the area between the Semichi Islands and Agattu.

(1142) **Ingenstrem Rocks,** 14 miles SE from the E end of Shemya Island, is a group of four visible rocks and several others that uncover. The highest and northernmost of the group is 9 feet high. The rocks are in an area about 350 yards in diameter.

(1143) Depths of 3 to 9 fathoms extend 2.2 miles SE from the 9-foot rock. This reef probably breaks along its entire length during heavy weather. Vessels should not approach the rocks closer than 3 miles on the SE, and 2 miles on the N and W.

(1144) **Charts 16436, 16423.–Shemya Island,** 3.8 miles long and 1.8 miles wide, slopes gradually from the shoreline on the S to a round bluff 250 feet high along the N shore. A 111-foot tall building is at the top of the bluff. An aero radiobeacon is at the W end.

(1145) The shoreline of Shemya Island is generally fringed with reefs except for a few short stretches of sand beach. Rocks, kelp, and shoals extend 0.6 mile N of the N point of Shemya. The outermost offshore danger is a 4¼-fathom shoal, 0.6 mile off the N shore. A danger zone extends 40 miles off the S shore of Shemya Island. (See **334.1290,** chapter 2, for limits and regulations.)

(1146) Several prominent rocky islets, highest 56 feet, are 0.7 mile off the NE coast of Shemya Island. About 0.3 mile NW of these islets is a rock covered 3 feet, which breaks much of the time. Foul area extends offshore to within 0.2 mile of the rocky islets. Between the outer end of the foul area and the islets is a channel which may be used by launches.

(1147) The waters for 1.2 miles E and S of the E point of Shemya Island are foul with visible and covered rocks; the area is marked by kelp. Shoals with depths of 9 fathoms or less and marked by kelp in the summer are 4 miles S and SSE of the point.

(1148) **Alcan Harbor,** on the NW side of Shemya Island, is protected on the E and S, somewhat protected on the W, and is wide open to N weather. When the seas are running, breakers can be seen along the submerged remains of a former breakwater which extends about 0.4 mile N from the point on the W side of the harbor. A wreck marks the end of the point and the submerged remains are marked by kelp. Several rocks are visible at low tide up to 100 yards N of the point; mariners are advised to exercise extreme caution in this area. On the W side of the harbor is a 333-foot sheet pile wharf with a 250-foot mooring face with a deck height of 23 feet and a depth of 27 feet alongside. In the middle of the harbor lies a wreck on a reef which is marked by kelp. Depths in the harbor cannot be relied upon because of the frequent changes, and vessels should be extremely careful of the natural and structural hazards. In September 1982, it was reported that a strong current had been observed to enter the harbor from the N, move in a clockwise direction around the head of the harbor, and exit W past the point. The diurnal range of tide is 3.4 feet in Alcan Harbor.

(1149) (See page T-8 for **Shemya climatological table.**)

(1150) The S side of Shemya Island is mostly fringed with reefs and rocks that extend as much as 1 mile off, but there are short stretches of sandy beach. **Skoot Cove,** 0.7 mile from the W end of the island, has depths of about 2 fathoms, and small boats may find shelter here when weather conditions prevent landings in Alcan Harbor. In 1970, it was reported that the submerged remains of a former breakwater extend about 100 yards seaward in a 150° direction from a point (52°43′00″N., 174°04′15″E.), on the W side of the cove. The cove has been used as a dump and is reported to be filled in N of 52°43′N.

(1151) **Hammerhead Island,** 55 feet high and 0.5 mile W of Shemya Island, is the southernmost of several small islands surrounded by foul ground near the middle of **Shemya Pass,** which is between Shemya Island and Nizki Island. The controlling depth through the passages on either side of Hammerhead Island is about 13 feet, but the E passage is the preferable of the two. During stormy weather or when swells are running high in the Bering Sea or the Pacific, heavy breakers are likely to be encountered in the passages.

(1152) **Chart 16435.–Nizki Island,** between Alaid and Shemya Islands, is 3 miles long and 1 mile wide, and is nearly connected to Alaid by a shifting sandspit. The island with a high point of 165 feet is lower than either Alaid or Shemya. The shoreline is very irregular and is fringed by numerous rocks, reefs, and kelp-marked shoals. Narrow channels between the reefs lead to small coves which provide shelter for small boats.

(1153) During NW to NE weather there is good protection in an anchorage 1 to 2 miles S of the narrow passage separating Nizki and Alaid Islands in 10 to 20 fathoms, hard bottom.

(1154) **Alaid Island** is 3 miles long and about 1 mile wide. The E part is low rolling tundra; the W part is made up of four hills, two of which are over 600 feet high. Most of the shoreline is rocky and fringed with reefs, but there are several bights that might provide anchorage for small boats in an emergency.

(1155) A dangerous 1-fathom shoal is 0.9 mile W of the W end of Alaid Island. Seas pile up on this shoal and much of the time it is marked by a breaker. Currents are strong in the vicinity and cause rips when the wind and sea are opposed. The deep channel between this shoal and the shore reefs may be used by launches under favorable conditions but is not recommended for large vessels.

(1156) **Chart 16421.–Attu Island,** the westernmost of the Aleutians, is 15 by 35 miles in extent and is indented by many bays and long inlets. The terrain is rugged and has practically no large level area. The bays on Attu Island offer a striking similarity. They are apparently formed by submerged valleys between mountain ridges. The heads of the bays are fed by streams which have carried down enough sand to give a good holding ground. The exception to this is Holtz Bay, which is rock and sand. At the head of each bay is a crescent-shaped, sand beach with a more or less high bank of sand across the middle. A course down the middle of the bay, with the exception of Massacre Bay, was found to be clear; all that have been investigated show deep water close inshore. Some have rocks along the shore but these are easily seen. Anchorages are in from 10 to 15 fathoms, sand bottom. The best method is to head into the bay until these depths are reached and anchor. At the heads of most of the bays are barabaras (huts) built by the Aleuts for use during the fur-trapping season.

(1157) **Currents.**–Strong currents may be encountered along the N coast of Attu Island, and while variable, the consensus seems to be that they follow strong winds and are noticeably affected by the weather. In calm weather the set is generally SE.

(1158) Survey operations in recent years have roughly defined tidal currents crossing the chain here, setting in a general NW and SE direction at the flood and ebb respectively, except as diverted by shoal and land areas. Slacks follow the times of local high and low water except for a lag at times as great as 1 hour.

(1159) **Chart 16432.–Chirikof Point** is the end of the long peninsula jutting E from Attu Island. This peninsula forms the N side of Massacre Bay and its approaches and the S side of Sarana Bay. It is mountainous and has several deep valleys running approximately N and S across it. Its shores are rock or boulders; it has rocky bluffs on the N shore, and like most of the land areas in the Aleutians, gentler slopes and fewer bluffs along the S shore. **Alexai Point,** midway along th S side of the peninsula, is flat and low with sand beaches in the E and W bights. Foul areas surround this point for 1 mile. The channel to Massacre Bay passes 0.8 mile SW of this point.

(1160) As a rule the peaks on Attu Island are clouded in and are of little use to the navigator in making a landfall. Peaks on the peninsula are no exception to this rule. The lower hills and summits on Chirikof Point are frequently clear when the peaks are cloud covered and consequently a landfall here is not as difficult. The end of the point is paralleled by a ridge of varying elevation, more or less crescent shaped, that extends from the SE to the NE extremities of the point. The highest part of this ridge is a peak 1,315 feet high, approximately at the center of the point (N and S). The ridge terminates at its NE end in **Buchanan Point,** a prominent knob and headland 320 feet high. To the S and SE of the summit, the ridge slopes down to a prominent 755-foot knob-topped hill and then drops still lower to a flat ridge carrying out E to the end of **McCloud Head.**

(1161) A prominent black islet, 10 feet high, is about 0.5 mile NNE of Buchanan Point. Low rock ledges, mostly bare at high water, make out in an E direction from the S part of the point. A fair anchorage in 15 to 25 fathoms, sand bottom, can be had in the bight between the two extremities of the point with good protection in SW to NW weather.

(1162) A 2-foot-high rocky islet is 2.4 miles ESE from McCloud Head. E, S, and SW of this islet for 0.8 mile are shoal areas of 7 to 10 fathoms. No dangers were found except close in to the islet, but the area should be avoided and the rocky islet approached no closer than 1 mile as the bottom is ragged and currents are strong. A safe channel exists W of this islet and 1 mile E of McCloud Head.

(1163) Reefs and kelp patches extend off the shoreline between Alexai Point and McCloud Head to a distance of 0.5 mile. Anchorage can be had under this shore inside the 20-fathom curve, having due regard for the charted foul areas. The bottom is hard, however. A prominent waterfall on this shore is about middistance between the two points.

(1164) **Massacre Bay,** on the S side of Attu Island 6 miles W of Chirikof Point, is 4 miles wide between Alexai Point on the E and **Murder Point** on the W, and recedes for about 3.5 miles in a N direction. Numerous shoal areas obstruct the bay but wire-dragged channels lead to the harbors. A radiobeacon is on the W side of Pyramid Cove.

(1165) **Caution.**–Earthquake activity, in 1975, in the Attu Island area has caused a bottom uplift of 4 to 7 feet at various locations in Massacre Bay. Until more complete information is developed, mariners are advised to exercise extreme caution as depths may vary from those charted and mentioned in the Coast Pilot.

(1166) Anchorage in Massacre Bay can be had in 10 to 20 fathoms; the bottom is volcanic ash and sand with some clay. The bay is protected on the N, E, and W by Attu Island, and in S weather heavy swells are broken up by off-lying reefs.

(1167) The diurnal range of tide is 3.3 feet in Massacre Bay. (See the Tide Tables for daily predictions.)

(1168) In 1967, it was reported that the piers at the head of Massacre Bay and in **Pyramid Cove** were in ruins at the surfline, and only the pier in **Navy Cove,** close NE of Pyramid Cove, was usable in this area. Numerous obstructions were reported to exist in Pyramid Cove and in the rest of the bay. Shallow-draft craft can tie up to dolphins behind the breakwater in the SW part of **Casco Cove,** which is midway between Pyramid Cove and Murder Point, 2.3 miles to the S.

(1169) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(1170) The Aleutian Islands are served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(1171) Vessels using Southwest Alaska Pilots Association pilots and en route to Navy Cove can meet the pilot boat about 1.3 miles S of Murder Point (52°47.7'N., 173°11.7'E.).

(1172) The pilot boat can be contacted by calling "NAVY COVE PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(1173) A U.S. Coast Guard loran transmitting station is maintained at Pyramid Cove. An airline calls at the landing strip near Massacre Bay.

(1174) **Chart 16433.–Sarana Bay** is 5 miles W of Chirikof Point and on the opposite side of the peninsula from Massacre Bay. From Buchanan Point to the head of Sarana Bay the shoreline is rocky and precipitous with few valleys of appreciable depth. Mountainous terrain carries abruptly to the water with few off-lying rocks or ledges except at the small points. The S side of the bay and approaches consist of rock bluffs with close inshore rocks and pinnacles. **Square Point,** 3.5 miles W of Buchanan Point, is difficult to identify as none of the numerous points in this locality are prominent; however, the waterfalls on either side of Square Point are fairly prominent.

(1175) The head of Sarana Bay and also Hodikof Bay are low sand beaches. At **Hodikof Point** rocky bluffs begin again and continue to Holtz Bay. A chain of rocks and reefs, including **Hodikof Island,** makes out about 1.2 miles E from

the small point at the N side of the inner bay. N of this chain of reefs is **Hodikof Bay.** A small-boat passage is W of Hodikof Island between Sarana Bay and Hodikof Bay. A low single-pinnacle rock, 4 feet high, is off the approaches to Hodikof Bay about 0.5 mile SE of Hodikof Point. About 0.7 mile ENE of Hodikof Point is an extensive area of irregular bottom with a least depth of 1½ fathoms, which breaks in a heavy swell.

(1176) Sarana Bay is not recommended as an anchorage except for medium and small craft, as a cable area extends through the middle of the bay and in the position of the only ship anchorage. Smaller craft may anchor N or S of this area depending upon weather conditions, or in Hodikof Bay. Also an emergency anchorage may be had along the shore W of Chirikof Point in not less than 15 fathoms but the bottom is hard and irregular and is subject to considerble current. Hodikof Bay seems to be the best anchorage for medium and small craft in this locality but it should be entered with suitable visibility. Approach on a W course, passing 400 yards S of the 4-foot rock off Hodikof Point. Anchor in the middle of Hodikof Bay in 10 to 12 fathoms, sand bottom. This anchorage is exposed to weather from the N around to the SE. SE to SW winds blow with considerable force in Sarana Bay, probably augmented in funneling through the passes across the peninsula. Their effect in Hodikof Bay is not known.

(1177) **Kelliher Cove** is a small bight 0.5 mile S of **Khlebnikof Point.** Small craft may obtain shelter from weather from S to NW. The shores are rocky except at the head of the cove which has a short gravel beach. The bottom is hard.

(1178) From inner Sarana Bay to Holtz Bay the coast is rocky but with gentle slopes back to the mountains in the interior. E of and close inshore from Khlebnikof Point are off-lying rocky islets, 5 to 15 feet high, that serve as landmarks when cruising close inshore. **Middle Peak,** 2,000 feet high, is the highest point between Sarana Bay and Holtz Bay, but is usually covered by clouds.

(1179) **Gibson Islands,** are on the N side of the entrance to Chichagof Harbor, the largest island is a flat-topped grass-covered island, 104 feet high. The smaller islets at the SE limits of this group are bare pinnacles. **Cooper Islands,** 0.5 mile W of Gibson Island, may be identified by the sheer pinnacle, 125 feet high, constituting the S half of the middle island.

(1180) **Kennon Island,** a 92-foot grass-covered island about 0.3 mile long, is at the NW side of the mouth of Chichagof Harbor. A narrow and shoal channel into the harbor is W of this island. **Middle Rocks** and **Inner Rocks** are low bare rocks 10 to 20 feet high. Middle Rocks are adjacent to and E of Kennon Island; Inner Rocks are adjacent to and S of the island. The main channel is SE of these rocks.

(1181) **Pisa Point,** on the S side of the harbor entrance, is a low point ending in a reef. **Pisa Tower** is a prominent leaning pinnacle 44 feet high on the point. A rock that uncovers is 140 yards N of the point.

(1182) **Chichagof Point,** between Chichagof Harbor and Holtz Bay, is reasonably flat and 300 feet high. The shores are rocky bluffs.

(1183) **Chichagof Harbor** is small in area, shoal, and holding bottom is poor, but it is well sheltered, although SE to SW winds appear to funnel through the valleys into the bay with augmented velocity. There is little or no current effect. The bay is about 0.7 mile wide and allows little swinging room except for small craft. About 18 feet at low water can be carried into the head of the harbor where depths are about 6 fathoms. Turns are sharp for medium craft. Fifteen feet is recommended as the maximum draft of vessels entering this harbor because of the concrete anchor clumps which stand 3 to 4 feet above the bottom. The bottom is mostly hard or gravel.

(1184) The head of Chichagof Harbor is a sand beach divided into two parts by a rocky point. Other shores of the bay are ledge or boulders. The N part of the bay, SW of Kennon Island, is shoal and is recommended for small craft only. In the central part of the bay is a relatively large area of depths from 15 to 18 feet, with scattered kelp. The channel is N and W of this area. The village of **Attu,** at the head of the bay, has been razed. There is a dock, suitable for small craft, on the SW side of the bay. Depths at the dock shoal from 10 feet at the outer end to 4 feet 50 yards inshore. A road leads across the island to Massacre Bay.

(1185) **Range Point** is 400 yards SW of Inner Rocks. A 2½-fathom spot is 200 yards N of Range Point.

(1186) The diurnal range of tide is 3.6 feet in Chichagof Harbor.

(1187) **Holtz Bay,** the first bay W of Chichagof Harbor, is the largest and the most spectacular on the N coast of Attu Island. It is a broad-mouthed bay thrusting deeply into the island and having bluff-bordered beaches backed by tundra-covered mountain masses on both sides.

(1188) The head of the bay is divided into two arms, separated by **Center Point,** a promontory about 500 feet high and having moderate, tundra-covered slopes. At the head of each arm is a broad sandy beach with low valleys beyond cutting back into the interior.

(1189) Holtz Bay is free from dangers except for inshore reefs. It may be entered on any course provided the shoreline is given a berth of at least 0.5 mile until the inner arms are reached. When 0.5 mile from Center Point and about abeam of a rocky islet off the W shore, take up a midchannel course down either arm. Anchor in 5 to 6 fathoms in **West Arm** and in 6 to 7 fathoms in **East Arm.** Vessels also anchor at the entrance to West Arm in 10 fathoms. The bottom in most of Holtz Bay is a fine gray sand, with shells and some boulders. The holding properties are fair.

(1190) Holtz Bay offers protection from S and W weather, but strong winds may draw up through the passes, especially in the fall and winter. One vessel reports having had an excellent lee from strong W winds when anchored in 17 fathoms in the central part of the bay about 0.6 mile off Center Point. The bay is wide open to storms from the N and E.

(1191) **Chart 16421.**–W of Holtz Bay the N coast of Attu Island is precipitous, rugged and fairly straight for 7 miles. A number of reefs and rocks, all less than 0.3 mile from shore, are off this coast. Except for these inshore rocks this stretch of coast is free from dangers.

(1192) **Austin Cove** is an open bight about midway in this 7-mile stretch of coast. It offers some protection from S weather to small boats anchoring close inshore. A ledge terminating in a rock awash at high tide makes off the W side of the cove. A rock ledge, which projects from the inner part of the cove for 0.3 mile, must be avoided.

(1193) **Steller Cove** is a wide bight in the coast about 10 miles W of Holtz Bay. Three open coves further indent the coastline of this bight. The shoreline is bluff-lined except for the stretches of sandy beach in the middle and W coves. The only dangers to navigation are the close inshore rocks.

(1194) **Local magnetic disturbance.**–Differences of as much as 4° from the normal variation have been observed in Steller Cove.

(1195) The westernmost of these coves offers the best anchorage. Some protection from S and W weather may be obtained here. To enter the anchorage, steer **210°,** heading

about 200 yards W of a prominent grassy knoll at the head of the cove. Anchor in 8 or 9 fathoms, with a fine gray sand bottom. The holding properties of this anchorage are fair. The anchorage offers no protection, however, from N weather. A current setting E along the shore may cause a vessel to lay in the trough of the sea and roll excessively.

(1196) **Red Head,** on the W side of Steller Cove, has a bluff-lined shore with a tableland sloping inland to mountains 1,860 feet high. The upper slopes of these mountains show bare and red and form a distinctive landmark in this region. A shoal area extends N from Red Head and marked currents swirl around this point. Red Head should be passed at least 1 mile off.

(1197) The only dangers from Steller Cove to the W end of Attu Island are the inshore reefs. Vessels can follow the coast with safety 1 mile or more offshore.

(1198) For several miles W of Red Head a low flat strip of land about 0.5 mile wide is between the shoreline and the mountains. Several conspicuous boulders are scattered over this flat. The most conspicuous, a block of rock about 20 feet high in 53°00.8'N., 172°46.4'E., forms an excellent landmark.

(1199) **Earle Cove,** 7 miles W of Steller Cove, is at the W end of the belt of flatland. At the entrance to this small cove are several rocks but anchorage for small boats may be had in 10 fathoms 0.2 mile SW of the larger rock in the cove entrance. Another anchorage in 11 fathoms may be had 0.2 mile S of this same rock. Care should be taken in approaching the anchorage to avoid the kelp and foul ground off the E point of the cove.

(1200) The shoreline for several miles W of Earle Cove is craggy and precipitous, rising rapidly to peaks over 2,000 feet high. **Kresta Point,** 8 miles NE of Cape Wrangell, is a prominent bold headland and marks the W end of this section of rugged coastline.

(1201) W of Kresta Point two small valleys make down to the coast, ending in a stretch of easy-sloping shoreline about 1 mile long. W of these valleys is another region of high mountains and craggy, precipitous shoreline, with a bold headland at its W end. This headland is 5 miles E of Cape Wrangell.

(1202) Two small coves are SW of this headland. W, between the coves and Cape Wrangell, the shore is bold and precipitous, with a few islets, rocks and reefs near the shore.

(1203) The current sets E on the flood and W on the ebb along the N coast of Attu Island near Cape Wrangell. Velocities of 1.5 knots have been observed and may reach 3 knots during spring tides. A current velocity of about 1 knot, 5 miles NE of Cape Wrangell, sets ENE on the flood and SSW on the ebb.

(1204) **Chart 16430.—Cape Wrangell** is the westernmost extremity of Attu Island. The cape appears as a string of rocky, rugged islets, about 150 feet high, reaching out from a mountainous ridge. This ridge is bold and steep with a summit about 1,800 feet high.

(1205) On **Peaked Island,** just off the cape, a natural bridge and buttress forms an opening which has the deceptive appearance of a large patch of snow against the dark rocks. This is a distinctive landmark to vessels N and S of the cape.

(1206) A rock 3 feet high is about 0.3 mile W of Peaked Island. Breakers usually mark this rock.

(1207) Cape Wrangell should be rounded at 1.5 miles distance. At maximum current the heavy tide rips extend for about 3 miles off the cape.

(1208) SE of Cape Wrangell, inshore currents were observed setting E at times.

(1209) Cape Wrangell is a Steller sea lion rookery site. There is a 3-mile vessel exclusionary buffer zone around the rookery. (See **50 CFR 227.12,** chapter 2, for limits and regulations.)

(1210) Between Cape Wrangell and Etienne Head, the mountainous coastline is indented by two coves. A shingle beach is at the N end of **Wrangell Cove,** the E of the two. Small boats have made landings on this beach.

(1211) **Etienne Head** is a moderate-sized headland about 120 feet high. A group of large black rocks and reefs are off the headland.

(1212) **Etienne Bay** is the first large bay E of Cape Wrangell. It is broad and open, and has high mountains on both sides and a long sandy beach at its head. A low valley and a pass run inland from this beach.

(1213) The bay is clear of dangers to navigation except for the reefs and kelp patches that border the E and W shores. The W shore should be given a berth of at least 0.5 mile. The bottom shoals gradually as the bay is entered. Deep-draft vessels can anchor in 14 fathoms in midbay about 1 mile from the head. The bottom is fine green sand and pebbles and has fair holding properties.

(1214) A perpendicular-sided table-topped shelf about 500 feet high is on the E shore 1.5 miles from the head of the bay. This makes a good landmark from seaward.

(1215) Etienne Bay is wide open to S and W storms, and because of the lack of protection is not recommended as an anchorage except in N or E weather.

(1216) **Mikhail Point** marks the SE approach to Etienne Bay. It is a broad, gently sloping headland with a terrace-sided shoulder near its NW part.

(1217) A narrow-mouthed cove cuts into the SE tip of Mikhail Point. This cove offers good protection to small boats, but the swinging room is very limited.

(1218) Mikhail Point should be given a berth of at least 0.5 mile by deep-draft vessels.

(1219) **Abraham Bay,** E of Mikhail Point, is the second major bay E of Cape Wrangell. It is wide-mouthed, narrowing to an inner arm at the NE end. This arm has parallel shores and a short, sandy beach at its head. The mountains surrounding Abraham Bay rise steeply from the shoreline to between 1,500 and 2,000 feet high. The steep, rugged slopes of the inner arm give it a fiord-like appearance.

(1220) An unusually large waterfall on the NW shore of Abraham Bay, 2.5 miles E of Mikhail Point, is a conspicuous landmark, even to ships offshore.

(1221) A group of rocks and reefs mark the W side of the approach to the inner arm of Abraham Bay. The highest of these, a steep-sided rock 48 feet high, is an excellent landmark for vessels entering the bay. Vessels should steer a course to pass not less than 0.5 mile off this rock, rounding it at that distance and then heading toward the middle of the sand beach at the head of the inner arm. Anchorage is found E of the innermost low flat reef in 13 fathoms, gravel bottom. The holding properties are only fair. This anchorage offers some protection from N and E storms, but is exposed to the W and S. In addition, fierce strong winds often draw through the inner arm, when no winds are noticeable off the approaches to the bay.

(1222) The E shore is clear of dangers except for the almost continuous string of reefs close inshore. The greatest dangers are the rocks almost 0.4 mile offshore 1 and 2.5 miles N of Chuniksak Point.

(1223) **Chuniksak Point,** between Abraham Bay and Nevidiskov Bay, is a broad, three-pointed promontory sloping moderately upward and back to two mountain ridges.

(1224) Small-boat landings have been made in the cove just NW of the easternmost point of Chuniksak Point.

(1225) A current with a W set has been noticed close inshore around this point.

(1226) **Nevidiskov Bay,** on the SE side of Chuniksak Point, is a fairly open, two-armed bay, surrounded by an irregular terrain of mountain ridges and valleys. Nevidiskov Bay is fairly clear of dangers and may be entered on any course, except that Chuniksak Point should be given a berth of at least 0.5 mile and Theodore Point a berth of at least 1 mile.

(1227) The steep sided, rocky islet, 38 feet high, S of the point separating the two arms of the bay is a landmark for vessels entering the bay.

(1228) At the head of the E arm of Nevidiskov Bay is a flat, sandy beach. Vessels of any draft can anchor off this beach in 15 to 17 fathoms, 0.7 to 1 mile E of the 38-foot islet. The bottom is fine gray sand mixed with small round boulders. It has fair holding properties.

(1229) This bay offers shelter for any draft vessel from NW through NE to SE storms. It is open and exposed, however, to storms from the SW quadrant.

(1230) Low rocks and reefs fringe most of the E shore of the bay for as much as 0.3 mile offshore. Kelp is found over and around these rocks.

(1231) The W arm of Nevidiskov Bay is constricted and has a rocky, submerged ledge across its inner part.

(1232) **Theodore Point,** between Nevidiskov Bay and Temnac Bay, is a bluff promontory sloping moderately to a knoll-like shoulder and then steeply to the mountain ridge behind. Theodore Point is the southernmost promontory of Attu Island and the knoll-like shoulder is a conspicuous landmark for vessels SE or SW of the point.

(1233) Reefs and rocks fringe Theodore Point on all sides for about 0.3 mile. Kelp patches cover and surround most of these reefs. A dangerous pinnacle rock, covered 5 feet, is 0.5 mile SW of the W end of the point.

(1234) Small boats have landed in the cove on the SW side of Theodore Point.

(1235) W currents were encountered close inshore off Theodore Point during the summer.

(1236) Fog covers the land above the 100- to 200-foot level much of the time in the late spring and summer.

(1237) **Charts 16431, 16423.–Temnac Bay,** the first bay W of Massacre Bay on the S coast of Attu Island, is about 8 miles wide between Theodore Point on the W and **Krasni Point** on the E and indents the island about 4 miles.

(1238) Coming from the E and Massacre Bay it is best to keep at least 1.5 miles off Krasni Point to clear the reef, that extends 1.2 miles S of the point, and the islands along the shore NW of the point. A rock that uncovers 4 feet is 700 yards S of the westernmost island. The W shore should be given a berth of 0.8 mile until well into the head of the bay.

(1239) Large vessels can anchor about 1.5 miles from the head of the bay in 20 fathoms, fine gray sand bottom, of fair holding qualities. Smaller vessels can anchor farther in. The anchorage offers some shelter from strong SE breezes. No williwaws were experienced while survey operations were in progress.

(1240) Temnac Bay is not, in general, recommended for anchorage but it might prove useful in an emergency, and it would be easy to get out of in case of undesirable weather conditions.

(1241) **Charts 16434, 16423.–Agattu Island,** about 22 miles SE of Attu Island, is the second largest and the southerly island of the Near Islands. This island is roughly triangular in shape with the N shore or base of the triangle trending in a WSW direction. The N shore is about 17 miles in length, the S shore 14 miles and the E shore 9 miles in length.

(1242) It is reported that at the time of the Russian voyages of discovery to Alaska that 35 native Aleutian villages were on the island. Many of the sites are in evidence at this time. The island is not at present populated.

(1243) The island is volcanic in origin, and similar in terrain, shoreline, and vegetation to the other islands of the aleutians. Mountain peaks 1,992 feet high are adjacent to the E half of the N shore and 2,080 feet to the SW. The shoreline is rocky and precipitous and fringed with close-inshore pinnacles. Boulder or pebble beaches are at the heads of most of the bights; frequently the boulders are outside the low water line which renders landing in small boats, except in a smooth sea, difficult. Water may be boated from streams in most of the bights. Most of the points rise 50 to 200 feet from the water to headlands and then slope more gradually to the interior.

(1244) The peaks are generally obscured by a low ceiling. For this reason the points are the most suitable features for navigational purposes. **Krugloi Point,** the NE end of the island; **Cape Sabak,** the SE end of the island; and **Gillon Point,** the W end of the island, are hills and plateaus sloping to the water's edge or ending in sheer headlands. Gillon Point ends in a low flat-topped headland which appears separated from the island. **Kohl Island,** 156 feet high, is about 2.5 miles W of Cape Sabak and is prominent. Gillon Point should be given a berth of at least 1 mile and Krugloi Point 3 miles.

(1245) Cape Sabak and Gillon Point are Steller sea lion rookery sites. There is a mile vessel exclusionary zone around these rookeries. (See **50 CFR 227.12,** chapter 2, for limits and regulations.)

(1246) **Armeria Point,** 5 miles NE of Gillon Point, is a sheer double pointed headland 100 feet high, fringed with high pinnacles, and rising to greater elevations a short distance inland. **Patricia Point,** 6 miles W of Krugloi Point, is low and slopes gradually back to the hills inland.

(1247) **Nile Point** on the S side, 2.3 miles E of Gillon Point, is a bold headland. A dangerous breaker is about 0.5 mile off this point. This is one of the few off-lying dangers.

(1248) The hills and plateaus constituting most of the island give the appearance of flat tableland from a distance but in most of the areas are interspersed with numerous valleys.

(1249) It is recommended that medium craft keep outside the 20-fathom curve around the island except when seeking shelter, and large craft outside the 40-fathom curve.

(1250) All anchorages about the island are limited as to shelter, but the island is not large and both medium and large craft can proceed to such anchorages as the prevailing weather requires.

(1251) The currents are weak and heavy tide rips will not be encountered about this island except in rare cases.

(1252) **Patricia Bight** is the best anchorage off the N shore. Extensive kelp beds make well out from the E side of this bight and a long reef makes out from about the deepest part in a N direction, ending in a rock which uncovers. This reef is surrounded by extensive kelp beds. Small craft may proceed to an inner anchorage E of this reef and into the deepest part of the bay. A fox farmer's cabin is at the head of this bight.

(1253) No evidence of kelp or dangers has been found in other parts of the bight except very close inshore. Large or medium craft should anchor in 15 to 20 fathoms, sand bottom, 0.5 to 0.8 mile off the W shore and about E of the end of Patricia Point. Shelter is afforded from SE to SW. W and E swells and sea make into the bay.

(1254) **Binnacle Bay** is a bight 1 mile SW of the end of Patricia Point. Kelp beds are off the N part of the E shore. A kelp bed also makes out from the point at the W side of the

deepest part of the bay. The remainder of the area seems to be clear of kelp and anchorage can be had as needed in 17 to 21 fathoms, hard bottom.

(1255) In **Armeria Bay** no dangers were found outside the kelp area. A 10-fathom bank is 1.5 miles E of Armeria Point. Anchorage may be had 0.5 mile SE of the bank in 24 to 25 fathoms, hard sand and rocky bottom.

(1256) **West Cove,** a two-armed bight 1.5 miles SW of Armeria Point, is a fair anchorage for small craft. The bottom is hard and there is insufficient sea room for medium craft. Enter 200 to 300 yards E of an islet off the W side of the entrance. Anchor in the middle of the bay in 15 fathoms or as desired.

(1257) A bight on the S side of the island, 1.5 miles E of Gillon Point, is free of dangers except for the breaker off the end of Nile Point. Anchorage can be had in 17 fathoms, sand bottom, about 0.5 to 0.7 mile from the shore. The bottom is hard sand, scattered rocks and broken shell. Reefs are close inshore and a black detached islet is at the W side of the head of the bight.

(1258) **Otkriti Bay,** on the S side of Agattu Island, is the largest bay on the island affording any protection; it is about 1 mile long and 2 miles wide. Two long narrow islands extend W from the E entrance point; the highest point, 83 feet, of the outer island is a good landmark. About 0.6 mile SW of the outer island is a ½-fathom shoal that breaks in a moderate sea. Anchorage can be had in 20 fathoms, coarse sand and shell bottom, SW of the bold point between Karab Cove and Otkriti Bay proper. Holding properties are fair, but there is no protection from the S and W.

(1259) **Karab Cove,** the bight on the E side of Otkriti Bay, is small - 1 mile long and 0.5 mile wide - but affords the best protection of any anchorage on the island for vessels less than 125 feet in length; it is open only to the SW. The anchorage is in the center of the cove in 12 fathoms, sand and gravel bottom; it is not recommended in S or SW weather.

(1260) **Agattu Roadstead,** on the E side of Agattu Island, is an extensive open bight. Numerous monolithic pinnacles are along the shoreline; **Monolith Point,** which appears black against lighter background, is on the N side of the entrance to **McDonald Cove.** There are no dangers to navigation if the shoreline is given a berth of 0.5 mile. The depth of the roadstead slopes gradually up from about 45 fathoms to 10 or 12 fathoms. The bottom is sand, although there is some rock opposite rocky promontories. Where there is sand it appears to be deep and affords good holding ground. Agattu Roadstead offers little protection from E and but little from N and S, but it is protected from the W, subject, however, to draw winds from that direction. The bight offers suitable anchorage for any type of vessel if weather conditions are favorable.

(1261) A good anchorage is available in this locality off McDonald Cove in 15 to 20 fathoms, sand bottom. Depths seem to be suitable for anchorage alongshore for some distance towards Krugloi Point. Reefs, making out 0.3 to 0.5 mile from shore, extend for 2 miles from Krugloi Point.

(1262) **Chart 16012.**–The area W of Attu Island was surveyed to 170°E in 1946. **Stalemate Bank,** 55 miles W of Cape Wrangell, Attu Island, is a large shoal area with a least depth of 18 fathoms.

8. BERING SEA

(1) This chapter describes the N coast of the Alaska Peninsula, the W coast of Alaska including Bristol Bay, Norton Sound, and the numerous bays indenting these areas. Also described are the Pribilof Islands, and Nunivak, St. Matthew, and St. Lawrence Islands. The communities of Nome, Unalakleet, Bethel, King Salmon, Naknek, Port Moller, and St. George are also discussed.

(2) **Chart 16006.**–The S limit of the **Bering Sea** is a line running from Kabuch Point (54°49'N., 163°22'W.) on the Alaska Peninsula through the Aleutian Islands to the S extremes of the Komandorski Islands and on to Cape Kamchatka in such a way that all the narrow waters between Alaska and Kamchatka are included in the sea. The N limit is the Bering Strait.

(3) Much of this area has been only partially surveyed, and the charts must not be relied upon too closely, especially near shore. The currents are much influenced by the winds and are difficult to predict; dead reckoning is uncertain, and safety depends upon constant vigilance.

(4) The chapter area is entirely within the 100-fathom-depth curve, which extends NW from Unimak Pass and passes to the SW of the Pribilof Islands. Depths vary more or less uniformly in the open sea except near the off-lying islands, which are volcanic and rocky and range in height to more than 2,000 feet.

(5) From the head of Bristol Bay to Norton Sound, shoals or banks formed by river deposits extend many miles from the mainland, in some places completely out of sight. Kuskokwim and Yukon Rivers are the principal drainage systems along this stretch of coast. As fog and thick weather are common during the navigation season, coasting vessels are advised to sound constantly and to stay in depths greater than 10 fathoms unless feeling their way in to the land.

(6) Navigational aids are few, and all are seasonal. The rocky islands and the rocky parts of the mainland are frequented by thousands of birds whose constant cries may serve to indicate the approach to these places in thick weather. Port facilities are rare, and most of the villages scattered along the coast lighter their supplies from vessels anchored offshore. Good water can always be found in the vicinity of high land.

(7) The navigation season depends largely upon ice conditions, discussed later. During the winter, the ice and snow along the shore, as well as inland, are suitable for travel by dog team over many miles of established trail. Tractors could be driven over long stretches of this beach area when the lakes and protected bays are frozen solid enough to support them. Airplanes equipped with skis can also operate in winter from many points along the coastal and inland areas.

(8) **Currents.**–Strong tidal currents flow through the Aleutian Islands passes, setting into the Bering Sea on the flood and into the North Pacific Ocean on the ebb. Observed velocities have exceeded 8 knots in some of the passes, but the decrease is rapid once the passes are cleared. The tidal currents set N and S along the Bering coast and into and out of the various bays. The periodic tidal flow along the coast is completely masked at times by wind currents. In constricted bays the currents may have considerable velocities. The tidal current has an average velocity of 0.5 to 1 knot at the off-lying islands.

(9) Most reports indicate that during the open season there is a general drift N along the Bering coast and thence through the Bering Strait into the Arctic Ocean. During the winter, ice moves from the Arctic into the Bering Sea. The N drift is probably not more than 0.5 knot in the open sea well N of the Aleutian passes. Wind and atmospheric pressure are said to materially affect the drift. In a disturbed area the current will generally set with a strong wind or toward an atmospheric depression, and such a current may serve as a storm warning.

(10) Along the N side of Unimak Island, the currents are fairly strong and generally parallel the coast. They attain a maximum velocity of 2 knots 1 mile off Cape Mordvinof and probably do not exceed 2.5 knots anywhere along this coast. Velocities have been estimated at 2 to 2.5 knots as far as 12 miles from shore in depths of about 40 fathoms.

(11) Between St. Matthew Island and Nunivak Island, the current sets NW with prevailing NE winds during the navigation season and NE with NW or SW winds. This N current continues and increases between St. Lawrence Island and the mainland, being stronger toward the mainland N of the **Yukon River** where it has a velocity of about 1 knot except in early summer when the Yukon freshets may increase it to 2 knots or more. A strong N current, amounting at times to 2.5 knots, has been observed setting on the Yukon flats. The current sets N across Norton Sound to Sledge Island and is strongly marked along the coast between Sledge Island and Bering Strait.

(12) Captain Covell, of the Coast Guard Cutter BEAR, said of the currents in this area: "After a SE gale in the Bering Sea, during which the water is banked up against Siberia, a very marked current sets in the opposite direction. The reverse is true for a SW gale. The exact interval between the gale and the strong countercurrent is, so far, undetermined. Of the existence of this countercurrent under such conditions, there is no doubt, and it demands consideration."

(13) **Weather.**–The weather over the Bering Sea is generally bad and very changeable. Good weather is the exception, and it does not last long when it does occur. Wind shifts are both frequent and rapid. The summer season has much fog and considerable rain. In early winter, the gales increase, the fogs lessen, and snow is likely any time after mid-September. Winter is the time of almost continuous storminess. Heavy winds from any direction are usually accompanied by precipitation; however, the rain or snow that comes with E or S winds is likely to continue steadily until the wind shifts, while rain or snow squalls are characteristic of the W and N winds. Skies tend to clear more quickly with the slackening of the speed if the winds have been blowing from N or W directions.

(14) Taking the area as a whole, the winds are most frequent from N and NE directions from October through May and are variable, with predominating winds from directions in the S half of the compass at most stations during the period from June through September. The local topography, however, influences the prevailing wind so that the general wind circulation does not show conditions at the individual stations.

(15) Over Bristol Bay, winter winds blow mainly out of the N through E, while summer winds are more likely to come from the SW through NW. In winter, gales can be expected 5 to 10 percent of the time. At King Salmon, northerlies blow more than 20 percent of the time during the winter season, at average speeds of 10 to 12 knots. Calms occur 10 to 14 percent of the time. During June, July,

and August, winds are out of the S through SW more than 40 percent of the time, at average speeds of 8 to 10 knots. Gales occur about 2 percent of the time in winter.

(16) At Bethel, the head of ocean navigation on the Kuskokwim River, winter winds are out of the N through NE 40 to 50 percent of the time; they blow at average speeds of 9 to 14 knots. Northwesterlies are also common from March through June, and then S through SW winds become predominant in midsummer; these summer winds average 10 to 12 knots. Gales at Bethel blow less than 2 percent of the time even in winter, although winds reach 17 knots or more up to 20 percent of the time. At Hooper Bay, winds are frequently out of the NE from November through February, but quite variable the rest of the year. St. Paul Island is more exposed than many locations along the coast. Here winter winds blow at 16 to 18 knots on the average, and gales can be expected up to 10 percent of the time. Winds are variable, but mainly out of the N through E during this season. By midsummer, S through SW winds become prevalent, at average speeds of 10 to 12 knots. Northwesterlies are frequent during September and October. Winter winds are also strong in Norton Sound, where they blow at 28 knots or more on up to 13 days per month, at exposed locations like Unalakleet. Nome is more sheltered, and winds reach this speed on less than 4 days per month. At Nome, N through E winds prevail during the winter; calms are also common. Summer winds are more variable, but often blow out of the S through W. Maximum winds have reached 65 knots in January. At Gambell on the northernmost point of St. Lawrence Island, the prevailing winds are SW in summer and generally N through NE in winter. In general, S through SW winds are prevalent over the N Bering Sea in the midsummer.

(17) Most of the precipitation over Bristol Bay and the Bering Sea falls from July through October. Annual average amounts are 20 to 25 inches in Bristol Bay. It rains about 20 to 25 days per month during the peak period. Snow totals 40 to 60 inches per year on the average and is most likely from November through April. From Kuskokwim Bay to Norton Sound, precipitation drops off to about 10 to 17 inches annually; rain falls on 10 to 25 days per month in late summer. At Bethel in August, about 4 inches of rain falls on an average of 26 days.

(18) Poor visibilities can be a problem all year around along the Bering Sea coast. Visibilities are restricted by land fog and snow in winter, and by sea fog and rain in summer. Sea fog is more frequent and more widespread. However, it does not drop visibilities below 0.5 mile any more frequently than land fog.

(19) In general, sea fog or haze drops visibilities to 7 miles or less on 13 to 20 days per month in midsummer. St. Paul Island is the most exposed, and fog or haze occurs here 20 to 28 days per month from May through August. At King Salmon, Bethel, and Nome, July and August are usually the worst months. Sea fog drops visibilities to 0.5 mile or below on about 2 to 5 days per month in summer. Snow and land fog during the winter restrict visibilities to less than 7 miles on about 8 to 12 days per month, and to less than 0.5 mile on about 2 to 5 days per month. Upriver ports like Bethel are the most vulnerable.

(20) There is a large continental influence in temperatures. Sheltered or inland ports get much colder in winter and much warmer in summer, compared to those exposed to the sea. St. Paul Island and Pilot Point are at about the same latitude. However, the average daily maximum in February is 27°F at St. Paul, compared to 11°F at Pilot Point, while average minimums are 19°F and –7°F, respectively. At St. Paul, temperatures have dropped as low as –26°F, compared to a –44°F at Pilot Point. In summer, the reverse is true. Pilot Point daytime readings are frequently in the low sixties with an 84°F extreme. At St. Paul Island, average daytime temperatures run in the low fifties, with a 64°F extreme. Along the coast, midwinter daytime temperatures usually climb to 20° F in the S, and 10° F in the N and at upriver ports. At night, readings frequently drop below 0° F at Bethel and Nome, while at King Salmon, 6°F readings are common. Extreme lows range from a –13°F at Port Heiden to a –55°F along the shores of Norton Sound. Significant warming takes place from March through May. Midsummer temperatures reach the midfifties to low sixties during the day and drop to the midforties at night. Extreme high temperatures have reached the low seventies to upper eighties. Highest temperatures occur at the more continental locations.

(21) **Ice.**–Except in sheltered places the ice of the Bering Sea is in detached fields, floes, and cakes, which are continually kept in motion, breaking up, piling, and telescoping by the action of variable winds and currents. At no time is the sea one solid sheet of ice, and in the winter, when it is forming, the ice is more scattered than in the spring, when the N movement begins and packs it closer together. The general S limit of ice is from Bristol Bay to the vicinity of St. George Island, and thence about WNW to the Siberian shore. The S edge is ragged and very much scattered, and continued N winds sometimes drive fields of ice far S. As a rule, no heavy ice will be encountered S of the Pribilof Islands and the ice in their vicinity is likely to be nothing more than detached fields.

(22) In the spring, beginning with April, the ice has a general N movement, the shore clearing ahead of the center of the sea; but the ice sometimes hangs on in the bays and around the islands later than in the open sea. The movement and position of the ice depend greatly on the winds. Generally, by June 1, the whole body of ice is well up with St. Lawrence Island, and a passage opens to its W side. The E side of the sea is likely to be obstructed a little later than the W side, and ice is often met between St. Lawrence Island and Nunivak Island in the early part of June. The breaking out of the rivers in the latter part of May clears the shores, but the ice is likely to remain in Norton Sound several weeks later. In general, for a vessel not fitted to encounter ice, Norton Sound is not navigable before the middle of June. At the opening of navigation the ice is likely to be heaviest and to remain longest on the N shore of Norton Sound; in general it is the latter part of June before that part of the sound is altogether clear.

(23) In the fall young ice begins to form on the rivers, and in the bays and sheltered places in October, and grows stronger and spreads according to the severity of the advancing season. At Nome, on the N side of Norton Sound, navigation is difficult from early December to early June and is usually suspended from late December to mid-May.

(24) (See page T-21 for dates of ice breakup and freezeup for the Bering Sea and Yukon River areas.)

(25) The National Weather Service publishes a Marine Weather Services Chart of Alaska waters which shows ice limits, forecast areas, and radio stations that transmit marine weather and additional information of interest to mariners.

(26) **Chart 16011.–Bristol Bay** may be said to include all that part of the Bering Sea E of a line drawn from Cape Sarichef, Unimak Island, to the Kuskokwin River. Unimak Island and the Alaska Peninsula bound it on the S and E, and separate it from the Pacific Ocean. The Naknek River is

at the head of deepwater navigation, while the bay itself terminates in the Kvichak River a few miles N. The region about Nushagak River, Kulukak Bay, and the Kuskokwim Bay forms its NW boundary.

(27) The shores are generally low and nondistinctive, but high mountain ranges and volcanic cones extend along the central parts of Unimak Island and the Alaska Peninsula. These rugged snow-covered mountains and lofty peaks would serve as unmistakable landmarks were they not obscured by the almost constant fogs that prevail during the summer. The shore and objects near sea level are often seen beneath the fog when the higher lands are obscured, and, therefore, most of the available landmarks are found on or near the beach.

(28) The Bristol Bay region must be regarded as a dangerous locality to navigate; it is only by the greatest vigilance and constant sounding that disaster can be avoided upon approaching the land. This is particularly true of the NE arms and approaches that receive the waters of the great salmon streams on which the Bering Sea canneries are located. The rivers discharge a great quantity of water into wide indentations which open on the arms of the great bay. The banks of the rivers are frequently marshy and generally muddy. The discolored waters of the rivers is charged with a large amount of sediment, which, when deposited forms shoal areas.

(29) The funnel-shaped configuration of the bay and river entrances creates tidal currents of great force, reaching, at times, velocities up to 6 knots. The diurnal range of tide averages about 18 feet at the river entrances. Vast areas of shoals uncover at low water, leaving only pools and narrow channels between them.

(30) In Bristol Bay and its tributaries, some lights and buoys are maintained by the Alaska Department of Fish and Game during the fishing season to mark fishing districts; they usually show quick flashing white lights and have no navigational significance. Marine lights and buoys are normally maintained only during the navigation season.

(31) Vessels operating in Bristol Bay, particularly at the head, are warned concerning the use of seawater as a cooling agent in internal combustion engines, heat exchangers, condensers, and evaporators. The heavy amount of silt in suspension in this area can do great damage to the machinery or equipment if overlooked. This is especially true of small diesel or gasoline engines with gear-type water pumps, since the fine sand will pack itself between the gears and cause them to bind. Also, the silt is likely to settle in various parts of the cooling system and accordingly the system may need regular flushing. Most small-boat operators in the salmon fishing area, such as Kvichak and Nushagak Bays, use freshwater cooling systems with piping led outboard.

(32) Reports of ice conditions at the head of Bristol Bay usually can be obtained from the National Weather Service Radio Weather Broadcast station at King Salmon near Naknek or the nearby canneries. On May 17, 1948, the survey ship PATHFINDER encountered floe ice about 20 miles NW of Port Heiden and a solid field of drift ice about 10 miles W of Egegik Bay. At this time of the year, the run from off Port Moller to the head of Bristol Bay should be made during daylight because of possible ice. In 1948, several commercial vessels encountered difficulties attempting the run at night.

(33) **Caution.**–The State of Alaska has established a crab pot storage area in the Bering Sea between 57°00'N. to 58°00'N. and 164°00'W. to 166°00'W.

(34) A **danger zone** of an air-to-air weapon range is in the N part of Bristol Bay. (See **334.1280,** chapter 2, for limits and regulations.)

(35) **Chart 16520.–Cape Sarichef** (54°36.0'N., 164°55.7'W.), described in chapter 7, the W end of the S coast of Bristol Bay, is low, with detached rocks close inshore, around which strong tidal currents sweep. The land falls away E in a gentle curve forming **Dublin Bay,** about 3 miles in depth and 16 miles across between the cape and Cave Point. This bay may be used as a temporary anchorage by vessels of any size. The holding ground is said to be good. From offshore the first 8 miles of this indentation is a smooth grassy slope gradually rising from low, rocky, grass-covered bluffs, about 60 to 100 feet high, to the mountains several miles inland.

(36) The beach is steep, and the surf breaks almost at the shoreline. The terrain leading back is quite rugged and is cut by numerous gullies. This part of the coast has several prominent hills ranging from 800 to 2,000 feet high at distances of 2 to 4 miles back from the shore. **Red Hill,** although only 798 feet high, is a very distinctive formation near Cape Sarichef; it is isolated and closer to the shore than the other peaks in the vicinity. The hill is easily recognized by its reddish hue and is prominent from the N, NE, and W. It is often clear when higher peaks are obscured by fog or clouds.

(37) A large valley, appearing not as a pass but as an indentation into the hills, is easily recognized from offshore. **Beartrack Creek,** having a considerable drainage area, is a swift stream flowing through a bed strewn with small boulders. About 6 miles NE of Cape Sarichef are several waterfalls that may serve as landmarks for vessels close inshore.

(38) The coast in the N half of this moderate indentation is a series of low sand dunes, and the shore is sandy. From the line of dunes along the beach a large marshy area extends back for 2 or 3 miles, where a low pass begins and leads between the peaks to the S side of Unimak Island. Two moderate-sized streams and a number of small ones empty into the Bering Sea.

(39) SW of Cave Point the bottom is generally even, of fine black sand, and good holding ground; the 10-fathom curve is from 0.4 to 0.8 mile from the beach. There are no charted shoals of any consequence, although the 10-fathom curve is a little farther off the points than off the bights and coves. The best anchorage is in about 19 fathoms, 7.5 miles 048° from Cape Sarichef Light. This anchorage affords protection from the NE through the SE, and around to the SW. In N and NW weather the current may prevent a vessel at anchor from heading into the sea.

(40) **Cave Point** is a vertical rocky cliff formed by a ridge extending from the N side of Black Hill. It is named for a cave on its face inhabited by sea birds which in summer hover about it in the thousands, making it conspicuous in clear weather by their numbers and in fog by their constant cries.

(41) The point is very prominent and can be easily seen in clear weather from Cape Sarichef or from Cape Mordvinof. The water off Cave Point is deep; no shoals have been found. The 20-fathom curve runs about 1 mile off the point.

(42) **Black Hill,** a black-looking hill about 3 miles ESE from Cave Point, is the highest peak near the shore; it can be plainly seen from the W to the N. The hill is covered with snow in the winter, but is bare in the summer.

(43) Between Cave Point and Oksenof Point, the westernmost point of Cape Mordvinof, is another moderate indentation in the coastline about 6.5 miles by 0.8 mile in size. The shore for 4 miles NE of Cave Point is a sandy beach with a series of grass-covered dunes just back of the high-water line. From the line of dunes a large flat area extends back for several miles; in this area is a large pond which is about 0.5 mile NE of Cave Point. Between this pond and the hills

forming Cape Mordvinof is a large swamp. One large stream empties into the sea at the N end of the sand beach. Offshore the bottom is even and no shoals of any importance have been found. The 20-fathom curve runs from 1 to 1.5 miles off the beach. The indentation in the coastline between Cave Point and Cape Mordvinof is a fair anchorage, giving some protection from the NE around to the S. In N and NW weather, currents affect the heading of an anchored vessel.

(44) Snow-clad **Pogromni Volcano,** 8.3 miles E of Cape Sarichef Light, forms a striking background to the low, monotonous coast. The top of the 4,040-foot peak, 1.9 miles N of Pogromni Volcano, is a ridge with no definite point. It is covered with snow most of the year and usually capped by clouds. However, at times, it is clear when Pogromni Volcano is not. On the NW slope of the volcano is a prominent arrowhead-shaped peak about 1,300 feet high. It is very prominent on the skyline from the N and NE, but is covered by clouds a great part of the time.

(45) **Cape Mordvinof,** 26 miles NE of Cape Sarichef, consists of a succession of points and coves at the end of a series of round-topped ridges separated by shallow valleys. The point, including **Oksenof Point,** is characterized by precipitous rocky bluffs ranging from 450 feet high on the W side of the cape down to 100 feet on the E end. Small clear streams run through the valleys, and the terrain slopes upward from the bluff line to a group of rocky peaks about 2,000 feet high. These peaks are snow covered in the winter and bare in the summer. The valleys and ridges are covered with grass and tundra. Good landmarks are lacking on Cape Mordvinof; the peaks are not distinctive and usually are hidden by clouds.

(46) Good anchorage for large vessels is not found off the cape, but shelter from S winds can be had in two of the coves indenting the cape for boats no longer than 65 feet. The water deepens rapidly and evenly off the cape, and the 20-fathom curve is from 1 to 2 miles off the shoreline. No shoal of importance is known off the cape, and no danger to navigation has been found at distances greater than 1 mile offshore.

(47) By making good a course of **036°** from 3 miles 270° of Cape Sarichef for 25 miles, vessels will be well outside the 20-fathom curve and the known dangers to navigation.

(48) E of Cape Mordvinof, the coast falls away slightly for 6 miles, where it turns abruptly E for 5 miles, and then takes a N direction forming **Urilia Bay.** This bay is open N, but affords protection from all winds from S of E or W. The approaches are clear, and the water shoals gradually to 6 fathoms, black sand bottom, about 0.8 mile from shore.

(49) From Urilia Bay to Isanotski Strait the coast trends NE, is very low, and has several rocky patches extending 0.5 to 1 mile from shore. Shishaldin Volcano, near the middle of Unimak Island, is described in chapter 7.

(50) **Swanson Lagoon** is a shallow lagoon on the N side of Unimak Island 7 miles W from **Chunak Point.** It has a narrow entrance and during some years light-draft launches can enter, but at other times only pulling boats can. Inside it is mostly a mudflat at low water with crooked channels 1 to 3 feet deep flowing between tidal flats. The lakes draining into the lagoon are spawning places for salmon, and the lagoon is important only as a fishery. About 0.8 mile E of the entrance is a cone-shaped hill, 85 feet high.

(51) Isanotski Strait (False Pass), used only by small vessels, is described in chapter 6.

(52) For 20 miles NE of Isanotski Strait to 175-foot-high **Cape Glazenap,** the coast is low with some grassy 50- to 100-foot bluffs. Except off the entrance to Isanotski Strait, dangers are within 1 mile of the shore. Cape Glazenap is prominent, because it is higher than the other places in this area.

(53) The **Kudiakof Islands,** low, narrow, and grass covered, extend from Cape Glazenap to Moffet Point, 16 miles to the NE. The wreck of an old schooner on **Glen Island,** the SW island, and domes on **Grant Point,** E of Glen Island, are conspicuous landmarks. The lights at the Cold Bay airport are visible over this general area on clear nights.

(54) Behind Cape Glazenap and the Kudiakof Islands is **Izembek Lagoon,** which is crossed by many shallow sloughs. Most of the extensive lagoon area is bare or awash; the bottom is mud and sand. The sloughs are difficult to follow except at low stages of the tide and are not recommended for craft drawing more than 3 or 4 feet.

(55) The Cape Glazenap channel into Izembek Lagoon is narrow and shifting. The entrance is close to the cape and is between breakers that extend seaward about 1 mile. The entrance channel has a depth of about 6 feet. During the summer, fishermen mark the approach with a drum buoy.

(56) **Charts 16520, 16011, 16363.–Moffet Point,** 95 miles NE of Cape Sarichef, is a curving sandy hook with dunes 40 to 60 feet high. A channel leads into the NE part of Izembek Lagoon between Moffet Point and the NE end of the Kudiakof Islands. The depth over the bar is about 2 fathoms. The channel is between breakers, and during the summer is marked by drum buoys placed by local fishermen. Passage should not be attempted without local knowledge or by boats drawing more than 3 or 4 feet.

(57) **Moffet Lagoon,** behind Moffet Point, is a shallow area similar to Izembek Lagoon, but much smaller in extent. The two lagoons are joined S of Moffet Point. **Joshua Green River** empties into the E side of Moffet Lagoon.

(58) **Amak Island,** 10 miles NNW of Cape Glazenap, is of volcanic origin. Along the shores are bluffs and huge boulders except on the S side, where there is a small flat that was the site of a World War II airstrip.

(59) Foul ground extends about 1.1 miles off the N side of Amak Island. A reef that uncovers is off the SE side of the island and extends E about 0.3 mile. A good anchorage, affording protection from N to SW winds, is about 0.5 mile E of the island, 1 mile NE of the rocky ledge off the SE point, in 8½ fathoms, gravel bottom.

(60) The passage between Amak Island and the Kudiakof Islands is clear and is the usual track for small vessels. Depths in midpassage are 10 fathoms or more; currents are about 2 knots.

(61) **Sealion Rocks** are about 2.5 miles NW of Amak Island. The largest of the rocks, 95 feet high and prominent, is marked by **Sealion Rocks Light** 55°27.9'N., 163°12.2'W.), 94 feet above the water and shown from a skeleton tower.

(62) Sealion Rocks is a Steller sea lion rookery site. There is a 3-mile vessel exclusionary buffer zone surrounding these rocks. (See **50 CFR 227.12,** chapter 2, for limits and regulations.)

(63) From Moffet Point the low coast trends almost 70 miles ENE to Cape Rozhnof, on the W side of Port Moller. A strong inshore set is frequently noted in this area.

(64) **Black Hill,** 24 miles NE of Moffet Point and 3 miles inland, is prominent. About 16 miles to the NE of Black Hill and 2 miles inshore is a low prominent sandhill known locally as **Last Knoll,** as it is the last knoll on the coast to be seen by a vessel bound E. Local vessels use this hill extensively in checking their distance to Port Moller.

(65) **Lagoon Point,** about 37 miles NE of Black Hill, , is on the W side of the entrance to **Nelson Lagoon. Nelson Lagoon Light** (56°00.9'N., 161°06.1'W.), 30 feet above the water, is shown from a skeleton tower with a red and white

diamond-shaped daymark just E of Lagoon Point; this light marks the entrance to the lagoon. In May 1986, extensive shoaling was reported to exist in the approaches and in Nelson Lagoon; caution is advised.

(66) **Chart 16363.–Herendeen Bay** and **Port Moller,** 175 miles NE of Cape Sarichef, are mostly shallow, but deep channels lead almost to their heads. The common approach to both bays is over a very flat gently sloping bottom with low shores. Farther in are extensive sand and gravel flats between deep channels. The earth bluffs along the beaches have hills behind them that increase in height to the S. Herendeen Bay has deep water near its head, and the mountains are broken by several large valleys; the head of Port Moller is surrounded by high steep mountains, but deep water is restricted to narrow channels that apparently are kept open by tidal currents.

(67) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(68) The Bering Sea is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(69) Vessels using Southwest Alaska Pilots Association pilots and en route to Port Moller can meet the pilot boat about 7.5 miles NW of Entrance Point (55°59.5'N., 160°34.6'W.).

(70) The pilot boat can be contacted by calling "PORT MOLLER PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(71) In the event prior pilotage arrangements have not been made, a stranger in the area should radio the cannery and request assistance.

(72) The entrance channel to Port Moller is marked by seasonal buoys.

(73) **Kudobin Islands,** on the W side of the entrance to Port Moller between Lagoon Point and **Cape Rozhnof,** are low and difficult to identify. **Walrus Island,** the easternmost island of the group, is marked by a light and at its E end by a distinctive 20-foot knob.

(74) **Entrance Point,** on the E side of the entrance to Port Moller, is marked by **Port Moller Light 5** (55°58.6'N., 160°34.6'W.), 22 feet above the water and shown from a tower with a square green daymark on the point. A cannery is inside the point at the village of **Port Moller.**

(75) **Harbor Point,** 4 miles S of Entrance Point and marked by a daybeacon, is a low, narrow, grassy, sand and shingle sandspit with high land behind it. Doe Point and Point Divide at the entrance to Herendeen Bay are bluffs that can be seen outside of Entrance Point.

(76) Extensive shoals just inside Port Moller are subject to frequent change.

(77) Anchorage can be had 3 miles W of Entrance Point in 8 fathoms, fair to good holding ground. Discoloration of the water in this area is caused by streaks of sediment carried by the tidal currents. Tide rips are caused by sand waves rising above the general depths.

(78) The current velocity at Port Moller is 1 to 2 knots. (See Tidal Current Tables for predictions.) The diurnal range of tide is 10.8 feet.

(79) The cannery pier inside Entrance Point is 350 feet long; depth alongside the face is about 6 feet. It is exposed to S and SE winds that blow across the peninsula and through the divides. Winds appear stronger at Entrance Point than at the anchorage in the middle of the bay entrance.

(80) It is advisable to be ready to move on short notice if moored at the wharf as SE winds come up very quickly, making it difficult to get away with the limited turning room. Many fishing vessels moor starboard side to the wharf in order to leave quickly. Larger supply vessels anchor in about 7 fathoms 1 mile S of the cannery.

(81) Fishing boats and barges find protection from the S and SE storms on the NW side of Harbor Point, 2.5 miles S of Entrance Point.

(82) Water is available at the pier at Entrance Point; gasoline, fuel oil, and diesel oil are stored for cannery use. A marine railway is maintained for cannery small boats. Limited provisions can be obtained at a store. A paramedic is at Port Moller in the summer and can be reached on 4125 kHz or VHF-FM channel 16. Air transportation is reported to be available. Radiotelephone and radiotelegraph communications are maintained.

(83) **Point Divide,** 9.5 miles SW of Entrance Point, has a 40-foot bluff with the land sloping gradually upward toward the mountain ranges. **Doe Point,** the SE end of **Deer Island** opposite Point Divide, is 50 feet high. The bluff on the E side of Deer Island is 150 feet high while the rest of the island and the mainland to the S and W are generally lower.

(84) **Hague Channel,** marked by buoys and leading to Herendeen Bay, is 1 mile wide at the N entrance, but contracts to 700 yards between Point Divide and Doe Point. Tidal currents are very strong in the channel; as much as 4 knots on the spring flood. The current does not follow the axis of the channel, but sweeps across the flats and narrow channel. As a result the channel is subject to change. In September 1983, a 3-fathom shoal was reported in Hague Channel about 2.5 miles W of Port Moller Light 5 in about 59°54'56"N., 147°28'06"W.

(85) A survey vessel anchored 3 miles NE of Point Divide in 10 fathoms, sand and gravel bottom, and 2.8 miles WSW of Point Divide in 8 fathoms, mud bottom; holding ground was good in both places.

(86) On the flood tide, the current causes spectacular tide rips between Point Divide and Doe Point, with an extensive area of swirls farther inside Herendeen Bay. Small craft should use caution during flood tide, especially when the wind is against the current.

(87) **Johnston Channel,** on the E side of Herendeen Bay and marked by buoys, is 6 to 15 fathoms deep and very narrow with steep sides. **Halftide Rock,** on the E side of the channel 3 miles S of Point Divide, is awash at half tide. The current velocity is about 1.5 knots near the rock. **Eagle Rock,** near the E shore 3.8 miles S of Point Divide, is pyramid shaped and prominent.

(88) Small craft can find protection on either side of **Shingle Point,** in the small cove between Shingle Point and **Bluff Point,** and in **Mine Harbor.** Larger vessels can anchor off **Marble Point. Crow Reef,** off the entrance to Mine Harbor, bares at low water. The reef, marked by a buoy, is an outlying danger in the upper bay. **Midway Reef,** extending 0.4 mile from the E shore of Mine Harbor, shows at half tide. A reef extends 0.5 mile W from **Crow Point.**

(89) A trail leads from the head of Herendeen Bay to Balboa Bay on the Pacific side of the Alaska Peninsula.

(90) **Chart 16011.**–The coast is low between Port Moller and **Cape Kutuzof,** 20 miles to the NNE. The cape rises in a rounded bluff to 150 feet.

(91) **Cape Seniavin Light** (56°24.0'N., 160°08.8'W.), 175 feet above the water, is shown from a small house with a red and white diamond-shaped daymark on rocky **Cape Seniavin.** Except for a cluster of small hillocks about 12 miles from the cape, low beach extends from Cape Seniavin to Seal Islands.

(92) **Seal Islands,** 30 miles NE of Cape Seniavin, are several barrier islets, barely above high water, strung along the coast for about 10 miles. It is reported that small boats can

find protection behind the islands. The coast continues low from Seal Islands to Port Heiden.

(93) **Chart 16343.–Port Heiden,** 250 miles NE of Cape Sarichef, is 9 miles in greatest width and extends inland about the same distance. The seaward side of the bay is formed by barrier sandbars 5 to 10 feet above high water. **Strogonof Point** (56°53.3′N., 158°50.7′W.), is the NE end of the barrier beach that extends from the SW. Farther to the NE is crescent-shaped **Chistiakof Island,** which extends nearly to the mainland on the NE side of the bay.

(94) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(95) The Bering Sea is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(96) Vessels using Southwest Alaska Pilots Association pilots and en route to Port Heiden can meet the pilot boat about 7 miles WNW of Christiakof Island (56°55.8′N., 158°42.8′W.).

(97) The pilot boat can be contacted by calling "PORT HEIDEN PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(98) The approach to Port Heiden should be recognized by the high, bold headlands and the airfield installations on the N side, but the bight back of Seal Islands, 20 miles to the SW, has been mistaken for the bay. **Aniakchak Crater** (see chart 16011) is about 15 miles E of Port Heiden, and **Black Peak** is about the same distance to the S.

(99) On the mainland back of Chistiakof Island is the village of **Meshik.** A commercial airfield, numerous radio towers, and several prominent buildings are about 4 miles NNE of the village.

(100) The seaward approach has a uniformly gently sloping bottom, with shoals extending considerably offshore. The 10-fathom curve is 6 to 8 miles off the bay, and the 20-fathom curve about 15 to 20 miles off. Over this area there is good holding bottom of fine sand and gravel, with some offshore sand waves lying perpendicular to the beach. Inshore of the 5-fathom curve the bottom tends to shoal abruptly.

(101) No passage is recommended between Strogonof Point and Chistiakof Island because of numerous shifting bars. Small boats, however, can approach Meshik around the NE end of Chistiakof Island, with local knowledge and by exercising caution. In September 1982, Chistiakof Island and the islands to the SW were reported to be submerged, forming more bars which close much of Port Heiden during inclement weather.

(102) The bottom in Port Heiden is sand and mud, and the holding properties are considered poor. The landing area off the cannery at Meshik is long and sloping, and heavy loading should be done in the latter stages of a rising tide because of the flats that uncover at low water.

(103) The diurnal range of tide in Port Heiden is 12.3 feet. The current velocity is 1 knot; the ebb current seems to be increased by a SE wind. Sea ice conditions are variable, with navigation seldom entirely suspended; drift ice usually restricts navigation to full-powered vessels from January through April.

(104) **Chart 16011.**–From Port Heiden the same low coast extends in nearly a direct line to **Cape Menshikof** (57°30.0′N., 157°55.0′W.), where the high land of Port Heiden gradually recedes from the coast. Cape Menshikof is a high bluff, extending some distance alongshore, with hilly country back of it.

(105) **Cinder River,** about 10 miles SW from Cape Menshikof, is a shallow indentation in the coastline that is often mistaken for the Ugashik River.

(106) **Ugashik River** empties into **Ugashik Bay,** the wide indentation between Cape Menshikof and Cape Greig. The capes can be approached from W to within about 2 miles. The coast between the capes, including the river valley, appears low. **Smoky Point Light** (57°37.5′N., 157°41.5′W.), 40 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on **Smoky Point,** a bluff on the N side of the entrance, 7 miles S of Cape Greig. Here the river is about 4 miles wide at high water. The indentations between the capes, including the mouth of the river, are filled with shoals. A channel in the river has a depth of about 10 feet, but a stranger could not follow it with safety. Only launches can approach the cannery at low water because of boulders in the channel. The river is fresh at low water about 5 miles above Ugashik.

(107) A seasonal lighted bell buoy marks the entrance to Ugashik River. Each year the cannery company anchors two floats on the N side of the channel at the entrance.

(108) A cannery is near the entrance at **Pilot Point.** The wharf is 144 feet long, but dries at low water. Water is available on the wharf. Gasoline, fuel, and diesel oils are stored for cannery use. A machine shop and scowway are maintained by the cannery; a 4-ton crane is on the wharf. Radiotelegraph communication is maintained.

(109) A cannery at the village of **Ugashik,** 13 miles from the entrance, has a wharf 200 feet long with a depth of 14 feet at high water, but is reported dry at half tide. Water is available on the wharf and by barge at the anchorage. Gasoline and diesel oil are stored for cannery use. The wharf has a 2-ton crane. The cannery has a machine shop and a scowway. Small tenders are beached for light hull repairs.

(110) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(111) The Bering Sea is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(112) Vessels using Southwest Alaska Pilots Association pilots and en route to Vgashik Bay can meet the pilot boat about 0.5 mile W of Smoky Point (57°39.0′N., 157°42.0′W.).

(113) The pilot boat can be contacted by calling "UGASHIK BAY PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(114) **Cape Greig,** 7 miles N of Smoky Point, is a prominent brownish bluff, with a few yellow vertical stripes extending several miles alongshore. It appears to be the seaward end of a low ridge with low land on each side. This and a peculiar notched mountain some distance inland are good marks. **Cape Greig Light** (57°44.5′N., 157°42.8′W.), 350 feet above the water, is shown from a small house with a red and white diamond-shaped daymark.

(115) Cape Greig is probably the best landfall for the approach to Kvichak and Nushagak Bays from SW. N of Cape Greig, the coast is low and has no distinguishing features, and even radar is not of much assistance until abeam of Egegik Bay. Particular care should be taken to clear the shoals off the entrance to this bay. After passing the bay, Middle Bluff can usually be identified, although the lights on this bluff and on Red Bluff are small structures not easily seen from offshore. **Johnston Hill,** 357 feet high, is not readily identified by a stranger approaching from the SW, but abeam of the hill and thence to the NE a sharp tip on the N side is very prominent.

(116) **Chart 16323.–Kvichak Bay,** the large arm at the head of Bristol Bay, extends NE from a line between the S entrance point of Egegik River and Etolin Point. The bay is an important fishing area for red salmon and has several canneries in its N part. Kvichak Bay is navigable for deep-draft vessels as far as the anchorage about 270° from the entrance to the Naknek River. The approach from the SW is restricted to a channel about 4 miles wide by **Big Flat,** an extensive tide flat extending off the E shore, and by **Dead Man Sands,** the large shoal in the middle of the bay NW of Johnston Hill. This shoal uncovers about 8 feet, and the area N of it is very foul. Fishing boats and collecting barges use the area at half tide or higher. Caution is necessary as a number of fishermen have been lost when trapped by the tides.

(117) About midway between Middle Bluff Light and Johnston Hill are two low spits which, while not discernible visually from a vessel in midchannel, are quite prominent on a radarscope and hence are valuable landmarks during periods of low visibility.

(118) N of Naknek River are numerous shoals and uncovered banks. The best water is on the E side of the bay between Naknek River and Koggiung, but local knowledge is needed to avoid the shoals. The land is low and flat, but the tanks and buildings of the canneries and the lights, which are maintained during the canning season, are good landmarks.

(119) Kvichak River, which empties into the head of Kvichak Bay, is the outlet for Lakes Iliamna and Clark, on the W side of the mountain system that borders Cook Inlet. At maximum ebb, the confluence of discharges from Naknek and Kvichak Rivers is apt to cause overfalls that are dangerous to small boats. Winds in excess of 20 knots, opposed to currents, make the bay quite rough for vessels of light draft.

(120) Good holding ground is available any place in Kvichak Bay where depths are suitable for anchorage. The bottom appears to consist of a layer of coarse gravel, sand, and stones, with mud beneath. The shoal depths permit a generous scope of chain, which is necessary because of the strong currents and frequent blows. Only one anchor is recommended because a vessel tends to swing to the direction of the current, despite wind direction, with consequent fouling if moored with two anchors. Experience has shown that a scope of 8 or 10 to 1 will withstand the effects of a 60-knot wind and a 3.5-knot current. With a strong wind opposed to current, a vessel will usually lie broadside to both, and while such a condition sometimes causes an anchor to walk, no such tendency has been experienced in this area.

(121) **Tides.**–The diurnal range of the tide at the Naknek River entrance is 22.6 feet. (See Tide Tables for predictions.)

(122) Navigators are reminded that the great range of tide in this bay must be considered when selecting an anchorage.

(123) **Currents.**–In Kvichak Bay and River the current is very strong, and consequently the channel shifts more or less each year. The current velocity is 3.5 knots in the lower part of the bay and 2.5 knots in the main ship anchorage off Naknek. In Naknek River at the **hole** off Morakas Point, 4 miles above the entrance, the current velocities are about 1 knot on the flood and 2 knots on the ebb. (See the Tidal Current Tables for predictions.)

(124) It is recommended that vessels anchor against the current, when it is at maximum strength, so that engines may be used to offset the sudden strain when the anchor is let go. Caution must also be exercised, on flood current, to keep the vessel from being carried beyond the anchorage area while maneuvering. Since the currents usually follow the axes of the bay channels, navigators should make ample allowance when proceeding between Kvichak and Nushagak Bays; otherwise they are apt to be set to the N or to the S when they are on an E or W course.

(125) **Weather and ice.**–The best weather in Kvichak and Nushagak Bays appears to be from the latter part of May through July. The bays are frozen over during the winter, and the ice usually does not break up until May. Vessels approaching the bays during this time of the year, which they frequently do in preparation for the fishing season, are cautioned to do so during daylight because of possible ice.

(126) Storms have a tendency to move into this area from the Aleutian Islands during August and September, and, while their intensity usually is diminished, their rate of movement is decreased and at times they remain stationary while the depressions fill, thus causing extended periods of poor weather. Fog is not as prevalent in these bays as farther to the SW in Bristol Bay proper. Storms S of the Alaska Peninsula at times cause strong winds to draw through the valleys, such as that of the Egegik River, thus giving the effect of williwaws near the valley entrances.

(127) Ice begins to form in November, but the salmon pack usually is shipped out in August and most canneries go on a caretaker status in September, with all floating equipment hauled out on ways. Winter activities in the area consist mostly of hunting and trapping, with transportation by skiplanes and dogsleds. During the ice-free months practically all transportation is by water or air, since there are virtually no roads.

(128) Mirages are seen frequently in the Kvichak Bay area during periods of calm, and particularly at low tide. They distort the appearance of bluffs and shorelines and make tanks and other elevated structures visible at greater distances than their altitudes warrant.

(129) **Egegik River** empties into Kvichak Bay 30 miles N of Cape Greig; **Cape Chichagof** is the N entrance point. It is a large river, 1 mile wide at the canneries, and is the outlet of **Becharof Lake.** (See also chart 16011.) It flows in a W direction for more than 28 miles.

(130) The lower part of the river forms **Egegik Bay.** A large part of its area is bare at low water. At the entrance, shoal water extends 6 miles offshore and should be given a wide berth by passing vessels. Entering vessels, depending upon their draft and condition of the sea, generally cross the entrance bar between half and full tide stages only.

(131) A seasonal buoy is about 2.5 miles off the entrance bar. Moderately heavy seas will break over this bar with any stage of tide, although it has 4 fathoms over it at high water. It is considered the most dangerous bar in the Bristol Bay area.

(132) In 1982, extensive shoaling was reported in the entrance to Egegik Bay; local knowledge is advised.

(133) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(134) The Bering Sea is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(135) Vessels using Southwest Alaska Pilots Association pilots and en route to Egegik can meet the pilot boat near Egegik Entrance Buoy 1 (58°15.5′N., 157°42.0′W.).

(136) The pilot boat can be contacted by calling "EGEGIK PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(137) At the entrance to Egegik River are two partially protected anchorages with limited swinging room that are used by power scows and tugs. The principal one is the channel inside **Coffee Point,** with depths up to 5 feet. A smaller anchorage is just E of the wharf at Egegik, with

depths from 6 to 11 feet. Ebb current at the smaller anchorage is very strong.

(138) Egegik River is navigable to small boats for its entire length into and across Becharof Lake. Although tidal to the foot of the rapids, mean range in its lagoons is only 1 foot; 5- to 6-foot drafts can be carried through the river, but the small lagoon reduces this to 3 or 4 feet, depending upon water stage. The controlling depth of the ¼-mile rapids of the lake outlet is 4 feet at low water stage. Although its midchannel current averages 5 knots, slow-speed powerboats run it frequently with and without handline aid from the shore. The river is open from May to October. In 1970, the river was obstructed by numerous boulders possibly carried in through ice action.

(139) Freight from oceangoing vessels is generally lightered into Egegik from the ship anchorage off Naknek. **Egegik** has limited facilities; a cannery wharf that is 80 feet long dries at low water. Water and a 5-ton crane are available. Gasoline and diesel fuel are available for local use only. A pier, 70 feet long and 40 feet wide, with dolphins 10 feet off each outer corner, is 0.2 mile ENE of the cannery, just N of the twin tanks. Depths of 6 to 11 feet are off the pier. A cannery wharf, across the river, is 150 feet long with little water at its face. This cannery is inoperative, but its marine railway is active and hauls out barges, piledrivers, and tugs for winter layup. A removable fish conveyor and three pile dolphins extend offshore from Coffee Point. The conveyor and dolphins are removed after the fishing season. Two stores remain open all year in Egegik. Their supplies are principally food staples and clothing.

(140) Radiotelegraph communications are maintained. Transportation is available by floatplane from May to October, and is usually obtained from Naknek village or King Salmon Airport. (See page T-21 for dates of ice breakup and freezeup.)

(141) **Naknek River** enters Kvichak Bay on the E side, about 10 miles S of Koggiung. **Cape Suworof** is the point on the N side of the entrance. The large 60-mile-long river has its source in **Lake Naknek,** where there are two villages.

(142) Anchorage can be had off the entrance to Naknek River in 35 to 40 feet; this is the head of navigation for deep-draft vessels. The approach channel to this anchorage has depths of 33 to 60 feet.

(143) The extreme range of **tide** at the river mouth is more than 25 feet. (See Tide Tables for predictions.)

(144) Shoals and banks, many of which uncover, fill the lower course of the river and extend 3 or 4 miles, then trend around N and join the body of the banks that fill the upper end of Kvichak Bay. With local knowledge, craft drawing 4 feet can enter the river at low water and proceed as far as the Diamond NN Cannery. In April 1980, a wreck, which covers with 13- to 15-foot tides, was reported in the vicinity of the Bumble Bee Cannery, about 300 yards off the opposite bank.

(145) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(146) The Bering Sea is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(147) Vessels using Southwest Alaska Pilots Association pilots and en route to Naknek can meet the pilot boat about 9 miles WSW of Naknek Light (58°42.5'N., 157°04.8'W.).

(148) The pilot boat can be contacted by calling "NAKNEK PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(149) **Naknek Light** (58°42.4'N., 157°05.0'W.), 78 feet above the water, is shown from a small house with a red and white diamond-shaped daymark on the S side of the entrance.

(150) The Naknek River has several large salmon canneries; all have wharves that bare alongside at low water. Some of the canneries have not operated for years. Deep-draft vessels anchor about 6 miles off the entrance to the river and lighter their freight ashore in barges which are available at Naknek; the approaches to the anchorages vary little from year to year. Vessels drawing up to 10 feet can go alongside the cannery wharves at half tide, but can remain afloat at low water only by shifting to what is called the **hole** just E of **Morakas Point,** which is 4 miles above the river mouth. The hole has depths of 9 to 14 feet at low water over a narrow crooked area 200 to 300 feet wide and about 0.5 mile long. Mooring buoys are maintained in this hole by the canneries on seasonal basis for use of power scows, tugs, and barges. Craft of these types, drawing up to about 12 feet, can proceed up the river with local knowledge some 12 miles from the mouth. In order to do this, vessels leave Naknek village 1 hour before high water. Beyond this point, small boats of 3-foot draft can proceed as far as the rapids, a distance of about 7.5 miles.

(151) An overhead power cable with a clearance of 48 feet crosses Naknek River about 1.3 miles above Morakas Point.

(152) (See page T-21 for dates of ice breakup and freezeup.)

(153) All active canneries maintain radio communication.

(154) The only marine railways in the Naknek River are those which each cannery maintains. These have a capacity up to 70 tons, draft of 10 feet, and approximate length of 120 feet. Limited repair facilities, including machine work, are available at the canneries, as well as water in any quantity. During the fishing season, water is available at the main ship anchorage by water barge.

(155) **Naknek** is on the N side of the Naknek River about 1.5 miles from the mouth. A nurse is on duty during the winter, and, during the cannery season, each cannery employs a doctor whose services are available to the public for a fee. Weekly mail service is by plane throughout the year. Regular scheduled steamers also carry mail during the summer. A road leads 0.8 mile inland to a lake used as a landing place for floatplanes; another road goes about 12 miles SE to **King Salmon Airport.** Transportation over land in this area is entirely by plane. Several floatplanes at the inland lake are available for hire or charter. The airport has scheduled freight and passenger service to Anchorage. There is a telephone line from Naknek to the airport.

(156) Diesel oil, gasoline, and lubricating oil are available in quantities sufficient for normal demands, and limited amounts of coal and stove oil also are available. Delivery can be made alongside the fuel dock for vessels drawing up to 10 feet at better than half tide or by drums to ships at anchorage. There is no fuel oil. Provisions in limited quantities are available.

(157) **South Naknek** on the S side of the Naknek River directly across from Naknek, has a school and a cannery that operates a general merchandise store.

(158) A cannery wharf with a removable fish conveyor and two pile mooring dolphins extend from the S shore of the river, about 0.7 mile W of South Naknek. The conveyor and dolphins are removed after the annual fishing season.

(159) **Weather.**–Nearness to the ocean tends to provide King Salmon with a climate that is predominantly maritime in character, with diurnal and seasonal temperature ranges normally confined to rather narrow limits. However, the area occasionally experiences definite continental influences that cause temperature extremes which tend to exaggerate the climatic conditions generally prevailing. The extreme maximum temperature for King Salmon is 88° F, but days in

summer with maximum readings reaching the 80° F mark are extremely rare. In fact, July, the warmest month, averages only 5 days with temperatures reaching 70° F or above. The coldest temperature on record is –43° F in January 1919.

(160) From December through March the area experiences rather strong winds, due to the passage of E moving Aleutian lows. The strongest winds are usually from a N direction, developing after the low centers have passed on E of the local area. Winds of 50 m.p.h. or more have occurred in all months with an extreme of 94 m.p.h. in February 1952.

(161) Cloud coverage in the King Salmon area is generally quite high, averaging about eight-tenths the year around. Mountain ranges to the S, E, and W tend to provide uplift for air moving toward King Salmon from these directions and produce considerable cloudiness which is carried out across the local area. When the wind movement is inland from the SW, the air arrives carrying a high moisture content to condense in low level cloudiness, and this action contributes to the frequent fog occurrences all months of the year. Fog development is most frequent during July and August. During the winter the high moisture content of the air causes substantial accumulations of frost on outside objects.

(162) Seasonal snowfall averages about 45 inches; the maximum depth on the ground during the winter season averages about 10 inches. This indicates the extent of melting that takes place with the snow accumulation. Although most of the snow is received during periods of general snowfall over most of the SW mainland, a considerable amount of snow is brought in as snow showers that move inland from the Bristol Bay area. These showers are generally quite local and usually of short duration, but they often follow in rapid succession to bring sizable accumulations of snow within relatively short periods of time. December, with an average of about 9 inches of snowfall, has the greatest monthly average snowfall amount.

(163) Ice in the bay near King Salmon usually becomes safe for man around November 11, with the Naknek River becoming safe for man around November 25. Breakup on the bay averages about April 6; the breakup on the river averages about April 18.

(164) (See page T-5 for **King Salmon Climatological Table.**)

(165) Bristol Bay Cannery, about 2.5 miles N of Naknek River entrance, has a wharf that bares alongside at low water.

(166) **Libbyville,** on the E side of Kvichak Bay, 3.5 miles N of Naknek River entrance, has a cannery with a 100-foot-long wharf.

(167) Common practice in this area is to avoid all movement of vessels N of Naknek River at the lower stages of the tide or on a falling tide. At or near high water it is safe to navigate almost any part of the area with vessels drawing up to 7 or 8 feet; vessels going aground on a rising tide are floated in a very short time and may proceed. No known rocks exist on the shoals, and temporary groundings do not often damage vessels.

(168) Most of the area between Naknek and Kvichak Rivers bares at some stage of the tide.

(169) **The Bend Light** (58°49.8'N., 157°00.3'W.), 30 feet above the water, is shown from a square frame with a red and white diamond-shaped daymark. The light serves as a useful aid to vessels and barges of shallow draft using the E channel from Libbyville to Koggiung where depths vary from 3 to 23 feet at low water. Local knowledge is necessary to avoid grounding on a falling tide.

(170) **Koggiung,** a village on the E side of Kvichak River, has several canneries. All of the wharves are dry at low water and have mud bottom alongside. All have water connections. Fuel oil, diesel oil, and gasoline are stored for cannery use.

(171) The longest wharf at Koggiung is 450 feet. The marine railway at this wharf can haul out vessels up to 60 tons at high water.

(172) **Kvichak River** (see chart 16013), from Koggiung to Iliamna Lake, is 50 miles long. In the upper half of its course it is much broken by islands and bars into narrow, shallow channels. The lower half is tidal.

(173) Occasionally vessels drawing 14 feet have ascended the river as far as the mouth of Alagnak River, but anchorage is difficult to find. Kvichak River is navigable for cannery tenders of 10-foot draft to **Alagnak River,** 22 miles above the mouth of Kvichak River. Launches of 3- to 4-foot draft can go on up into Iliamna Lake.

(174) In 1984, the channels through the entrance to Kvichak River were reported to be extremely changeable. Local knowledge is advised.

(175) The Kvichak River has four recommended anchorages where mooring buoys are maintained during the fishing season. Water is available at the canneries.

(176) At **Graveyard Point,** near the mouth, fair protection is available in depths of 10 to 12 feet in all weather except strong SE storms. The bottom is fine gray sand with good holding ground.

(177) **Graveyard Point Light** (58°52.1'N., 157°00.8'W.), 40 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark 0.7 mile S of Graveyard Point.

(178) Off **Nakeen** and the mouth of **Squaw Creek,** good protection in all weather is afforded in depths of 13 to 23 feet. The bottom is fine gray sand; the holding ground is good.

(179) **Duck Creek Light** (58°57.3'N., 157°01.7'W.), 48 feet above the water, is shown from a square frame with a red and white diamond-shaped daymark on S point of entrance to Duck Creek.

(180) At **Kvichak** good protection is afforded in depths of 8 to 10 feet in all weather except a strong N storm. The bottom is gray sand; the holding ground is good.

(181) At **Levelock** (see chart 16011) good protection is afforded in all weather, in 8 to 10 feet, fine gray sand bottom, with good holding ground.

(182) Common practice on the Kvichak River is to restrict navigation to the direction of the current and to a stage about half tide, if possible. Vessels grounding on a rising tide are floated in a short time, and temporary groundings cause no damage since there are no rocks on the shoals.

(183) Local knowledge of the channels is necessary, and anyone not thoroughly familiar with the river is strongly advised to obtain a pilot from one of the canneries.

(184) **Chart 16013.–Iliamna Lake** is about 70 miles long and generally from 7 to 17 miles wide. It is about 50 feet above tidewater. Reported soundings indicate a depth at the E end of many hundred feet. The lake is usually frozen from late December until late in May; the snow leaves the low ground in April, remaining until June in the pass between Iliamna Lake and Cook Inlet. Some snow may be expected in September, but the ground is not permanently covered at low altitudes until some months later.

(185) **Old Iliamna** is an abandoned village 3.5 miles above the mouth of the **Iliamna River,** which drains into the E end of Iliamna Lake.

(186) A 15.5-mile State-maintained gravel road connects Pile Bay, at the E end of Iliamna Lake, and Williamsport on the W shore of Iliamna Bay. The road is open from June to

October. (See chapter 4, for a description of facilities available at Williamsport.)

(187) **Newhalen River** (59°41.5'N., 154°56.0'W.), about 20 miles long, connects Iliamna Lake with Lake Clark. The upper 10 miles can be navigated by canoes and poling boats. Rapids and reported falls make even canoe navigation impossible for the lower 10 miles. These rapids may be avoided by a 5-mile portage.

(188) **Iliamna** is near the mouth of Newhalen River. An airfield is adjacent to the village.

(189) **Lake Clark** is about 45 miles long and from 1 to 3.5 miles wide. It is about 220 feet above tidewater, and is tributary to Iliamna Lake and Newhalen River.

(190) **Chart 16322.–Nushagak Bay** and **Nushagak River,** on the N side of Bristol Bay near its head, are important for the extensive salmon fishing and a number of large canneries that operate during the summer. The bay is 17.5 miles wide at the entrance between Protection Point and Etolin Point. The surveys of 1948-50 show that the bars and channels in the upper bay and river have changed considerably. Local authorities state that the area between Clarks Point and Dillingham (Snag Point) is particularly subject to change on the ice runout each spring.

(191) Nushagak Bay and River are obstructed by extensive shoals near the shores, and by long bars, partly bare at low water, which generally extend in the direction of the channels. In the absence of aids, navigation is safe only in the daytime when the marks and distant peaks can be seen. The worst dangers in the approach are the extensive shoals S and SE of Cape Constantine, the outer one being nearly out of sight of land.

(192) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(193) The Bering Sea is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(194) Vessels using Southwest Alaska Pilots Association pilots and en route to Nashagak Bay can meet the pilot boat close aboard Nushagak Bay Entrance Buoy 2 (58°33.7'N., 158°24.2'W.); a seasonal aid.

(195) The pilot boat can be contacted by calling "NUSHAGAK BAY PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(196) N of Dillingham is a sparse growth of timber, which becomes heavy farther inland, but to the S are only occasional clumps of alder bushes.

(197) The peninsula of **Cape Constantine** is low rolling tundra country, with bluffs in places. **Nichols Hills,** 125 feet high, are small sand knolls, the highest part of a ridge that follows the E side of the cape, and is 5 miles NW of Protection Point.

(198) At the SW end and on the SE side of the cape are the entrances of two lagoons that can be entered by boats at high water when there is no surf. At low tide, water remains in the entrance and for a short distance inside the first lagoon; the second lagoon is bare.

(199) Shoals with little water on them in places extend 6 miles S from Cape Constantine, and the outer shoal, Ustiugof Shoal, is 8 to 9 miles SE from the cape. These shoals are in the form of long ridges trending in the direction of the set of the tidal currents around the cape to and from Nushagak Bay. They are steep-to, especially on the offshore side, and soundings will not give sufficient warning to avoid them. The tidal currents NE of **Sterling Shoal,** off Cape Constantine, have a velocity of about 2 knots. (See the Tidal Current Tables for predictions.)

(200) **Ustiugof Shoal** is a narrow ridge with a least depth of 13 feet, and has a length of 15 miles in a 052° direction. Close to its SE side are depths of 11 fathoms or more. From a vessel near the shoal, Cape Constantine can be seen in clear weather. The greatest care is required when S or SE of the cape. The shoaler ridges are generally indicated by rip or breakers at low water, but there is generally nothing to indicate Ustiugof Shoal.

(201) **Protection Point,** the E end of Cape Constantine, is a low marshy spit which extends 1.5 miles from the higher land. On the N side of the point, 2 miles WNW of its end, is the entrance to a lagoon; small boats can anchor in, or close inside the entrance, but the current is strong on the ebb. The current velocity off the point is about 2 knots on the flood and 3 knots on the ebb. A narrow shoal which uncovers in places at low water extends 4.2 miles S from the point. The S half of the shoal is about a mile from shore; between the point and the N end of the shoal is a narrow channel. A detached shoal about 2 miles E from the point has a least depth of 15 feet.

(202) **Nichols Spit,** E of Nichols Hills, forms a cove, dry at low water, that can be entered by boats at high water and affords shelter except from N winds.

(203) **Igushik River,** 15 miles N of Protection Point, is a crooked winding river on the W side of the bay; vessels up to about 24-foot draft have been taken out. The channel into the river is not surveyed. The flat on the E side of the channel leading to the mouth of the river shows for nearly its full length at low water. The bar at the entrance of the channel has depths of 5 to 14 feet on it, and is about 7.5 miles SE of the mouth of the river and 8.8 miles N from Protection Point.

(204) **Igushik Ridge,** on the W side of Igushik River, is prominent, being about 260 feet high near its N end, where it breaks sharply to the river. The peninsula E of the river is low.

(205) **Snake River,** 10 miles N of the mouth of Igushik River, is used only by fishing boats. The channel leading to the mouth of Snake River has depths of about 7 to 29 feet, and is well defined at low water by the flats, which uncover, except at the entrance.

(206) The land on the E side of the bay is low and rolling tundra, and the entrance point is rounding without a distinct point.

(207) **Etolin Point,** the larger rounded point between Kvichak and Nushagak Bays, is flat, tundra covered, with several shallow lakes, some of which have been used for floatplane landings. The W extremity of the point is a 90-foot-high bluff. A 149-foot-high rounded hill, 2 miles E of the point, is a prominent landmark when approaching from seaward.

(208) Shoals covered less than 12 feet extend 5 miles S of the rounding point SE of Etolin Point, while depths of 30 feet or less are more than 10 miles from the shore. The shoaling is gradual, and sounding is a good guide in approaching the E shore when just outside a line joining Etolin and Protection Points. A seasonal buoy on the E side of the entrance to Nushagak Bay is near this line. Above this line in the E half of the bay are long shoals, most of which show in places at low water. A **341°** lighted range marks the channel to Ekuk. **Ekuk Bluff,** NNW of Etolin Point, is 170 feet high and prominent. **Ekuk** is a native village on a spit at the N end of the bluff. The lagoon inside the spit is bare at low water. The cannery wharf at Ekuk is 150 feet long with 7 feet alongside at high water. Gasoline, diesel oil, and fuel oil are stored for cannery use, and water is available.

(209) **Clarks Point,** 1.5 miles N of Ekuk, is low and has an extensive gravel beach. On the point are a large Alaska

Packers Association cannery and the village of **Clarks Point.** The ridge, 169 feet high, terminates in a bluff at the shoreline 0.6 mile S of the point and is prominent from seaward. Several large water tanks near the shore end of the bluff are prominent landmarks. A wreck, awash at low water, is about 1 mile SW of the cannery.

(210) The Alaska Packers Association wharf at Clarks Point is 175 feet long and has a depth alongside of about 8 feet at high water. A T-pier with a face of 80 feet and a depth alongside of about 13 feet at high water is extended out 90 feet from the face of the main wharf during the cannery season. The main wharf has a 20-ton crane on the NE corner and a 3-ton crane on the SW corner. Radiotelephone communication is maintained.

(211) Water is piped to the wharf. A general store is operated throughout the year. Gasoline, diesel oil, and fuel oil are stored for cannery use. The marine railway can haul out vessels up to 150 tons at high tide; a small machine shop is nearby.

(212) **Clark Slough,** 1.5 miles NE of Clarks Point, is navigable for launches at high water for about 17 miles. The bar that must be crossed at the edge of **Combine Flats** when entering the slough bares at low water. Fishing craft and tenders use Clark Slough and the part of Combine Flats behind Clarks Point for shelter during heavy SW weather.

(213) **Nushagak Point,** on the E side of Nushagak Bay and 7 miles N from Clarks Point, is the outer end of a prominent 250-foot ridge, to the E of which is a deep valley. **Nushagak,** a small village on the point has two abandoned canneries which serve as a fish camp during summer. There are no wharves. Vessels may approach as closely as their draft permits and use small boats or barges for reaching the shore. Landing at low water is difficult because of the very sticky mud on the flats, but a good landing can be made on the gravel beach at high water. Nushagak has no post office or supplies. Mail is received through Dillingham.

(214) From **Coffee Point** to **Snag Point,** 9 miles to the NE, the W shore of Nushagak Bay consists mostly of bluffs. **Bradford Point,** between Coffee Point and Snag Point, is opposite **Grassy Island,** which is awash at highest tides.

(215) **Kanakanak,** at Bradford Point, is a small settlement which includes the former sites of Dillingham and Kanakanak, and is connected by roads with the present site of Dillingham at Snag Point. A hospital is in Kanakanak, about 7 miles from Dillingham.

(216) **Dillingham** is the principal settlement and source of supply in Nushagak Bay. The village has a school and churches, and hospital facilities at Kanakanak may be reached by road. Ordinary supplies are available at several general stores. Petroleum products, except fuel oil, can be obtained from the Delta Western Plant. Fuel oil for the canneries in Nushagak Bay is generally brought in by tanker early in the season and transferred to cannery barges at the anchorage off Clarks Point. Limited quantities of fuel oil can be obtained from the tanks of supply vessels handling general cargo for the bay. Larger quantities are available at the Tesoro Bulk Plant.

(217) Vessels drawing 23 feet ascend the bay on high tide and anchor just below Snag Point. Supplies are lightered to Dillingham either by the canneries' equipment or by private equipment. The oil and cannery wharves can be approached only at high tide; vessels drawing 12 feet moor at these wharves on higher high tides. A 200-foot City Dock accommodates large ships and barges for unloading, but goes dry at low tide.

(218) The cannery at Dillingham has a wharf 178 feet long with a depth alongside of 2 feet at low water and can be used by small tenders at high tide. Gasoline, diesel oil, and fuel oils are stored for cannery use. Telephone service is available. The cannery maintains radiotelephone and radiotelegraph communications. A marine railway at the cannery can haul out vessels up to 100 tons at high tide.

(219) **Dillingham Small-Boat Harbor** on the W side of Dillingham provides about 950 feet of float space for small fishing and pleasure craft. A dredged 5-foot channel leads from Nushagak Bay to the basin, but should only be used with local knowledge. The basin retains less than 5 feet of water behind a rock sill. The entrance channel and basin are subject to rapid shoaling due to sediments from Nushagak Bay, and annual maintenance dredging is attempted each year. The **harbormaster's office** is across from the small boat harbor.

(220) An airport 1.5 miles W of the village, provides air services the year round. An aerolight is at the airport.

(221) **Wood River** has its entrance N of Snag Point, and has a length of about 24 miles to **Lake Aleknagik.** Its width varies from about 600 yards in its lower part to about 50 yards where it joins the lake. A depth of 3 to 3½ feet at low water can be carried 15 miles upriver and not more than 2½ feet to the lake; at high water 4 feet can be carried this distance. The lake is about 24 miles long and navigable for its entire length.

(222) **Prominent features.**–N of Nushagak Bay is a chain of prominent mountains that are snow-covered in early summer, but are bare except in the ravines by the middle of July. In clear weather the peaks show from a long distance seaward, but much of the time they are obscured by clouds and haze. Many of the summits are shown on the chart.

(223) **Channels.**–The controlling depth in Nushagak Bay and River is about 10 feet to Dillingham, 30 miles above the mouth. Small vessels of 2½-foot draft can continue up Nushagak River to **Nunachuak,** 100 miles above the mouth.

(224) **Anchorages.**–Vessels can anchor in the outer part of Nushagak Bay in N weather. The wind from this direction does not appear to blow with force during the summer. This part of the bay is exposed to a heavy sea during E to S weather. The strong current causes a vessel at anchor to lie stern or broadside to the sea when the wind opposes the current. The bars seem to afford little protection. In SW and NE weather, the W and E sides of the bay, respectively, should be selected.

(225) Good anchorage can be found S of Ekuk Bluff, in 30 to 35 feet, mud bottom, where the current is not strong. During the cannery season, mooring buoys, placed in a line parallel to the beach, are maintained for tally barges in the area S of Ekuk Bluff and E of the main channel.

(226) In SW weather, good anchorage in about 18 feet is offered to vessels drawing 12 feet or less, 1 mile 021° from Protection Point. Deeper draft vessels should anchor farther NE.

(227) Above Ekuk good anchorage will be found wherever the depth will permit. This part of the bay is very choppy in heavy weather, but the sea seldom, if ever, is heavy enough to endanger a vessel. The bottom is sand, but the anchor holds well if given a scope of about 60 fathoms. The currents are strong, and care should be taken to avoid dragging. Vessels remaining long are anchored in line in the channel to interfere as little as possible with the nets. During the cannery season, mooring buoys are placed by the canneries in lines parallel to the channel off Ekuk Bluff and Clarks Point.

(228) **Tides.**–The tides in Nushagak Bay are influenced to some extent by strong winds. The diurnal range of tide at Clarks Point is 19.5 feet. (See Tide Tables for predictions.)

(229) **Currents.**–The currents in Nushagak Bay have considerable strength; velocities of about 4 knots have been observed on both the flood and the ebb. The ebb usually begins shortly before high water and continues to run after low

water, roughly about 7 hours ebb and 5 hours flood. The period of slack water is usually short. The currents generally set fair with the channels, but in navigating the bay the course is often across the current and allowance must be made for it. The velocity is influenced by freshets and continued winds, which also affect the times of slack water. A current of over 5 knots may be experienced at times. (See Tidal Current Tables for predictions in Nushagak Bay.)

(230) **Weather.**–The weather is variable, but it is considered better than farther W. Spells of bad weather occur, and their duration increases in the late summer. SW winds sometimes predominate in the early summer and E winds later. E winds bring thick weather and rain, and are accompanied by a low or falling barometer. SW winds, if moderate, bring fair weather, but if strong bring rain. NW winds bring fine clear weather, but seldom blow steadily. In settled weather the wind may be light from any direction, accompanied by showers. After a gale there is usually no shifting of the wind or sudden breaking of the storm, but the wind decreases, and there is a gradual return to fair weather. Fog sometimes sets in from the sea, but there is little fog during the summer.

(231) **Ice.**–The movement of the ice is variable, depending upon the direction of the wind. It is said that the arrival of cannery vessels has been as late as June 17. The ice is not solid, but drifts in floes with the wind and current. NE winds drive the ice out of the upper bay to ground and breakup on the shores and sandbars of the W side of the bay. Cannery floating equipment is hauled out upon completion of the season in mid-August, and the salmon pack is taken out at that time. One winter supply vessel generally makes the last trip into the bay about the middle of September. (See page T-21 for dates of ice breakup and freezeup.)

(232) **Routes.**–The channels and bars of Nushagak Bay and River are probably subject to constant change because of the action of currents and to a smaller extent by the action of the sea. Changes of considerable extent are reported by those of long experience. A margin of safety should therefore be allowed for the soundings found by the survey. It is also well to remember that with a very low tide the water may fall as much as 4½ feet below the plane of reference of the chart.

(233) The navigation of the bay is not easy, and a stranger should proceed with great caution. Tide rips may be taken as good evidence of shoals. The shoals are long ridges trending in the same directions as the tidal currents, and the danger of stranding is greatly increased if a course is set across the currents. A stranger should navigate only on a rising tide and is advised to communicate by radio with one of the canneries and arrange to have a pilot sent out.

(234) It is recommended that vessels bound to Nushagak make Cape Greig (see chart 16011), which is high and easily recognized and marked by a light, then shape the course for the entrance lighted bell buoy, favoring the Etolin Point side in preference to the Cape Constantine side. The currents that may be experienced when crossing from Cape Greig are not known, but there may be considerable set. Great care should therefore be exercised in approaching the entrance. The land at the entrance when first seen in approaching is indefinite, and presents no feature that can be readily identified.

(235) After making the entrance buoy enter the bay on the 341° lighted range through **Ship Channel.** Favor the E side of the range until clear of the 6-foot spot on the E edge of **Long Sands** and take care to avoid the 3- and 4-foot spots near the edges of the channel through the N end of the bar. When through the cut on the bar, leave the range and follow the general trend of the shore to off **Ekuk.**

(236) **Note.**–On the flood, just inside the bar, cross a distinct rip and keep it about 150 feet off the port side. The waters of the upper bay and river carry heavy sediment, and the only indications of shoals usually are swirls or rips. On the ebb the waters of the upper bay are practically fresh, but they become brackish on the flood.

(237) From Clarks Point to the upper canneries, numerous mud and sandbars are exposed at low water in the central and W parts of the river. Shoal water in the middle of the river is extensive and restricts crossing during low water; nearly all navigation of this section is done on a rising or high tide. Navigation of this area should not be attempted by large vessels except on a rising tide and then only with local knowledge or with a local pilot. Local authorities state that the area is subject to change on the ice runoff each spring.

(238) Present traffic follows the E shore above Clarks Point, keeping about 1 mile off. The channel follows close along the edge of the E mudflats and is marked by local buoyage during the summer. The W line of this buoyage marks the E edge of the channel, and the other two or three lines mark set-net sites. The channel is 0.8 mile offshore at the N end of Combine Flats and 0.5 mile off at Nushagak Point. One mile below Nushagak Point, vessels cross over and pass 0.2 mile off Bradford Point, then follow the W shore at this distance to the anchorage off Dillingham. Traffic generally starts upriver on half-flood tide.

(239) **Repairs.**–The large tides and the flats make it easy to beach a vessel of drafts up to about 18 feet. A good place is at Clarks Point. Small machine repairs can generally be done at the companies' shops.

(240) **Communications.**–The Northland Marine Lines makes several trips a year into the Nushagak Bay area, the earliest about May 15 and the latest about September 15, depending upon ice conditions. Commercial airlines serve the area. Dog teams are used to some extent by natives and trappers during the winter, and small boats are used for local travel during the summer. Tankers and barges bring in diesel oil, gasoline, lubricating oil, and fuel oil. All canneries and their tenders are equipped with radiotelephone, and radio traffic can be handled through the cannery shore stations during the season. Radiotelephones are maintained by cannery caretakers during the winter.

(241) **Charts 16011, 16315, 16305.**–The area between Cape Constantine and Cape Newenham (58°40′N., 162°10′W.) is unsurveyed, and there are indications that the present charts are considerably in error. Vessels setting a course from outside Ustiugof Shoal (58°17.0′N., 158°39.0′W.), to pass about 2 miles off Cape Peirce (58°38.0′N., 161°45.0′W.), in thick but otherwise moderate weather, have reported making Hagemeister Island dead ahead. This undoubtedly is because of a N set in this vicinity. In the thick weather which prevails in this locality safety is assured only by constant sounding.

(242) **Kulukak Bay,** entered between **Kulukak Point,** 38 miles NW of Cape Constantine, and Right Hand Point, about 9 miles WSW, is shoal; there is a depth of 3 fathoms just inside the entrance and the N half dries at low water. The buildings of an abandoned native village are above the bluff at the NW corner of the bay.

(243) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(244) The Bering Sea is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(245) Vessels using Southwest Alaska Pilots Association pilots and en route to Kulukak Bay can meet the pilot boat about 3 miles S of Kulukak Point (58°51.0'N., 159°36.0'W.).

(246) The pilot boat can be contacted by calling "KULUKAK BAY PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(247) **Right Hand Point** is the S extremity of a mountainous peninsula that separates Kulukak Bay from Togiak Bay.

(248) **Walrus Islands,** consisting of three islands and three above-water rocks, are in the approach to Togiak Bay. Several shoals of 3 fathoms or less are between the islands as well as S of the group. Shoaling is rapid after reaching a depth of 3 fathoms, requiring continuous sounding while navigating these waters. Thick weather is frequent in this area, and often the higher islands are fog-capped when the weather is otherwise clear. The diurnal range of tide is 9.5 feet. The land areas and adjacent waters of Round Island, Crooked Island, High Island, Summit Island, The Twins, and Black Rock are established as the **Walrus Islands State Game Sanctuary.**

(249) **Round Island,** the easternmost of the group, is 1,410 feet high and is about 10 miles SSW of Right Hand Point. Access within a two mile radius of Round Island is prohibited without a permit from the Alaska Department of Fish and Game. The W side of the island is precipitous and bare in the lower elevations. A narrow beach makes around the E side. To the N the island terminates in a distinct pinnacle rock. A reef, bare in places and consisting of sand and smooth boulders, extends about 1.3 miles NW of the pinnacle rock.

(250) Indifferent anchorage may be found about 1 mile NE of the island in about 11 fathoms, hard sand bottom.

(251) **Crooked Island,** 1,254 feet high, is 9 miles WNW of Round Island; it is almost entirely covered by tundra. There are large coves on both the SW and E sides of the island. These coves have been reported to be shoal; the 3-fathom curve extending about 2 miles offshore on the W side of the island. About 0.5 mile off the E side of the island just S of the large cove, anchorage with protection from W to SW winds and good holding ground can be found. A bank, covered 2 fathoms or less, is about 1.5 miles off the NW side of the island. Shoal extends the full length of the W side of the island.

(252) **High Island,** the westernmost of the Walrus group, is 1,716 feet high and is 2 miles W of Crooked Island; this island is steep-to on its E and W sides, with a few strips of sand beach.

(253) **The Twins** are two isolated rocks 3 miles S of Crooked Island. The larger is 300 feet high; the lower and SW of the two is 100 feet high.

(254) **Black Rock,** 131 feet high, is 3 miles E of the N part of Crooked Island. From the air the rock appears to be an upthrust on a submerged ridge, the axis of which parallels that of Crooked Island. Black Rock, the SE tangent of Crooked Island, and the Twins are very nearly on range.

(255) **Summit Island,** 801 feet and 505 feet high near the S and N ends, respectively, is 8.5 miles WNW of Right Hand Point, and 2 miles from the E shore of Togiak Bay. Good anchorage, in 5 to 6 fathoms and sheltered from SW weather, may be had in a bight about 0.5 mile off the middle of the NE side of the island in 5 to 6 fathoms, sand bottom.

(256) **Togiak Bay,** N of the Walrus Islands, and about midway between Cape Constantine and Cape Newenham, is shoal; the head of the bay uncovers to the S for 3 to 4 miles. A submerged ledge and rock extend 0.2 and 0.5 mile, respectively, from **Rocky Point** at the E entrance of the bay.

(257) **Togiak** is near the head of the bay. The waters off Togiak are shallow and not navigable during low water. Good anchorage can be had for deeper draft vessels on the E side of the bay about 1 mile off **Anchor Point** in 5 to 6 fathoms of water, sand bottom.

(258) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(259) The Bering Sea is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(260) Vessels using Southwest Alaska Pilots Association pilots and en route to Togiak can meet the pilot boat about 1 mile S of Summit Island (58°50.0'N., 160°12.0'W.).

(261) The pilot boat can be contacted by calling "TOGIAK PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(262) **Hagemeister Island,** 10 miles W of High Island, is mountainous except for about 5 miles at the N end. Shoals surround the island and extend E 20 to 25 miles, including the area between Hagemeister Island and the Walrus group.

(263) Shoals and sand waves with depths less than 2 fathoms extend E and SE from the northern half of Hagemeister Island in the direction of High Island. Ice has been observed grounded there. Foul ground is also reported as extending N of the N point of the island.

(264) **Current** observations were made in June 1948 for a period of about 10 hours, about 8 miles SW of Hagemeister Island. The current sets approximately 335° and 165° with velocities at strength of about 0.8 knot and 1.5 knots, respectively. In June 1985, the NOAA Ship RAINIER anchored 3 miles off the SE corner of Hagemeister Island observed currents flooding 070° and ebbing 240° at velocities up to 4 knots.

(265) **Hagemeister Strait** is about 16 miles long between the island of that name and the mainland. It is 3 to 4 miles wide, but shingle spits contract it in two places to less than 2 miles. Good anchorage was found under **Tongue Point,** the shingle spit making out from the mainland about midway of the channel. Good anchorage can be found throughout the strait avoiding the shoal areas NE of Hagemeister Spit. In 1991 NOAA Ship RAINIER observed currents of 0.5 to 1.5 knots flooding **060°** and ebbing **220°** near Estus Point. Currents are significantly stronger near the western end of Hagenmeister Spit causing tide rips in the area. Strong currents and an unstable bottom result in shifting sand waves throughout the strait and its approaches. Shoal areas that lie directly S of the spits on both sides of the strait cause waves to break at times of heavy swell.

(266) The **Osviak River** empties into the strait about 13 miles W of Tongue Point. In 1991, NOAA Ship RAINIER reported an average river depth of 1.3 feet and that many portions of the river bare at low stages of tide. The channel runs approximately mid-stream. The river is navigable in this channel for two miles upstream of the entrance by shallow draft vessels when the tide is 5.3 feet or greater. The abandoned native village of **Osviak** is on the W bank of the river about 3 miles from the mouth.

(267) **Cape Peirce** (58°38.0'N., 161°45.0'W.), of moderate height and symmetrical form, is 22 miles W of the S end of Hagemeister Island, and 15 miles SE of Cape Newenham. A shoal area, with depths of 2 to 3 fathoms over it and possibly less, is reported to extend some distance W from the cape. Depths of 19 fathoms, about 7 miles WSW of the cape, were found outside the charted 20-fathom curve. Depths of 10 fathoms are found 2 miles S of the cape, and good anchorage in 10 fathoms is found inside **Shaiak Island,** (see chart 16300), just E of the cape. There are reports of good anchorage, sheltered from N weather, in the bight NW of

Cape Peirce. To make the anchorage from E, give Cape Peirce a berth of about 3 miles and steer **009°** for the junction of the NW end of the sand beach with the rocky shores; select anchorage at will off the sand beach. The approaches from W are clear except for the above-mentioned shoal.

(268) **Charts 16300, 16006, 16305.–Kuskokwim Bay** and **Kuskokwim River** open into the Bering Sea N of the entrance to Bristol Bay. The bay, filled with many flats, and hard steep-to shoals, is entered between Cape Newenham and **Cape Avinof,** 93 miles NW.

(269) The channels through the bay are not always apparent by the surface indications of the water. At times the channels will be smooth with rips on the shoals, and at other times the reverse will be true. The edges of the channels are often marked by long lines of foam, but occasionally the foam extends across the channels; it is well to approach these lines with caution. Navigation is recommended only at low water, when the mudflats are visible, enabling the channels between them to be followed. Because of the inequality of the tides, a vessel grounding at high water may not be refloated for several days.

(270) The 40-mile approach through **Eek Channel** to Kuskokwim River is a maze of shifting sandbars, both visible and covered, and blind channels. The channels in the bay and river undergo constant change from year to year, because of the action of the sea, currents, and ice; extreme caution and continuous soundings are necessary.

(271) The procedure usually followed is for a small pilot boat from Goodnews Bay to precede the vessel through these waters, constantly feeling out the channels and sounding.

(272) During S storms a heavy sea makes up the bay nearly to Eek Island, at the head of the bay, and vessels caught on a shoal are in danger of breaking up.

(273) The channel through Kuskokwim Bay and up Kuskokwim River to Bethel is marked by seasonal buoys. The deepest draft that should attempt to reach Bethel is about 15 feet.

(274) **Caution:** In November 1983, the Coast Guard reported that as a result of flooding in the area in May 1983, about 20 ocean shipping containers were washed into the Kuskokwim River from the riverbank at the village of Napakiak, about 12 miles SW of Bethel. Reports indicate that several of the containers sank in the river near the village, and the remainder of the containers were carried downriver and sank. Mariners are advised to exercise caution in navigating Kuskokwim Bay and River.

(275) **Cape Newenham** is the landfall for this region, and can be approached close-to with deep water. It is the end of a peninsula formed by a series of rough sawtoothed mountains. These mountains terminate in a level plateau that forms the immediate cape. In S weather a heavy sea and tide rips occur off Cape Newenham. In 1981, during heavy N winds, the NOAA Ship MILLER FREEMAN found a good anchorage in a small cove on the S side of the cape about 0.4 mile offshore S of Jagged Mountain in 10 fathoms, sand and mud bottom. Satisfactory anchorage for S or E weather can be had in about 8 fathoms off the small cove on the N side of the cape and about 3.5 miles from its outer end. An aero radiobeacon (58°39.4′N., 162°04.4′W.) is shown from the N side about 3 miles E from the outer end of the cape. About 1.3 miles ESE of the aero radiobeacon is a parabolic antenna.

(276) **Jagged Mountain** is a well-defined peak, the highest of the Cape Newenham group. Viewed from N, its slopes appear jagged.

(277) **Security Cove,** 9 miles ENE of Cape Newenham, is a good anchorage except with NW winds; the usual summer gales are SE. The bottom is even and shoals gradually. The best anchorage in 3½ fathoms, mud bottom, is about 0.8 mile NE of Castle Rock and on the range of Castle Rock and the first promontory SW. Water can be obtained from a stream which enters the cove. There is also good anchorage in 2 fathoms with good holding ground in the middle of the bight on the SW side of Castle Rock. This anchorage is less affected by the ground swell making along the coast from Cape Newenham than the anchorage in Security Cove.

(278) **Castle Rock,** the SW entrance point of Security Cove, is a small prominent headland, 260 feet high, joined to the land by a low neck. At the NE entrance point of Security Cove is a conspicuous pinnacle rock, 169 feet high, covered with light tundra.

(279) **Chagvan Mountain,** between Security Cove and Chagvan Bay, is smooth shaped and terminates in two high rounded knobs.

(280) **Chagvan Bay** has a narrow shoal entrance. Inside it is very shoal and cut up by bars that are bare at low water.

(281) **Red Mountain,** just S of Goodnews Bay, is a reddish color and conspicuous. From N it appears as a long ridge with the highest part at its N end.

(282) **Goodnews Bay** is shoal except for a channel with depths ranging from 1¼ to 12 fathoms that leads through the entrance to a point about 1 mile inside. This channel affords good anchorage, either in the middle of the entrance or up to 0.8 mile inside the bay on a line approximately NE of the S tangent of North Spit. The diurnal range of tide is 8.9 feet. Inside the entrance the strength of the tidal currents reaches a maximum of about 2.5 knots in a direction parallel to the axis of the channel. (See Tidal Current Tables for predictions.) Along the NE shore of South Spit the ebb current is very strong, and during the flood an eddy sets N along this shore. The holding ground is good. Small craft can select from the chart a place that affords the best shelter. A restricted anchorage for small vessels is about 1 mile S of the S entrance point, but local knowledge is necessary for its use. The sea from the outside is broken by the shoals off the entrance and does not reach the anchorage. With S or E winds, tide rips dangerous for small craft occur in the channel. The spits at the entrance are shingle and steep-to.

(283) **Platinum,** at the inner end of the spit on the S side of the entrance of Goodnews Bay, is the headquarters of a mining company and of most of the commercial activity in this area. The village has semiweekly airmail service during the summer and weekly service during the winter; an airplane landing strip is here. Radiotelephone and radiotelegraph communications are maintained.

(284) Groceries, general supplies, petroleum products, and water are available at Platinum. The small-boat basin just S of the oil-storage tanks on the NE side of South Spit can be entered only at high water as the entrance bares at low water. A road leads from the village to the storage tanks and boat basin. The platinum mines are about 15 miles SE of the village.

(285) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(286) The Bering Sea is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(287) Vessels using Southwest Alaska Pilots Association pilots and en route to Goodnews Bay can meet the pilot boat about 7.5 miles SW of Platinum (59°01.0′N., 161°49.4′W.).

(288) The pilot boat can be contacted by calling "GOODNEWS BAY PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(289) **Beluga Hill** is a prominent conical hill, 924 feet high, with a steep, rocky face that rises abruptly from the N side of Goodnews Bay. Although lower than the mountains behind it, the hill usually stands out prominently from all parts of Kuskokwim Bay.

(290) To enter Goodnews Bay from a point about 2.5 miles S by W of the entrance, stand in on the NE-SW range on course **037°** until the E-W range, nearing 090°30′, closes; then steer **000°** for about 0.7 mile or until abeam of W tangent of the spit; then follow South Spit at a distance of 0.25 mile, and cross the entrance to the small-boat anchorage.

(291) To go to the anchorage in the N part of the bay, round North Spit at a distance of 300 yards and steer **312°** for the high bluffs on the W side of the bay. Hold this course for about 2 miles, or until the E side of Beluga Hill is in range with the flat-topped mountain just back of Goodnews Bay village. Then head up to Beluga Hill and hold the range until up to the anchorage under the mountain.

(292) About 6 feet of water will be found here at low tide. In 1913 the survey ship YUKON was at anchor here during a N gale. There is no protection in S or E weather. A stream enters the bay here. The bay has a good shingle beach.

(293) It should be noted that this route has not been surveyed, and there may be, in places, less than 6 feet of water at low tide. This route should be used with caution and only on a rising tide. Keep sounding constantly. On the bluffs at the foot of Beluga Hill is a cabin.

(294) The UNITED, drawing 16 feet, was taken into Goodnews Bay. Good anchorage is reported in 7 to 11 fathoms, 2 miles NNE from the bay entrance on line to Beluga Hill. This indicates that deep water can be carried farther into the bay in the main channel than is indicated on the chart.

(295) **Goodnews Bay (Goodnews)** is a small village with a school at the head of Goodnews Bay. The channel to the village is shallow and winding so that local knowledge is desirable, but can be followed by small boats at low water when the bars are visible.

(296) **Carter Spit** (59°19.0′N., 162°00.0′W.), on the E side of Kuskokwim Bay, is a low sandspit about 4.5 miles long and from 50 to 300 yards wide. Carter Spit encloses **Carter Bay,** which is a wide area of shoals and mudflats. Around the end of the sandspit a narrow channel is scoured out, affording anchorage for launches and small craft, but without protection from N. A small stream, known as **Indian River,** flows into the E side of Carter Bay near two abandoned cabins formerly called **Carter.** Water can be obtained by boats from Indian River at high water.

(297) **Explorer Mountain** is the highest peak N of Goodnews Bay. From S it appears as a long ridge, and is recognized by three deep gulleys on its side. From W it appears as a pyramid peak, the highest of the group.

(298) **Tooth Mountain,** a flat-topped mountain in the front range, has a sharp, rocky pinnacle on the N edge of its summit. It is easily recognized from the vicinity of Carter Spit.

(299) **Figure IV Mountain** is a sharp peak in the front range E of Jacksmith Bay. The deep ravines on the side of this mountain form a Roman numeral IV, that is conspicuous from W when the ravines are filled with snow. In the latter part of the summer, the snow disappears from the ravines.

(300) **Cone Mountain** is a large conical mountain in the first range.

(301) **Yukon Hill** is low but is the N end of the front range paralleling the coast; it is visible from the entrance of Eek Channel. From W the hill is not distinguishable, as it has the receding range for a background.

(302) **Thumb Mountain** is a fairly sharp summit in the range that recedes from Jacksmith Bay. From off Quinhagak it resembles a huge thumb placed on a high flat mountain plateau. As Eek Island is approached, the mountain appears as a less distinctive ridge.

(303) **Jacksmith Bay,** the large indention 14 miles N of Carter Spit, is bare at low tide.

(304) **Quinhagak,** 66 miles N of Cape Newenham, is difficult to approach by water because of the great mudflats bordering its shores. Launches can enter the river here only at the highest tides, and even small craft can hardly get within sight of the village and remain afloat at low water. Supplies are landed with great difficulty, because of the extensive flats and their exposure. Quinhagak has a Moravian mission, a store, and a school. Radiotelegraph communications are maintained. A limited amount of supplies may be procured. The church steeple is sometimes visible from Eek Channel. **Kanektok River,** entering Kuskokwim Bay at Quinhagak, runs fine clear mountain water at all stages of the tide.

(305) **Warehouse Bluff,** a long dark-colored bluff about 11 miles NW of Quinhagak, is an important landmark, as it is the first land on the E bank to be sighted when ascending Eek Channel. No objects on the W shore are visible until approaching the head of Eek Channel.

(306) **Warehouse Creek,** 2 miles above Warehouse Bluff, is deep and can be approached through a long tortuous channel that can be followed by small craft when the mudflats are bare. Small craft may find shelter here. The greatest range of tide in the bay occurs in the vicinity of Warehouse Creek. Inside the creek there is just swinging room for a 75-foot vessel riding to 15 fathoms of chain.

(307) In the early days trading schooners ascended the bay only to Warehouse Creek. Natives and traders from various bay and river points assembled here to await the coming of the schooner. At one time some small warehouses were built here, but no trace of them now remain.

(308) **Kuskokwak Creek** flows into the E side of the bay 4 miles S of Beacon Point. It is approached through a short channel across the flats and affords a good shelter for launches and other small craft. Just inside the mouth of this creek is a depth of 4 fathoms.

(309) At **Cape Avinof,** on the W side of Kuskokwim Bay, the E shore of the Bering Sea turns NW.

(310) **Kwigillingok** is a native village on the W side of the entrance to the bay. Radiotelegraph service is maintained.

(311) **Beacon Point,** 12 miles N of Warehouse Bluff, is flat and barely above storm high water. A line between Beacon Point and **Popokamiut,** a native fishing village on the W shore opposite Beacon Point, is considered the dividing line between Kuskokwim River and Kuskokwim Bay. The W shore of Kuskokwim Bay has not been surveyed.

(312) **Eek Island** is a grass-covered mudflat cut up by deep sloughs, and is covered by the higher tides. The island is a feeding ground for many thousands of ducks and geese.

(313) **West Point** is a fishing camp on the W bank of the river just above Eek Island. The mudbank making out from West Point has extended itself considerably since the time of the survey.

(314) **Eek River** is a large tributary flowing into the Kuskokwim River on its E side just above Eek Island. It is navigable by launches for 15 to 20 miles. The river rises in the mountains about 60 miles distant; its waters are muddy and silt laden.

(315) **Eek,** on the E side of the Eek River about 8 miles by boat from its mouth, is a large Indian village with a general store and school. Daily radio schedules are maintained with Bethel. Limited supplies of gasoline and canned goods are available.

(316) **Bethel,** 65 miles up the Kuskokwim River, is considered the head of ocean navigation. From here river boats operate to points on the upper river. The diurnal range of tide is 4.0 feet, but the stage of the river influences the depth.

(317) **Weather.**–The two main topographical features affecting Bethel's climate are (1) the Bering Sea, which is about 100 miles to the W and SW; and (2) the Kilbuck Range of mountains, about 40 miles to the E and SE of the station. This range, averaging about 4,000 feet in height, extends roughly in a N-S direction in that part nearest to Bethel. Some 160 miles SE of the Kilbuck Range, the Aleutians, extending in a NE-SW direction, provides an additional natural barrier to many of the storms originating on the outward end of the Aleutian Chain and moving out through the Gulf of Alaska. Both ranges tend to direct some of the storms NE into the Bering Sea, and thus directly affect the Bethel area. During invasions of such storms, it is not uncommon for wind velocities to exceed 50 m.p.h. Maximum speeds usually accompany NE winds in the winter and SE winds in the summer. During the winter, strong S winds tend to be considerably affected by the mountains to the S, producing at times, a pronounced foehn (chinook) effect. Temperatures have risen almost 50°F in less than 24 hours under these conditions.

(318) Bethel's climate is somewhat more maritime than continental in character, which tends to modify daily temperature extremes during most of the year. However, there are usually two periods during the year when the area becomes affected by continental climatic influences. In June and July, temperatures in the area rise noticeably under the influence of warmer continental air. Around the latter part of December and early January, cold, clear continental air becomes quite dominant, and Bethel's climate becomes quite similar to other areas farther inland. Extremes of temperature registered during these periods of dominant continental type climate range 142° F from –52° F in January to 90° F in June. Average temperatures through the entire winter season, however, are considerably higher than those experienced in the Alaska interior, and temperatures for the entire summer season average considerably cooler than in the Alaska interior. Annual precipitation averages nearly 19 inches. August is usually the wettest month, with an average of slightly over 4 inches of precipitation. Thunderstorms are rare, the average being about two a year. The few thunderstorms that do occur are generally short in duration, but rather severe. They usually develop and move out of the NE during June and July. Snowfall averages about 50 inches per year.

(319) (See page T-10 for **Bethel Climatological Table.**)

(320) At Bethel there is a large Alaskan Native Health Service Hospital, a National Guard Armory, a Moravian mission, several churches, hotels, and stores that are the distributors for the Kuskokwim district. Direct telephone communication, provisions, gasoline, and fuel oil are available. A limited amount of coal is kept on hand.

(321) A large well-equipped airfield with a weather station and a FAA flight service station is 3 miles W of Bethel and is serviced by an all-weather road. Daily airmail and transportation services with Anchorage are maintained.

(322) Communication between Bethel and the numerous outlying villages is by floatplanes.

(323) Ocean vessels make several trips during the summer between Seattle and Bethel, transporting freight and equipment that are distributed from Bethel over a large area. A considerable amount is shipped upriver on barges and river steamers to the many native villages along the river.

(324) At **Aniak,** 125 miles from Bethel by river steamer, is an airfield. Limited supplies of gasoline, fuel oil, and provisions are available. General stores and a hotel are in the village.

(325) Radiotelephone and radiotelegraph communications are maintained.

(326) **McGrath,** 400 miles above the mouth, is the head of navigation on the Kuskokwim River.

(327) Radiotelephone and radiotelegraph communications are maintained.

(328) **Routes.**–Enter Kuskokwim Bay about 2 miles W of Cape Newenham, and make good a **028°** course for about 6 miles until the cape bears 190°; thence steer **010°** with Cape Newenham directly astern for about 18 miles until Beluga Hill bears 065° and Red Mountain 121°. From this position, steer **341°** for about 13 miles to a position 4 miles 256° from the elbow of Carter Spit.

(329) In thick or hazy weather a route nearer the coast may be taken as follows: Pass 0.5 mile off Cape Newenham and Bird Rock, and then make good a **070°** course for about 6.5 miles until Castle Rock, the SW headland of Security Cove, bears 177°. Strong tidal currents occur along the N shore of Cape Newenham. From here steer **357°** with Castle Rock astern for 14 miles until the summit of Red Mountain is abeam, thence **341°** for 19.5 miles to a position 4 miles 256° from the elbow of Carter Spit.

(330) Next steer **302°** for 5.5 miles with Beluga Hill in range with Pyramid Mountain astern, then head up the channel on a **006°** course.

(331) Vessels should arrange to make this point at the last of the ebb, and go up the channel with the flood. After heading on the **006°** course, the long shoal on the E side of the channel should be made out, either heaping or breaking. It is only with a very smooth sea that this shoal is not in evidence at low water. After continuing on this course for about 10 miles, the long shoal on the W side of the channel should be made out, either heaping or breaking. This shoal should be followed at a distance of about 1 mile until its N extremity is reached. Here it becomes a mudflat, bare at about half tide, of a yellowish color with deep water close-to. This flat is the leading mark for entering Eek Channel, therefore it should always be made at low water.

(332) From here, the track veers W and follows the flats on the W side of the channel on a course of about **000°** for some 13 miles.

(333) It is reported that extensive changes have taken place N of 59°36′N. The chart is no longer a sufficient guide with respect to the channels.

(334) In proceeding upriver the passage W of Eek Island is used. A crossover from Eek Channel to the W channel is made in an area subject to considerable change. It is generally necessary to wait for nearly high water before making a crossover to the W channel. Navigation in this region is difficult, and a pilot and his launch should be employed. There are no landmarks visible; if buoys are in place the crossover is much easier.

(335) **E side of Eek Island.**–The channel along the N side of Eek Island, once used by power schooners, has shoaled until it is now bare at low water and is used only by small fishing boats. Small vessels now go as far as Apokak Creek. From Beacon Point the channel follows the E bank of the river.

(336) **Passage W of Eek Island.**–Once in the W channel, follow the W bank of the river SW of Eek Island for 4 miles. The course then bears out into the river towards Eek Island. From here the channel crosses to the E bank and continues to Bethel, crossing back and forth many times. There are no

leading marks, and at some of the crossings it is necessary to wait for high water. A pilot is necessary.

(337) Vessels coming downriver stand out to sea from abreast of Carter Spit. In entering, this track is not used because of the possibility of running up a blind channel.

(338) **Tides.**–The diurnal range of tide is 12.2 feet at Kuskokwak Creek entrance and 4.0 feet at Bethel.

(339) **Currents.**–The currents of Kuskokwim Bay and River are strong, attaining velocities of 5 knots at times. A strong tidal current sweeps past Cape Newenham, setting approximately N and S. Along the N side of the cape, tidal currents of about 1 knot have been observed setting NE and SW. In general, the currents set in directions parallel to the axes of the channels between the shoals. In the channel leading to Goodnews Bay, about 1 mile from the N end of South Spit, flood and ebb each has a velocity of about 2.5 knots, setting NE and SW, respectively. In the deep channels off Jacksmith Bay the flood current has a velocity usually of about 2 to 2.5 knots at strength, and the ebb from 2.5 to 3 knots. In the vicinity of Apokak Creek, the strongest current observed was 3.5 knots. The flood current is felt only about as far as Bethel.

(340) By arriving at the entrance to Eek Channel on the last of the ebb, a favorable current can be carried nearly to Bethel, providing there are no delays.

(341) (See Tidal Current Tables for predictions in Kuskokwim Bay and River.) Variations from the predicted times and velocities, because of freshets and winds, may be expected.

(342) **Weather.**–The best weather usually occurs in March and April. During the summer, SE to SW gales are frequent and last from 2 to 5 days. These storms gradually blow themselves out and are generally followed by a few days of good weather. In the early fall, N winds are frequent and are usually accompanied by clear skies. After mid-September, strong gales become frequent and prolonged.

(343) (See page T-21 for dates of ice breakup and freezeup.)

(344) Water can be obtained from small streams in Security Cove, Goodnews Bay, and Carter Bay. In the vicinity of Eek Island, the river water is fresh at all stages of the tide; it is very muddy, but the silt settles readily.

(345) **Chart 16380.**–The **Pribilof Islands**, in the Bering Sea about 200 miles NW of Unimak Pass, consist of St. Paul, St. George, Otter, and Walrus Islands; the latter two are small and uninhabited. St. Paul and St. George have the largest and most numerous fur seal rookeries in the world. The group is under the jurisdiction of the National Marine Fisheries Service and is patrolled during the sealing season by vessels of the U.S. Coast Guard, under provisions of the international treaty governing sealing. From June 1 to October 15, the fur seal breeding and birthing season, landing is forbidden at the rookeries in the vicinity of English Bay, Reef Point, Lukanin Point, Polovina Point, and Northeast Point on St. Paul Island. Walrus and Otter Islands are bird reservations, landing is prohibited at all times, unless a permit is obtained from the National Marine Fisheries Service.

(346) Radiotelephone and radiotelegraph services are maintained on St. Paul Island and St. George Island. In addition, interisland radio and satellite communications are maintained.

(347) A supply vessel makes several trips a year between Seattle and the Pribilof Islands (St. George and St. Paul).

(348) There are no landlocked harbors about the islands, but safe anchorage is always available on the lee sides. Residents of St. Paul Island say that the prevailing wind during the summer is from the NE, which makes Village Cove on St. Paul Island a good anchorage in all but severe SW winds. The bottom in Village Cove is black sand, and the holding ground is good. During SW winds good anchorage is available in Lukanin Bay on the SE side of St. Paul Island.

(349) The following regulations are from 50 CFR, Wildlife and Fisheries:

(350) **Part 215–Pribilof Islands**

(351) **Subpart C–Administration**

(352) **§215.21 Visits to fur seal rookeries.**

(353) From June 1 to October 15 of each year, no person, except those authorized by a representative of the National Marine Fisheries Service, or accompanied by an authorized employee of the National Marine Fisheries Service, shall approach any fur seal rookery or hauling grounds nor pass beyond any posted sign forbidding passage.

(354) **§215.22 Dogs prohibited.**

(355) In order to prevent molestation of fur seal herds, the landing of any dogs at Pribilof Islands is prohibited.

(356) **§215.23 Importation of birds or mammals.**

(357) No mammals or birds, except household cats, canaries, and parakeets, shall be imported to the Pribilof Islands without the permission of an authorized representative of the National Marine Fisheries Service.

(358) **§215.24 (Reserved)**

(359) **§215.25 Walrus and Otter Islands.**

(360) By Executive Order 1044, dated February 27, 1909, Walrus and Otter Islands were set aside as birdreservations. All persons are prohibited to land on these islands except those authorized by the appropriate representative of the National Marine Fisheries Service.

(361) **§215.26 Local regulations.**

(362) Local regulations will be published from time to time and will be brought to the attention of local residents and persons assigned to duty on the Islands by posting in public places and brought to the attention of tourists by personal notice.

(363) **§215.27 Wildlife research.**

(364) (a) Wildlife research, other than research on North Pacific fur seals, including specimen collection, may be permitted on the Pribilof Islands subject to the following conditions: (1) Any person or agency, seeking to conduct such research shall first obtain any Federal or State of Alaska permit required for the type of research involved.

(365) (2) Any person seeking to conduct such research shall obtain prior approval of the Director, Pribilof Islands Program, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, 1700 Westlake Avenue North, Seattle, Wash. 98109, by filing with the Director an application which shall include:

(366) (i) Copies of the required Federal and State of Alaska permits; and

(367) (ii) A resume of the intended research program.

(368) (3) All approved research shall be subject to all regulations and administrative procedures in effect on the Pribilof Islands, and such research shall not commence until approval from the Director is received.

(369) (4) Any approved research program shall be subject to such terms and conditions as the Director, Pribilof Islands Program deems appropriate.

(370) (5) Permission to utilize the Pribilof Islands to conduct an approved research program may be revoked by the Director, Pribilof Islands Program at any time for noncompliance with any terms and conditions, or for violations of any regulation or administrative procedure in effect on the Pribilof Islands.

(371) **Weather.**–Fogs are especially thick and prevalent in this vicinity in the summer, and navigation is attended with difficulty and danger. A navigator should plan to make landfalls in the Pribilof Islands during the summer based on

no land being visible. One annoying characteristic of the area is very thick fog accompanying strong winds. Logs from survey vessels indicate that a typical summer day in the Pribilof Islands is as follows: Dense fog at daylight, vessels anchored 200 yards distant not visible, calm sea, light airs; by noon intermittent sun, a wet drifting fog, gentle breeze; by evening a dense fog, winds increased to force 6. Dense fog with visibility less than 0.5 mile is more common around St. Paul Island than around St. George Island. An unusual characteristic off North Anchorage, St. George Island, was clear visibility along the shore accompanied by dense curtainlike fog to seaward.

(372) Winds do not continue to blow from the same quarter for any length of time. From December through April winds blow from the NE more than from the other directions. After September 1, gales are frequent and violent, and blow from all directions.

(373) **Ice.**–The Pribilofs are near the S limit of the ice in Bering Sea. On rare occasions the icefields extend as far as 35 miles S of St. George Island. In 7 years of National Weather Service ice records at St. Paul Island, no sea ice at all was reported in 3 years. In the other 4 years, navigation remained easy throughout 1 year and became restricted to full-powered vessels for short periods in March and April of 3 years; at no time did navigation become suspended or require the use of an icebreaker.

(374) In 1974, a pinnacle was reported 68 miles WNW of St. Paul Island in 57°39.2'N., 173°24.0'W. (see chart 16006). Depth of water over the pinnacle is not known.

(375) **Chart 16381.–St. George Island,** the southernmost of the Pribilof Islands, consists mainly of high volcanic hills and ridges, and its entire coast is a precipitous cliff except for a few miles on the N side and short intervals at Garden Cove and Zapadni Bay. The E and W extremities of the island, **Tolstoi Point** and **Dalnoi Point,** are bold promontories. **High Bluffs,** on the N side of the island, 1,012 feet high, is a prominent landmark and is visible from St. Paul Island, a distance of nearly 40 miles, on a clear day.

(376) **St. George Harbor,** on the SE side of Zapadni Bay, is the only harbor on St. George Island. The channel is dredged with a controlling depth of 17 feet. The entrance is protected by breakwaters and marked by a 076° lighted range and daybeacons. There are two docks on the E side of the basin; N dock is 60 feet and S dock is 75 feet, both with 19 feet alongside and staging areas. An additional 250 feet of moorage is provided by dolphins on the W side with 22 feet alongside. The harbormaster assigns berths (telephone 907-859-2263) and monitors VHF-FM channels 16 and 12. Water, sewage pumpout, a boat ramp, and marine supplies are available. The harbor is owned and operated by the village of St. George. Anchorage can be had at North Anchorage, Garden Cove, and Zapadni Bay, according to the direction of the wind; the anchorages are poor except with the wind directly off the land. At a distance generally not greater than 2 miles from the island the depth of the water is but little less than the surrounding sea, and in thick weather it is not safe to depend upon soundings for picking up the land unless sure of the position. Vessels should not approach the island in less than 12 fathoms of water. There are no outlying dangers except the rock awash 0.6 mile NE of East Landing, and the small reefs at Zapadni Bay and North Anchorage. A rocky shoal, covered 1¾ fathoms, is 9.3 miles 078° from Tolstoi Point.

(377) The anchorage in **Zapadni Bay,** on the SW side of the island, in 10 fathoms, affords shelter with winds from ENE to NNW. A reef extends about 0.2 mile offshore S of the anchorage.

(378) With N winds, a landing may sometimes be made at **Garden Cove** S of Tolstoi Point, on the sand beach. The anchorage affords shelter from NW winds, but with the exception of a small area the bottom is rocky.

(379) **Currents.**–In the open water the tidal current is rotary, turning clockwise. Along the N and S shores of the island the current in general sets E on the flood and W on the ebb. The largest velocity observed over a period of about 6 days in July and August was about 1.5 knots. With opposing wind and current, tide rips occur off Tolstoi and Dalnoi Points. These rips are not heavy enough to be of any consequence, except that to strangers they appear to be breakers. The water is deep off both points, which can be passed close-to with safety.

(380) The approach to **North Anchorage** is marked by a private marker about 0.5 mile N of St. George. The most prominent landmarks in the village of **St. George** are the white roofs of the quadrangle of sheds, low down at the water's edge. The roofs loom up first through the fog. Also conspicuous is a tight group of buildings on the slope and ridge back from the beach. Most easily identified is the Russian Orthodox church whose bell tower has a green onion-shaped roof topped by a white St. Andrew's cross.

(381) Vessels should keep the street which extends through the village bearing 164°. Good anchorage will be found about 700 yards from the landing. There is swinging room for a 400-foot vessel riding to 45 fathoms of chain.

(382) The landing is a square block of reinforced concrete next to a cutting in the rocks. The area around the landing, and for about 75 feet to seaward, practically bares at extreme low water. The landing can be used by small shallow-draft boats 3 hours on either side of high water. A launching ramp is at North Anchorage.

(383) **East Landing,** just NE of the village, is better protected from a W swell. A ledge awash is a short distance off the landing. If desired, a boat will come out to anchored vessels when landing is practicable.

(384) **Local magnetic disturbance.**–Differences of as much as 11° from the normal variation have been observed on St. George Island.

(385) The U.S. Public Health Service maintains a Native Health Services clinic in the village of St. George.

(386) **Communications.**–St. George Airport provides air services four times a week. Peninsula Airways Aircraft Charter will provide air transportation in an emergency.

(387) **Chart 16382.–Otter Island,** off the S side of St. Paul Island, has an abrupt bluff 288 feet high at its SW end, slopes gradually to the N, and rises again in a crater, about 141 feet high, at its extreme E end. Foul ground, marked by kelp, extends about 0.8 mile from the island on its S, SW, and N sides. The N side, from **Crater Point** to **Northwest Reef,** is clear of dangers. Probably the best anchorage near the island is in 9½ fathoms, black sand and broken shells, with the NE extremity of Crater Point bearing 185°, distant 0.5 mile. This island must be approached with great caution in thick weather, and at all times a vessel should keep out of kelp. A 38-foot shoal is 2.1 miles ENE of Otter Island.

(388) Between Otter Island and Reef Point, St. Paul Island, the tidal currents are strong, and with heavy winds the tide rips are dangerous especially on the ebb current. In 1976, the NOAA Ship SURVEYOR observed currents setting NW at about 2.5 knots about 2.1 miles SW of the SW end of Otter Island.

(389) **Walrus Island,** off the E side of St. Paul Island, is low, about 39 feet high, level on top, and composed of irregular masses of volcanic rock. It is very hard to pick up in thick weather. It is about 0.4 mile long and 0.1 mile wide.

Anchorage in emergency situations can be had on either side of it, 0.3 to 0.5 mile offshore, in 10 to 15 fathoms. Landing can be made with smooth water, the best place being a small cove at the SW corner. The island is a bad place to make in a fog. Parts of both other and Walrus Islands are covered with sea birds in the breeding season.

(390) Walrus Island is a Seller sea lion rookery site. There is a 3-mile vessel exclusionary zone around the entire island. (See **50 CFR 227.12,** chapter 2, for limits and regulations.)

(391) **Current** observations made in July and August W of Walrus Island show that the current is rotary turning clockwise, with velocities exceeding 2 knots at times.

(392) **St. Paul Island,** the northernmost of the Pribilof Islands, is about 235 miles NW from Unimak Pass. The W and SW parts of St. Paul Island are high and mountainous, with precipitous cliffs at the coast. The rest of the island is a comparatively low, rolling plateau, with a number of extinct volcanic peaks scattered over its surface. **Bogoslof Hill,** 590 feet high, a conical crater near the center of the island, and **Polovina Hill,** double-peaked and 470 feet high, near the E end, are conspicuous and the best landmarks in clear weather when coming from S. From this latter hill the island stretches away, in a low, narrow neck to **Hutchinson Hill,** about 100 feet high, on **Northeast Point.** W of **Lukanin Bay** the coast of the S side of the island is rocky, with bluffs at the points. The shore of the rest of the island is generally a sand beach, with rocks in the vicinities of the seal rookeries. A radiobeacon is about 2.7 miles NE of the village of St. Paul, and a tall loran tower is about 0.8 mile SW of the beacon. An aerolight is about 0.5 mile ESE of the beacon.

(393) A rocky ledge covered less than 3 fathoms with no visible kelp is 5 miles NE of Northeast Point. Kelp-marked reefs extend about 0.4 mile SE from the two low points S of Northeast Point. A dangerous ledge with two rocks covered less than 2 fathoms is 1 mile N of Hutchinson Hill. With a moderate swell the sea breaks over these rocks.

(394) On the N side of St. Paul Island, depths of 5 fathoms or more are 1 mile offshore.

(395) A shoal covered 2 fathoms is 7.5 miles W of St. Paul Island.

(396) Breakers extend 0.3 mile of more off **Southwest Point.**

(397) A dangerous ledge, usually marked by breakers, extends 0.6 mile SW and S from **Reef Point,** the S point of the island.

(398) **Sea Lion Rock,** about 0.3 mile S of Reef Point, is prominent when approaching the point from an E or W direction.

(399) A reef extends about 0.3 mile off **Stony Point,** the NE point of Lukanin Bay.

(400) **Pilotage,** except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(401) The Bering Sea is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(402) Vessels using Southwest Alaska Pilots Association pilots and en route to St. Paul can meet the pilot boat about 4 miles W of Reef Point (57°06.5'N., 170°17.7'W.).

(403) The pilot boat can be contacted by calling "ST. PAUL PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(404) **Anchorage.**–The usual anchorage at St. Paul Island is W of Village Cove between Zapadni Point and Reef Point in the vicinity of the 10-fathom curve. The bottom, in general, is sandy, but rocky bottom will be found in the vicinity of Zapadni Point and Tolstoi Point. Anchorage can be found NE from Reef Point, off **Black Bluffs** and East Landing, and in Lukanin Bay.

(405) Lukanin Bay has a sandy bottom and is used when W swells make the Village Cove anchorage undesirable. From the Village Cove anchorage the village of St. Paul is obscured by a bluff although it is in full view from the Black Bluffs anchorage.

(406) In the spring (April-May) as the ice edge moves N, the winds can radically change its configuration. Vessels anchoring in Village Cove or other areas around the Pribilof Islands should maintain a careful ice watch so as not to become entrapped.

(407) Vessels should not attempt to ride out a gale at anchor near the islands, unless to leeward and well sheltered. The surf is apt to make quickly and is dangerous on the weather side of the island.

(408) Prominent in the approach to the anchorage off **Village Cove** are the three large steel tanks on a bluff just W of the village. Also on the bluff, just to the N, are eight smaller white tanks. Vessels should steer **082°** for the center of the three large steel tanks and anchor in about 8 fathoms with Reef Point and the center of Sea Lion Rock in range.

(409) **Zapadni Point, Tolstoi Point,** and **Reef Point,** 2.5 miles WNW, 0.6 mile NW, and 1 mile SW of Village Cove, respectively, are the best radar targets in the area at a range of 5 to 7 miles.

(410) Village Cove is protected by breakwaters marked by lights. Depths of 23 feet are available in the entrance and the harbor by staying in the S section of the harbor near the shore. The harbor shoals rapidly in the NE section. There are three main docks with depths of about 23 feet alongside and deck heights of 11 feet. Caution should be used when approaching the harbor as heavy swells may still break near the entrance.

(411) **St. Paul,** about midway along a peninsula extending from the S side of St. Paul Island, has small wooden dwellings painted white with dark-colored roofs, a church, hotel, a small hospital, several large buildings, and a machine shop with limited facilities. The hospital patients requiring surgery are transferred to Anchorage by jet medevac. A 10-ton marine skidway is available for emergency repairs.

(412) A commercial airline provides weekly mail and passenger service to and from Anchorage via Cold Bay or Dutch Harbor when weather permits. A weather station and a loran station are on St. Paul Island. The weather station monitors CB channel 9, and the loran station monitors VHF-FM channel 16 (156.80 MHz).

(413) Landing is forbidden at the fur seal rookeries on St. Paul Island during the breeding season, June 1 to October 15.

(414) **Weather.**–The climate is typically maritime, resulting in considerable cloudiness, heavy fog, high humidity, and rather well restricted daily temperature ranges. Humidities remain uniformly high from May to late September, and during the summer period there is almost continuous low cloudiness and occasional heavy fog. The differences between average maximum and minimum temperatures for the entire year are only slightly above 7° F, and the greatest monthly variation in March is slightly less than 12° F. Temperatures remain on the cool side even during the summer, and the highest temperature on record is 64° F in August of both 1936 and 1941. Extreme highs in summertime usually range around the middle fifties. Although record low readings fall well below the zero mark, such extremely cold days are rather rare. On the average only 5 days each winter season have temperatures falling below the zero mark.

(415) Despite an environment of high humidities, precipitation on St. Paul Island is surprisingly light. The annual average is slightly above 24 inches, which is slightly below the average for Alaska as a whole. The greatest 24-hour precipitation on record fell slightly short of 2 inches. April is generally the driest month, with a gradual increase of precipitation until a mean monthly total of over 3 inches is reached during August, September, and October. This is followed by a gradual decrease during the succeeding months until the return of April. Thunderstorms are extremely rare on St. Paul Island. The only isolated occurrence ever reported was in June 1939.

(416) Frequent windy periods are characteristic of the island area throughout the year. Frequent storms occur from October to April, and these often are accompanied by gale force winds to produce general blizzard conditions. Under the influence of prolonged N and NE winds between January and April, the ice pack occasionally moves S to surround the island. During recent years, the S limit of this movement has been between St. Paul and St. George Islands, some 40 miles to the SE of St. Paul.

(417) (See page T-9 for **St. Paul Island Climatological Table.**)

(418) **Tides and currents.**–The diurnal range of the tide at Village Cove is 3.2 feet. Around the island the current sets NW on the flood and S on the ebb, following the trend of the shore. The greatest velocity occurs at Northeast Point and between Reef Point and Otter Island. Average velocity at strength of current is 1 to 2 knots, but with continued strong winds from one direction it may increase to 3 knots.

(419) There are heavy rips around Northeast and Southwest Points, also between Reef Point and Otter Island, where they are worse on the ebb. The tides and tidal currents are greatly influenced by the winds.

(420) **Chart 16006.–Nunivak Island,** in the Bering Sea near the Alaska mainland, is about 330 miles N of Unimak Pass. Dangerous shoals and uneven bottom have been reported and are shown on the chart; the island should be approached with extreme caution.

(421) From W, Nunivak Island shows gentle slopes terminating seaward in reddish cliffs 150 to 462 feet high. The highest point of the W part of the island rises to 866 feet 10 miles ESE from Cape Mohican. Near the center of the island is **Roberts Mountain,** 1,675 feet high, the highest of a group; this mountain is built up of a series of volcanic benches, the top being the steep side of a breached crater. The E end of the island is low, for the most part, except for some low hills and **Twin Mountain,** a breached crater 627 feet high.

(422) In clear weather the island generally can be made out for 30 miles from any direction. The island is inhabited by herds of reindeer.

(423) In 1899 the U.S.S. CORWIN cruised completely around Nunivak Island, following the shore and outlying islands at a distance of about 2 miles, and found general depths of 7 to 10 fathoms. The coast is generally abrupt and rocky, with numerous bights in which anchorage was found in 3½ to 7 fathoms.

(424) **Cape Mohican,** the W point of Nunivak Island, is a narrow promontory about 2 miles long. The point of the cape is a cliff 266 feet high from which the terrain descends E to 150 feet for 2 miles before ascending gradually to the higher ground inland.

(425) **Cape Mohican Light** (60°12.7′N., 167°27.5′W.), 285 feet above the water, is shown seasonally from a skeleton tower with a red and white diamond-shaped daymark on the end of the cape.

(426) A shoal about 1 mile wide extends 5 miles 050° from Cape Mohican and has depths of 2 to 4 fathoms over it. The shoal area should be avoided until it has been completely surveyed. The 10-fathom curve extends 7.5 miles 058° from the cape.

(427) In 1979, the U.S. Coast Guard Cutter IRONWOOD reported possible shoreline charting inaccuracies on the NW side of Nunivak Island between Cape Mohican and Nash Harbor. Until surveys are made of this area, mariners are advised to use caution when using shoreline features for navigation.

(428) **Nash Harbor,** on the N coast of Nunivak Island 16 miles E of Cape Mohican, is a good anchorage except with winds from NW through N to NE. The coast to the W of the harbor is fairly high and is backed by cliffs, while to the NE it is low. The S side of the harbor has a sand-and-gravel beach at the foot of a 30-foot bluff. The bottom slopes gradually from 10 fathoms outside Nash Harbor to the beach at the head.

(429) The harbor is 1.5 miles wide and about 1 mile in depth. The bottom is sand except near the rocky parts of the shore, and there are no indications of dangers over a large 4- to 6-fathom area in midharbor. Boats usually land off the village of **Nash Harbor,** on the W side of a creek that empties into the SW part of the harbor; however, there are boulders close to shore at this landing as well as in the cove on the W shore. The creek drains a lake, but the water is brackish because the lake level is affected by the tides. The lake freezes every winter and makes an excellent landing place for airplanes fitted with skis; it is also large enough for seaplanes to use in summer.

(430) In 1951, the survey ship PATHFINDER made the approach to Nash Harbor (see chart 16006) on course **090°** for 21 miles from a position 4.5 miles N of Cape Mohican until abeam of the harbor, then steered **180°** for midharbor to anchorage in 6 fathoms.

(431) **Cape Etolin,** 40 miles ENE of Cape Mohican, is the northernmost point of Nunivak Island. The cape is a narrow strip of land with a ridge of low hills midway along its outer part; it appears as two or more islands from a distance W. A small island is about 2 miles off the end of the cape; between are ledges. A dangerous rocky area extends W from Cape Etolin for about 1.5 miles.

(432) **Cape Etolin Light** (60°26.3′N., 166°10.0′W.), 40 feet above the water, is shown seasonally from a skeleton tower near the N tip of Cape Etolin.

(433) **Mekoryuk,** about 2 miles W of the inner end of Cape Etolin, and Nash Harbor are the only villages on Nunivak Island that are inhabited the year round. A weather station is maintained at Mekoryuk, and the village has weekly mail service by air; radiotelegraph communication is maintained.

(434) Anchorage can be found NW of Mekoryuk in 25 to 32 feet of water.

(435) In 1951, the PATHFINDER anchored on the W side of Cape Etolin, 4.5 miles NW of Mekoryuk, in 5 fathoms, sand bottom, on bearings 080° to N tangent of Cape Etolin, 089°30′ to highest knoll on Cape Etolin, 122° to center of schoolhouse, the largest building in Mekoryuk, and 246° to N tangent of point 5.5 miles to the SW. From this anchorage the N tangent of Cape Etolin was open 001°30′ from the S tangent of Cape Vancouver. The anchorage was approached from W on a heading of **092°** for the highest knoll on Cape Etolin. The approach should be made with caution as the area shoals rapidly and the reference points are apt to be obscured by fog except during N winds. From the anchorage, a launch ran on a general course of **120°** toward Mekoryuk for 3 miles and obtained a minimum depth of 25 feet.

(436) Shoals covered 3 fathoms have been reported about 7.5 miles N and 15.5 miles NW from Cape Etolin, and a shoal covered 4½ fathoms has been reported 12.5 miles NNE from the cape; all with deep water surrounding them. Keeping Cape Vancouver bearing N of 086°, Cape Etolin can be rounded when coming from W in 10 fathoms. With Cape Vancouver bearing 086° or E of this bearing, considerable shoal water and irregular depths are found.

(437) **Cape Etolin Anchorage,** the bight on the E side of the cape, has fair holding ground in 2 to 5 fathoms, but is open to the NE. Near the S side, and about 0.3 mile from the head of the bight, is anchorage in 3 fathoms; the holding ground is gravel and only moderately good. Farther out, it is deeper but more exposed to the strong tidal currents and rips of **Etolin Strait,** the wide passage between Nunivak Island and the mainland.

(438) Several shoals have been reported in Etolin Strait. In 1968, the U.S. Coast Guard Cutter NORTHWIND, in transiting the strait, reported that depths in some cases were found to be greater or lesser than now charted. Until surveys are made of this area, mariners are advised to use extreme caution.

(439) In 1971, the Coast Guard Cutter STORIS observed the following conditions on the E side of Etolin Strait: Depths of 2½ fathoms were found in 59°59.0'N., 164°56.0'W. Proceeding essentially W from that position, depths increased to 5 fathoms, then quickly shoaled to 1¾ fathoms in 60°01.0'N., 165°05.0'W. The bottom was sand and mud. The 3-fathom shoal centered in 59°49.0'N., 164°55.0'W. was found in charted position. The STORIS further reported that the depths were found to be generally as noted on chart 16006 in the area SE of the charted shoals and changes in depth were very gradual.

(440) In May 1977, the NOAA Ship MILLER FREEMAN reported shoaling to 4¼ fathoms centered in about 59°49.9'N., 165°33.0'W. Caution is advised in this area.

(441) **Cape Manning** is 15 miles SE of Cape Etolin. **Triangle Island** is 5 miles NW of Cape Manning and 2 miles from the nearest shore of the main island, with foul ground reported between.

(442) **Cape Corwin,** 20 miles S of Cape Manning, is the easternmost point of Nunivak Island. The cape is low and has a rocky shore on its N side. The two peaks of Twin Mountain are 7 miles NNW of the point of Cape Corwin and can be seen for 25 miles in clear weather.

(443) **Cape Mendenhall,** 18 miles WSW of Cape Corwin, is the southernmost point of Nunivak Island. The cape is 255 feet high and has a low rock bluff 10 to 20 feet high on its E side. A 2¾-fathom shoal is 4 miles SW of Cape Mendenhall.

(444) During a N blow in August 1951, the survey ship EXPLORER found satisfactory anchorage in 8½ fathoms about 10 miles NW of Cape Mendenhall. The anchorage is about 1.5 miles off the beach of the second bight NW of the cape and is protected from NW through N to E. As the ship approached on a NE course, the water shoaled uniformly from 14 to 8½ fathoms. The fine gray sand bottom is good holding ground. Currents along the coast had velocities estimated to be as much as 1 knot.

(445) From Cape Mendenhall the coast extends NW for about 40 miles to what may be called the SW cape of Nunivak Island. The few soundings obtained show deep water fairly close to shore, and it is apparently safe to follow the shore at a distance of 2 miles. Depths of 4¼ to 6 fathoms have been found on an extensive shoal about 10 miles off this stretch of coast.

(446) The SW cape has cliffs 100 to 150 feet high; the summit is gently sloping tundra. In the small cove E of the cape, landings can be made on the sandy beach in front of the few barabaras of **Tachikuga,** an abandoned native village. Water can be obtained from the stream just E of the abandoned village; at low water the stream is fresh to its mouth. Temporary anchorage is possible in 7 to 9 fathoms about 0.8 mile off the entrance to the cove.

(447) From the SW cape, the coast of Nunivak Island extends N for about 8 miles to Cape Mohican. Along this stretch are impassable cliffs 150 to 450 feet high, and there are no landing places. The 6-fathom curve is about 1.3 miles offshore.

(448) **Tides.**–The diurnal range of tide at Tachikuga, on the SW side of Nunivak Island, is 4.3 feet. At Nash Harbor, on the N side, the diurnal range is 5.3 feet, and the tide occurs about 1 hour later than at Tachikuga.

(449) **Currents.**–On the N and SW sides of Nunivak Island the current has a large diurnal inequality. NE of Cape Mohican a 4-hour series of current observations in July 1951 showed a NE current which at strength had a velocity of 1.8 knots. Observations made in June and August 1951 W of Cape Etolin showed tidal currents setting along the shore in both directions with velocities of about 1 knot at strength of current. On the E side of the island in Etolin Strait, it is stated that tidal currents are so strong that the middle portion does not freeze over in winter. (See the Tidal Current Tables for predictions off the W coast of Nunivak Island.)

(450) **Ice.**–(See page T-21 for dates of ice breakup and freezeup.) Navigation is difficult from mid-December to mid-May and usually is suspended from early January to late March.

(451) **St. Matthew Island** and adjoining islands are 145 miles W from Nunivak Island. They are rocky, uninhabited islands whose shores are poorly charted except for a small area between Sugarloaf Mountain and Pinnacle Island. St. Matthew Island is a succession of hills and low valleys. During the season of navigation, fog is prevalent in this vicinity. Anchorage can be made with an offshore wind on the N or S sides of the island.

(452) **Cape Upright,** the E point of St. Matthew Island, is high and vertical, and the land in its immediate vicinity is mountainous. A mountain 1,505 feet high is 0.7 mile back of the cape, and another mountain 1,280 feet high is 0.9 mile SW of the cape. Off the cape is a detached rock 25 feet high. W of the highland of the cape is a low neck, apparently of sand, and the cape might be easily mistaken for a detached island.

(453) **Glory of Russia Cape,** the N point of St. Matthew Island, is also high and mountainous. A 1,475-foot peak is about 1.3 miles S of the cape.

(454) Numerous detached rocks along the shores of St. Matthew Island should not be approached too closely. On the island is an abundance of freshwater in streams and lakes.

(455) **Sugarloaf Mountain,** 1,380 feet high, is 11.5 miles W from Cape Upright. From Sugarloaf Mountain the coast trends about 0.8 mile SE to the westernmost point of a wide bight that extends to Cape Upright. A rock is about 350 yards S of this point.

(456) Good anchorage may be had in about 14 fathoms, sheltered from winds between SE and SW, in a bight on the E side of St. Matthew Island, about 10 miles NW of Cape Upright, with Sugarloaf Mountain bearing 220°, and W of some rocks which show well out of the water and should not be approached closely. Landing is difficult with any swell, as the beach is stony and steep. In 1951, the PATHFINDER anchored frequently in 9 to 10 fathoms, about 3.5 miles WNW of Sugarloaf Mountain, with broken bottom and satisfactory holding ground. The PATHFINDER also

anchored in about 14 fathoms, with protection from N gales, 4 miles E by S of Sugarloaf Mountain.

(457) **Sarichef Strait** is a 2.5-mile-wide passage between St. Matthew Island and Hall Island. Tidal currents and rips were not found to be strong in 1951. The PATHFINDER obtained a least depth of 10 fathoms in two passages of the strait near the middle, but the records indicated that shoaler depths could be expected.

(458) **Hall Island,** about 3 miles N of St. Matthew Island, is 1,665 feet high and is rugged on its NE, N and W sides; the SE point is low. **Elephant Rock** is a large detached rock off **Cape Hall,** the N point of the island, and **Arre Rocks** are several smaller detached rocks off the SW side of the island. Anchorage is available in 10 fathoms in the bight on the SE side of the island.

(459) In 1993, the Canadian Survey Ship John P. Tully reported discolored water, confused and mounting seas, and being abruptly set to the E with currents of about 3 knots when passing on the E side of Hall Island about 2 miles off Elephant Rock.

(460) **Pinnacle Island,** with its spires and needle formations making a striking appearance, rises abruptly from the sea with scarcely a place for a boat landing. The N end of the island is 8 miles SSW of Sugarloaf Mountain. Pinnacle Island is 1.4 miles long, 0.3 mile wide, and rises to 1,250 feet midway of its length.

(461) An unusual submerged ridge extends from the N end of Pinnacle Island in a 021° direction to the shore of St. Matthew Island. The ridge is about 300 yards wide between the 10-fathom curves. The least depth found in 1951 was 4 fathoms, and there were several depths of 5 fathoms. The best water over the ridge was 9 fathoms 1.6 miles SW of the point below Sugarloaf Mountain. Tide rips occur along the ridge with fresh winds.

(462) Rocks and islets 55 to 95 feet high are off the S shore of Pinnacle Island. **Gull Rock,** 93 feet high, is 0.5 mile WNW of the S end of Pinnacle Island.

(463) **Tides and currents.**–The diurnal range of the tide at St. Matthew Island is 2.1 feet. (See the Tidal Current Tables for predictions at St. Matthew Island.)

(464) In 1971, a rock covered 23 feet was reported 127 miles SW of St. Matthew Island in 58°38.0'N., 175°02.5'W.

(465) **St. Lawrence Island** is in the N part of the Bering Sea about 120 miles S of Bering Strait.

(466) The E end of this island is usually made by vessels bound into Norton Sound, and in clear weather can be seen from a distance of 30 to 35 miles. From Southeast Cape a ridge of mountains extends in a N direction across the island, and another ridge extends in a N direction from Apavawook Cape to Northeast Cape. Between these two ridges a deep bight makes in from S, and at its head very low land extends N across the island. The shore of the E end of the island is generally a low sand beach with outlying rocks; the mountain ridges begin 0.5 to 2 miles back from the beach.

(467) **Northeast Cape,** E end of St. Lawrence Island, is low tundra land, with numerous freshwater lakes. The cape is 2 miles wide to the foot of a mountain that rises abruptly and has a peak 1,435 feet high. This peak can be seen on a clear day for 35 miles or more. At 0.3 and 0.6 mile from the end of the cape are two hummocks 94 and 280 feet high, respectively; the lower hummock is in 63°18'N., 168°42'W.

(468) Although the bottom is irregular off the point of the cape, no breakers were noticed while passing it in rough weather. The N shore of St. Lawrence Island, for 10 miles W of Northeast Cape, is a low sand beach and grassy tundra with numerous freshwater lakes. Anchorage with shelter from S or SE winds can be had along this shore about 2 miles from the beach in 8 to 9 fathoms; the holding ground is not good, the bottom being gravel. At a point on the N shore 6 miles W of Northeast Cape, breakers extend 1 mile offshore.

(469) From the Northeast Cape the E coast of St. Lawrence Island has a general S trend for 4 miles to a point where a 450-foot-high spur from the higher hills reaches to within 0.5 mile of the beach; along this stretch the 6-fathom curve is 0.8 to 1 mile offshore.

(470) The coast then trends SSW for another 4 miles, then curves W and N for 5 miles, forming **Apavawook Cape,** which is so rounding that it has no definite point. This entire stretch of coast is a low, narrow strip behind which is a large lagoon. The mountains are about 2 miles inland and about 900 feet high.

(471) **Punuk Islands,** 4 to 5 miles SSE from Apavawook Cape, are a group of three small islands 1.5 miles long; the NE end of the group is about 13.2 miles 192° from Northeast Cape. The northernmost and largest island has two marked rocky hummocks, the higher being 230 feet high; on the SW end of the island are the remains of a native village. The southernmost island is an irregular mass of rocks, the highest point about 75 feet above water. Between these islands is a low, sandy islet, which is separated from the other two by narrow channels completely obstructed by ledges, over which the sea breaks. The shores of all the islands are foul, and a ledge extends S from the southernmost island; a rocky shoal covered 3½ fathoms is 1.4 miles S of the southernmost island; over 7 fathoms can be carried 2 miles S of the islands. A reef covered 2 to 3 fathoms extends about 0.7 miles NNW of the southernmost island. Vessels should approach these islands with caution.

(472) A reconnaissance survey in 1951 indicated a clear approach to good anchorage in N and W weather off **Maknik Lagoon,** NW of Punuk Islands. The anchorage, in 6½ fathoms, is in 63°09'N., 169°15'W., about 1.5 miles off the beach. All soundings showed a uniform slope to the 6-fathom curve, where there is a break and a steeper slope to the beach. Maknik Lagoon is behind the low sand barrier beach.

(473) Heavy breakers have been observed in the channel between Punuk Islands and Apavawook Cape; vessels should not attempt to pass through. A depth of 3 fathoms is 1.7 miles NW of the northernmost and larger island. Several areas with 3½ fathoms are in this passage. From E the islands can be approached as close as 1 mile. It is reported that 2.8 miles 220° from Punuk Islands the flood current was observed setting about 024° with a maximum velocity of 1.1 knots.

(474) **Southeast Cape** is about 5 miles across on its S face; the E point of the cape slopes gradually to the water for 0.3 mile from the highland, and a reef extends about 0.5 mile SE from the point. The W point is lower and slopes more gradually to the water for 3 miles from the highland, and a reef makes off from the point in a S direction for 2 to 3 miles. The bight between these points is very foul and should be avoided.

(475) **Kialegak Point,** about 5 miles NNE of Southeast Cape, is a long sandspit strewn with rocks that extends in an E direction from the highland of the coast. There are breakers about 0.8 mile 355° from the end of the cape, and there may be others inside; a reef extends S from the S side of the sandspit for about 1 mile. The remains of a native village are on the sandspit.

(476) The bight between Cape Kialegak and Apavawook Cape has a uniform slope from 16 fathoms to the 10-fathom curve, where there is a steeper slope to the beach. The 10-fathom curve is about 2 miles off and parallels the shoreline. Good holding ground can be found in most parts of the

bight with good anchorage in N and W weather. Within 3 miles of the Punuk Islands the holding ground is very poor and is not recommended.

(477) **Northwest Cape,** the NW end of St. Lawrence Island, 660 feet high, is a steep, black bluff and flat on top. A wide sand beach is W of the bluff. **Gambell** is a native village with a school and a store, open the year round. Small quantities of oil and gasoline are available. A visiting nurse calls at the village periodically. A small airstrip is available. Mail and supplies are flown in weekly from Nome. Radiotelegraph communication is maintained.

(478) The water is deep close to Northwest Cape, and anchorage can be had in 9 fathoms, rocky bottom, 0.5 mile offshore on either side of the point of the sand beach with Gambell village bearing 225°. In W winds, breakers have been observed that extend 400 yards NW from the NW tip of land about 1.7 miles W of Northwest Cape. The bay, 6 miles SE of Northwest Cape, affords anchorage with protection from S and W winds, in 9 fathoms, rocky bottom, off the house on the beach.

(479) The W end of the island, S of Northwest Cape, is rolling land. From **Tatik Point** around to the bay E of **Southwest Cape,** the land is mountainous and abrupt close to the coast, being highest at Southwest Cape. Only a few families live at Southwest Cape.

(480) Several rock pinnacles, the largest of which is 25 feet high, are off the SW tangent of Southwest Cape on the E side of the entrance to Murphy Bay.

(481) Between the highland E of Southwest Cape and **Siknik Cape** the land is low. A vessel reported striking a submerged rock about 2 miles offshore at a point about 16 miles NE of Southwest Cape.

(482) A reef, bare at low water, makes off 1 mile in a 220° direction from Siknik Cape. The submerged part of this reef extends about 4 miles in a general 175° direction from the bare part. This reef is dangerous, as the water shoals abruptly when approaching the cape.

(483) The rest of the island is generally high and rolling. There are some submerged rocks in the bight W of Southeast Cape, and also some detached rocks showing off the N shore near **Kookoolik Point** and **Savoonga Point.** It is probable that with care an anchorage may be found almost anywhere around the island, but the shores must be approached with caution.

(484) **Savoonga,** at the extreme end of Savoonga Point, has a school and a native store open the year round. Small quantities of gasoline, diesel fuel, and motor oil are available. Mail is delivered from Gambell weekly, weather permitting, by boat in summer or dogsled in winter. There is a village nurse. Radiotelegraph communication is maintained.

(485) A bar that extends NE from the village breaks at low water. Anchor just W of the village in 6 fathoms. Good anchorage can also be found about 1 mile W and 1 mile N of the village in 14 fathoms.

(486) **Tides and currents.**–The diurnal range of the tide at St. Lawrence Island varies from 1.2 feet at **Niyrakpak Lagoon** entrance, 26 miles W of Savoonga, to 2.4 feet at Northeast Cape and **Powooiliak Point,** 6 miles NE of Southwest Cape.

(487) The current velocity about 0.8 mile off Savoonga is about 1 knot on the flood setting NW and 1.5 knots on the ebb setting E. The current velocity at other places around St. Lawrence Island is generally less than 1 knot. (See Tidal Current Tables for predictions.)

(488) **Weather.**–During the ice-free months of May to November, the diurnal temperature range is only 5° to 10°F. From January through March, the range is 10° to 12°F. In the winter, passing cyclonic storms exert the major control on air temperatures. Mean monthly temperatures at Gambell range from 2.8°F in January to 49.3°F in August. Extremes of –28°F have been recorded in March and 71°F in July.

(489) Relative humidity at Gambell is high, usually 80 to 90 percent or more. At least a trace of precipitation occurs on 275 to 300 days a year, yet the annual total is only about 15 inches, about half of which falls during July to October, the ice-free months. The greatest rainfall comes with SE winds of cyclonic centers to the S of the island. Snow accumulation is at a maximum of about 2 to 2½ feet in March, and by the first week in June it remains only in drifts, some of which persist through the summer.

(490) During the winter, from October through April, the wind is prevailingly from the N or NE and averages over 20 m.p.h. The peak recorded velocity was 80 m.p.h. in October 1947 and was from the N. During the summer, the wind is more variable, being from the N or NW about 30 percent of the time and from the SE or SW about 40 percent of the time. The mean summer velocity is 12 to 13 m.p.h.; the mean maximum is 38 to 40 m.p.h.

(491) Throughout most of the year, and particularly in the summer from May to September, broken to overcast sky conditions prevail. Clear skies are seldom seen more than 2 or 3 days a month. The principal cloud types consist of fog, stratiform, and rarely cumuliform clouds at various levels. Most are generally below 10,000 feet. Low ceilings are most common during the summer. The visibility is over 7 miles for about 70 percent of the period June through September. The best visibility is in September.

(492) (See page T-21 for dates of ice breakup and freezeup.) Navigation is difficult from mid-December to late May and is suspended during most of March and April.

(493) **Warning.**–The soil, surface waters, and vegetation of St. Lawrence Island are potentially contaminated by the microscopic eggs of a parasite that causes a long-term and sometimes fatal infection of the liver known as alveolar hydatid disease. Although this parasite occurs elsewhere on the W and N coasts of Alaska, it is unusually common on this island, where it is carried by local dogs, cats, and wild foxes. Visitors are warned to avoid contact with these animals and not to transport them under any circumstances from the island to other localities.

(494) **Communications.**–Air service is available to Savoonga and Gambell from Nome. An aerolight is shown from the Gambell airport 0.5 mile S of the town.

(495) Ships visit St. Lawrence Island infrequently. A Northland Marine Lines barge calls at Savoonga and Gambell once a year. An Alaska Native Service vessel makes a trip or two each year, and one or two visits by Coast Guard cutters can be expected. Local vessels from Nome call occasionally.

(496) Transportation about the island in summer is mostly by native walrus hide boats or whaleboats, which usually are powered by outboard motors mounted inboard in a specially constructed well. Dogsleds are used in winter and summer on tundra, but are not particularly efficient in summer. There are no roads. Trails are unmarked, but are readily followed in the areas around Gambell and Savoonga.

(497) Caterpillar tractors are available at Gambell and Savoonga, but their use for ordinary transportation is prohibitively expensive. Trains of tractors and go-devils can be used in many parts of the island if heavy transportation is necessary. Weasels have proved their value on snow, on the tundra, and in small lakes; such vehicles can move over most of the island, except on the coarsest boulder fields and the steeper slopes.

(498) Landings can be made on almost any part of St. Lawrence Island during the summer. The surf is not heavy, except where brisk offshore winds pile up the shallow offshore water into large breakers. Supplies for Gambell are landed by whaleboat on both the N and W sides of the spit, depending upon weather and sea conditions. At Savoonga, supplies can only be landed during periods when a N wind is not blowing because of the heavy surf.

(499) **Chart 16006.–Cape Vancouver** (60°32.0'N., 165°24.0'W.), about 16 miles NE from Nunivak Island, is a bold promontory, 1,132 feet high. The shoal from the mouth of the Kuskokwim River is thought to extend along the coast to Cape Vancouver, so that on the S side of the cape the water is shoal; about 6 miles W of the cape a 1.5-mile circular shoal covered 1½ fathoms was reported in 1957. Immediately off the end of the cape is deep water that extends about 5 miles along the N side of the bight on which the native village of **Tununak (Tanunak)** is situated. This bight is a series of mudflats mostly bare at low water. The BEAR anchored in 4½ fathoms about 1 mile off the S point of the bight and reported shoals that extend NW off the mouth of that bight. **Hazen Bay** is also reported to be shallow.

(500) **Hooper Bay,** 60 miles N of Cape Vancouver, and the second bay S of Cape Romanzof, appears to offer the best anchorage for moderate-draft vessels in the area between Cape Vancouver and Cape Romanzof. The recommended anchorage is 0.2 mile SE of the E end of the sandspit, about 2.5 miles SE of the village of Hooper Bay. The least depth found in the approach to the anchorage was 3½ fathoms on the series of sand ridges that parallel the beach. The anchorage is in 8 fathoms in the channel between the sandspit and a sandbar to the E that bares at low water.

(501) Off the end of the sandspit, the channel is about 0.3 mile wide and its axis is in a NE-SW direction. Both sides of the channel are very steep, and depths of as much as 13 fathoms were found close to the spit.

(502) **Currents.**–(See the Tidal Current Tables for predictions for Kokechik Bay.) There are two floods and two ebbs each day; the flood sets NE and the ebb SW.

(503) (See page T-21 for dates of ice breakup and freezeup.)

(504) The village of **Hooper Bay,** 62 miles NNW of Cape Vancouver and 17 miles S of Cape Romanzof, is the most prominent feature in the area. It is on the highest ground, and the school and tin-roofed buildings are visible for about 10 miles. To reach the anchorage, steer **075°** for the village until within 2.5 miles of shore, then steer **130°** until abeam of the E end of the sand dunes and within 1.1 miles of shore, then head for the anchorage off the sandspit.

(505) The village can be reached from the anchorage by small boat across the W end of the bay and up the creek along which the village is situated. The entrance to the creek is marked by stakes. The limiting depth depends on the stage of the tide. The entrance to the creek bares at low water, and the entire W end of the bay is very shallow, but there is deeper water inside the creek. Emergency supplies can be obtained from a store. Airmail service is weekly during most of the year; radiotelephone and radiotelegraph communications are maintained.

(506) Small boats drawing 1 to 4 feet, depending on the season of the year, can travel inland from Hooper Bay to the Yukon River. The route follows the **Keoklivik River,** S and larger of the two emptying into Hooper Bay, to a junction with the **Kashunuk River** at the old village of **Chevak;** thence through a cutoff to the **Aphrewn River;** thence up this river, also called the Kashunuk on some charts at this point, and into Driftwood Slough about 5 miles S of the Yukon.

(507) **Driftwood Slough** has two entrances from the Yukon. The one most used is about 2 miles downriver from **Pilot Station,** which is about 115 miles above the mouth of Apoon Pass. The other entrance is about 12 miles above **Mountain Village,** which in turn is about 85 miles above Apoon Pass. The part of the slough leading from this latter entrance meanders considerably and is little used. At the Yukon, Driftwood Slough is about 250 feet wide and is 1½ to 2 feet deep during the dry season.

(508) Following the ice breakup in the spring, the least depth along the inland route is about 3 feet; by early July it is about 1 to 1½ feet; and by early September, after the rainy season in August, it may be as much as 4 feet. The shallowest part of the passage is about 20 miles SSW of Pilot Station.

(509) This inland passage may also be entered from the Bering Sea by way of the Kashunuk River, which empties into the sea between Hooper Bay and Hazen Bay, or from Hazen Bay by way of the Aphrewn River.

(510) **Kokechik Bay** (also see chart 16240) is the funnel-shaped body of water on the S side of Cape Romanzof. The neck of the funnel is at the E end of the bay and is the mouth of the **Kokechik River.** On the seaward side of the bay a long narrow sandspit extends N from **Dall Point** for about 6 miles. On the spit is a ridge of low dunes that are visible about 5 miles to seaward on a clear day.

(511) About 0.8 mile N of the spit, a long narrow sand and mudflat, part of which bares at all stages of the tide, begins and extends to within 0.5 mile of Cape Romanzof. The gap between the spit and the flat is the best entrance to Kokechik Bay. Except for the deep water that extends 1 mile inside the entrance, the bay consists mostly of extensive flats 4 to 5 feet deep with numerous bars that bare at low water.

(512) About 1 mile off the entrance to Kokechik Bay is an extensive breaking shoal that bars approach from the NNW and W. The best approach to the bay is on an ENE course for Dall Point, which shows very well and is easily identified by radar in thick weather. From off Dall Point, steer a N course, paralleling the sandspit and about 0.8 mile off, and round the end of the spit at a distance of about 0.5 mile. The controlling depth along this course to the end of deep water 1 mile inside the entrance is 12 feet.

(513) Large vessels must anchor at least 5 miles W of the sandspit in 5 fathoms, sand bottom. Vessels up to 12-foot draft will find protected anchorage in the 10-fathom holes, one outside and the other inside the entrance to the bay. The outer anchorage, 0.8 mile NW of the end of the sandspit, is between the previously described shoal and the spit, and has mud bottom. The inner anchorage is 0.8 mile NE of the spit and has sand and mud bottom.

(514) The diurnal range of **tide** is 6.5 feet in Kokechik Bay. Tidal **currents** are estimated to have a velocity at strength of 1.5 to 2 knots in the entrance.

(515) **Charts 16006, 16240.–Cape Romanzof** (61°48.0'N., 166°06.0'W.), 85 miles N of Nunivak Island, is a bold and prominent headland with cliffs rising abruptly from the water over 1,200 feet along its W face; at the sharp extremity of the cape are remarkable perpendicular shafts of rocks on the side of the cliff. The cape is the W termination of the **Askinuk Mountains;** the highest 2,363 feet is about 5 miles from the cape, and can be seen a considerable distance at sea. An aero radiobeacon is on the cape.

(516) **Tide.**–The diurnal range of tide at Cape Romanzof is 6.8 feet.

(517) **Current.**–Past observations showed a diurnal tidal current velocity of nearly 0.5 knot about 7 miles SW of Cape Romanzof.

(518) Wind effects are important at this location. Continued strong S winds will cause the current to set N continuously for days at a time, and a similar S current results from N winds. The greatest velocities during nearly a month of hourly surface observations were 2.2 knots N and 2 knots S; in each case the current was setting approximately with a wind of about 40 knots.

(519) The S end of **Sand Islands** is 4.5 miles NE of Cape Romanzof. These two islands, **Neragon Island** and **Krekatok Island,** extend in a general N and S direction about 13 miles, including the interval between them. The N island is mostly covered at high water.

(520) The coast trends in an E direction from Cape Romanzof 15 miles to the mouth of **Kun River,** and throughout most of this distance is bordered by abrupt cliffs and hills gradually diminishing in elevation.

(521) **Scammon Bay,** entered between Cape Romanzof and Neragon Island, is very shoal with numerous bars bare at low water. There are two small coves along its S side, **Windy Cove** and **Edmonds Cove,** respectively 1 and 9 miles from Cape Romanzof, but both are quite shoal. **Kongishluk Bay** is the native name for Edmonds Cove. A limited area with depths of 5 fathoms is just S and E of the S end of Neragon Island, and a channel of the same depth leads into it and passes about 2.2. miles N of Cape Romanzof. A narrow channel with a minimum depth of about 1½ fathoms continues through Scammon Bay and into the Kun River. The depths are from 2 to 4 fathoms off Cape Romanzof, but the water shoals quickly NE, so there is little protection except for very light draft boats. A large shoal area with breakers is about halfway between the cape and Neragon Island, and another shoal with less than 2 fathoms is 2.5 miles 338° from the cape. Along the highland forming the S shore of Scammon Bay the water is 1 fathom or less in depth throughout its length, except just inside Cape Romanzof.

(522) The village of **Scammon Bay** is on the S shore at the entrance of Kun River. Radiotelegraph communication is maintained.

(523) The coast is low and marshy from Kun River N to the Yukon Delta. The waters along this stretch are extremely shallow and are navigated only by river boats.

(524) **Black River,** 39 miles NE of Cape Romanzof, is marked by **Black River Entrance Light** (62°20.9'N., 165°21.2'W.), 20 feet above the water and seasonally shown from a skeleton tower with a red and white diamond-shaped daymark on the E side of the entrance.

(525) **Chart 16006.–Norton Sound** is one of the important arms of the Bering Sea. Some supplies for Yukon River by way of St. Michael pass through it. The N shore is important because of the mining operations there. The S side of the entrance to the sound is occupied by the extensive Yukon Flats and should be avoided by deep-draft vessels. The rest of the sound generally has soundings of 8 to 12 fathoms; the greater depths are near the N side. Off Cape Nome and Cape Darby are spots with depths of 15 to 19 fathoms. The bottom of the sound is very even, and the depths decrease to the shore with marked regularity. There is driftwood on all the shores of the sound.

(526) **Weather.**–During the season of navigation the prevailing winds are S with variable force. Severe storms are usually from the SW. June, with less severe winds, appears to be the best month for navigation. July is about the same, but the rainy season and SW winds pick up in the latter part of the month and continue through August and part of September. September is usually somewhat drier, with more frequent winds from the N. Prevailing winds during October are N to NW; the general weather is clearer and colder.

(527) **Fog.**–The remarks on fog in the Bering Sea apply to the region W of Cape Nome, but not to Norton Sound E of it. On entering the sound with thick weather in the Bering Sea, a vessel will find that the fog almost always thins out and gradually clears as the vessel proceeds up the sound. At St. Michael fogs are rare except in the spring when ice floes are close in to Norton Sound and the winds are W. With E winds the area is clear of fog.

(528) **Mirage.**–In the vicinity of St. Michael and Stuart Islands and the coast S, mirage often distorts the appearance of the land and sometimes greatly magnifies small objects.

(529) Because of this abnormal refraction, positions obtained by astronomic sights (especially on the flats) cannot be depended on and may be several miles in error although the sight seemed good.

(530) **Charts 16006, 16240.**–The **Yukon Delta** extends about 90 miles from Black River, 40 miles NE by N from Cape Romanzof, to Apoon Pass. The land along the coast is only a foot or two above high water, is covered with low marsh grass, and is entirely lost to view when but a few miles offshore. The only landmarks visible in clear weather are the sharp peaks of **Kusilvak Mountains** and the Askinuk Mountains back of Cape Romanzof, all very distant and often obscured by clouds or mist. The extreme flatness of the land and the remarkable mirage effect, often seen over the shoals when bare, make the whole region deceptive at times.

(531) The river discharges by many mouths through the delta. The bars at the entrances have little depth, and the channels through the flats are narrow, crooked, and bordered by shoals bare at low water. They are also subject to constant change. Apoon Pass is the entrance used by the river boats.

(532) When well inside the confined bank the country on each side is covered with an almost continuous growth of willow and alder bushes. The water has a brownish white appearance, something like glacial water, without its fine, sharp grit. It has no unpleasant taste and is always fresh in the inner channels.

(533) The main channels are free from snags, though trees sometimes become temporarily lodged on the bars and quantities of driftwood are piled along the shores in places. Undoubtedly the ice carries off the snags when it goes out each season. The channels and banks show indications of changing rapidly both from erosion and deposits. Very probably much of this is effected each year during the breaking up of the ice, its consequent jams, and the great floods following.

(534) The 3-fathom curve is about 6 miles off Cape Romanzof and about 18 miles off the Yukon Delta and the shore of Pastol Bay, then comes close in to the shore of Stuart Island. From the cape to the delta, detached shoals with depths of 2¾ to 6 fathoms are as much as 30 miles from shore. Deep-draft vessels should avoid depths less than 8 fathoms.

(535) There are several settlements along the passes of the Yukon Delta. Strangers are advised to seek local knowledge before entering the Yukon Delta passes. Local independent pilots from Alakanuk and other settlements upriver monitor VHF-FM channel 16; telephone (907) 238-3629.

(536) **Currents** varying from 0.5 to 1.5 knots have been observed in the delta channels. Greater velocities occur in the

bar channels and up the river; none observed exceeded 3 knots.

(537) The prevailing **winds** in summer are NE, E, and SE. The strong blows are from the same directions, the most severe being the strong E winds that funnel from the Yukon Valley down low Unalakleet River Valley. In winter, 50-knot winds are common. The area has considerable mist and rain.

(538) **Kwemeluk Pass,** 54 miles NE of Cape Romanzof, is the most S of the Yukon Delta passes. A seasonal light marks the entrance to Kwemeluk Pass on the N. **Sheldon Point Light** (62°32.2'N., 165°01.3'W.), 18 feet above the water, is shown seasonally from a skeleton tower with a red and white diamond-shaped daymark and marks the entrance to the pass on the S side. The village of **Sheldon Point** is on the S side 5 miles above the mouth; river barges call here at irregular intervals during the summer.

(539) **Kwikluak Pass,** which empties into the Bering Sea along the N side of the islands that separate it from Kwemeluk Pass, is the main S mouth of the Yukon River. The bars at the mouth of the pass were reported to have an average minimum depth of 17 feet, but constant shifting of the bars and the shoals in the pass make navigation hazardous. Entrance should be attempted only by persons familiar with existing conditions. The diurnal range of **tide** is 2.3 feet at the mouth of the pass.

(540) The villages of **Alakanuk** and **Kwiguk** on the NW bank 12 and 18 miles, respectively, above the mouth of Kwikluak Pass, have telephone communications and daily air transportation to Anchorage. Diesel fuel is available at the village of Kwiguk. Alakanuk has radio service. The village of **Akulurak** is on the SE bank 17 miles above the mouth.

(541) **Kwiguk Pass,** about 12.5 miles N of Kwikluak Pass, connects Bering Sea with Kwikluak Pass at the village of Kwiguk. A seasonal light marks the seaward entrance to the pass.

(542) **Kawanak Pass** and **Kwikpak Pass** have a common outlet to the sea about 30 miles N of Kwikluak Pass. A seasonal light marks the entrance to Kawanak and Kwikpak Passes. The diurnal range of tide is 2.7 feet inside the mouth of Kawanak Pass.

(543) **Head of Passes** on Yukon River is the junction of Kwikluak and Kwikpak Passes at 62°30'N., 163°51'W.; the junction is 42 miles from the mouth of Kwikluak Pass and 53 miles from the mouth of Kwikpak Pass. Kawanak Pass and Apoon Pass join Kwikpak Pass 26 and 22 miles, respectively, above its mouth. By way of Kwikpak Pass, Head of Passes is 49 miles from the mouth of Kawanak Pass and 55 miles from the mouth of Apoon Pass. A seasonal light marks the junction of Kwikluak and Kwikpak Passes.

(544) **Pastol Bay,** at the NE extremity of the Yukon Delta is about 25 miles wide between the delta on the W and Point Romanof on the E and has general depths of 1 to 6 feet.

(545) **Apoon Pass,** at the head of Pastol Bay, is the principal approach to Yukon River from St. Michael. In common with the rest of this region, the surrounding country is only 1 to 2 feet above high water. The banks of Apoon Pass, to within about 2 miles of its mouth, are mostly covered with willow and alder bushes 8 to 10 feet high. At the mouth the land is more marshy, and a large area to the W appears to be entirely an open marsh. The channels and banks of the pass are subject to rapid changes from erosion and deposit.

(546) The open country E of Apoon Pass is mostly marsh, ponds, and tundra. The only high ground is **Hogback Hill,** a rounded ridge about 300 feet high, 7 miles E of the pass and 2 miles back of the coast. A range of hills and mountains 10 to 20 miles back of the coast extends SW to the first great bend in the Yukon.

(547) The approach to Apoon Pass is across unmarked shallow flats. The entrance to the pass is marked by a seasonal light. Because the depths are only 1 to 2 feet, all but the shallowest draft vessels must cross the flats at or near high water.

(548) The **tide** in Apoon Pass is more or less diurnal; the diurnal range is 4 feet at the mouth of the pass and about 1 foot at the Head of Passes. The tides at the entrance are greatly affected by winds, that may be strong enough to entirely obliterate the natural tides; N and E winds lower the water level, and S and SW winds raise it. The ordinary outflowing **current** in Apoon Pass is much less rapid than that in other passes, but there is a tidal inflow and outflow with velocities that depend upon the particular range of the tide.

(549) **Chaniliut,** on the S side 1 mile above the mouth of Apoon Pass, has a school and radiotelephone service. **Kotlik** is at the mouth of **Kotlik River,** which empties into the S side of the pass 5 miles above the mouth.

(550) **Old Fort Hamilton** is on the SE side about 22 miles above the mouth of Apoon Pass. The abandoned village of **Hamilton** is near Old Fort Hamilton.

(551) **Nunachik Pass** and **Little Apoon Pass** make off to the W from Apoon Pass just above Old Fort Hamilton. Apoon Pass joins Kwikpak Pass 25 miles above the Apoon mouth. **New Fort Hamilton,** on the E bank of Kwikpak Pass, is 40 miles from the Apoon mouth.

(552) **Yukon River,** one of the largest of the world, is the largest and most important river in Alaska. It is navigable for flat-bottom boats along its entire course from the mouth to near the head of **Lake Bennett.** No one company operates vessels along the entire river. Transfer points are at **Marshall,** 153 miles above Apoon Pass; **Tanana,** 628 miles above Apoon Pass; **Nenana,** 50 miles SW of Fairbanks on the Tanana River; and **Dawson,** Canada, 1,197 miles above Apoon Pass. The **Porcupine River, Chandalar River, Tanana River, Koyukuk River,** and **Innoko River** are the principal tributaries of the Yukon in Alaska.

(553) Between Tanana and the delta, **Ruby,** 526 miles above Apoon Pass, is the only town on the S side of the river.

(554) River steamers may ascend to Whitehorse, Yukon Territory, Canada. The White Pass and Yukon Railway connects Skagway, Alaska, and Whitehorse, Canada, the head of riverboat navigation. The Alaska Railroad connects Seward and Fairbanks; the latter is on Chena River. **Chena River** flows into the Tanana River.

(555) Although the Yukon River is navigable all the way from the Bering Sea to Whitehorse, it can neither be entered by oceangoing ships nor navigated by them. The river itself is shallow in many places and, like the Mississippi, is a maze of bars, bayous, and side channels for much of the length. At the river mouth is a vast delta with sand flats reaching far out to sea. Such channels as the currents have made are too shallow for the passage of oceangoing ships and are perpetually shifting. The riverboats are built especially for this shallow-water work, as are those used on the Mississippi.

(556) (See page T-21 for dates of ice breakup and freezeup at places on the Yukon River.)

(557) The mouth of **Pastolik River,** about 2 miles from the outer end of Apoon Pass, affords anchorage for small vessels. The Apoon flats extend in front of the entrance, and it can only be entered at high tide.

(558) With the exception of the promontory of Point Romanof, the immediate coast is low and flat all the way from Apoon entrance to St. Michael Island. **Point Romanof,** 360 feet high, stands well out about 12 miles W from the

high hills of the coast range. It appears in clear weather like an island in the sea. **Point Romanof Light** (63°12.0'N., 162°50.0'W.), 25 feet above the water, is seasonally shown from a steel tower with a red and white diamond-shaped daymark.

(559) After passing Point Romanof, **Crater Mountain,** on the mainland back of St. Michael Island, and St. Michael, Stephens, and Stuart Mountains, on St. Michael and Stuart Islands, appear above the horizon and are excellent landmarks.

(560) An anchorage for medium-sized vessels is in the mouth of the right-hand stream of **Pikmiktalik River,** 8 miles NE of Point Romanof. The depth over the bar is about 2½ feet. A shoal extends out from the S point at the entrance.

(561) In moderate weather the ocean swell is not felt between the Apoon entrance and Stephens Pass; but in heavy weather and W weather, which is more likely to occur during the latter part of the season, a choppy sea develops and is heavier off Point Romanof than elsewhere. In general, this passage is safe for river steamers in the summer season. During the latter part of the season, however, high winds become more frequent, and the boats are obliged to watch their opportunities.

(562) **Anchorages.**–Riverboats anchor on the flats or in the channel, wherever exigency demands. In the S end of St. Michael Canal in the S branch just above the junction, is a good and safe anchorage in all kinds of weather. The depth is only about 3 feet on the outside bar, and it has to be crossed at high water.

(563) Good protection is available from all but SW weather in 6 to 9 feet in the cove on the S side of Cape Stephens. **Stebbins,** on the shore of the cove, has a school and a nurse. Radiotelegraph service is maintained. Mail is delivered from St. Michael and Unalakleet.

(564) **Stuart Island,** NW of St. Michael Island, is separated from the latter by **Stephens Pass,** which has a minimum width of about 0.6 mile. The island is divided into two approximately equal parts by a narrow N-S waterway which is used considerably by small launches and native craft. **Stuart Mountain,** 480 feet high, E of the center, is the highest point. The rest of the island is low and rolling, with some small, scattered peaks. The shore of the island is very irregular. From **North Point** to **Observation Point** and around through Stephens Pass is a line of conspicuous bluffs about 170 feet high; the rest of the coast is much lower. From Observation Point to the W point of the island the N shore is free from outlying dangers; 5 fathoms can be carried 1 mile from the beach. Off the W point, some detached rocks extend about 300 yards. On the E face of the island, well toward the SE point, a shoal makes out about 3 miles. **Cape Stephens Light** (63°32.7'N., 162°18.0'W.), 200 feet above the water, is shown seasonally from a small house with a red and white diamond-shaped daymark on the SE side of Stephens Pass.

(565) **Egg Island,** 16 miles E of Stuart Island, is small and affords little protection in heavy weather, but it is the only lee to be had in N gales. The water off the W shore is deep, 6 fathoms being found close inshore. **Egg Island Light** (63°36.0'N., 161°43.2'W.), 90 feet above the water, is seasonally shown from a tower with a red and white diamond-shaped daymark on the highest part of the island.

(566) **St. Michael Island,** separated from the mainland by St. Michael Canal, is mostly low, but has two conspicuous rises: **St. Michael Mountain,** 450 feet high, near the center of the island, and sharp conical **Stephens Hill,** 331 feet high, overlooking Cape Stephens and Stephens Pass.

(567) **St. Michael Canal** is a narrow, crooked tidal slough that forks and comes together again. Distances through the canal are 18 miles by way of the N fork and 20 miles by way of the S fork. The S fork is generally used because it is wider. Depths in the canal are probably less than the 6 feet of the old improvement project, but are sufficient for the traffic of the area; the depth over the bar at the SW entrance is about 3 feet. **Canal Point** is on the N side of the SW entrance.

(568) **Chart 16240.–St. Michael Bay** is the harbor on the E side of St. Michael Island. **Orizaba Reef** extends 1.5 miles off **Rock Point,** and is **051°** from St. Michael Mountain.

(569) **Whale Island,** close off the E end of St. Michael Island, is 95 feet high and small; on approaching the harbor its E end is seen as a vertical bluff. **Whale Island Light** (63°29.5'N., 161°59.8'W.), 53 feet above the water, is seasonally shown from a small house with a red and white diamond-shaped daymark on the E end of the island. Four tanks are about 0.75 mile NE of the village of St. Michael. The passage between Whale and St. Michael Islands is blocked by rocks, bare at low water. E and N of the island the water deepens rapidly.

(570) A boulder covered 18 feet is 0.5 mile 064° from Whale Island Light.

(571) **Beulah Island,** about 0.3 mile NNW from Whale Island, is 50 feet high, small, and rounded. It has bold water off its NE side. Between this and Whale Island the water is shoal.

(572) **St. Michael,** near the E end of St. Michael Island, is about 55 miles from Apoon Pass via Stephens Pass. The village shows little evidence of the days when it was of major importance in the Yukon River traffic. Gone are most of the buildings of the Army post and the warehouses of the trading companies, and the tall masts of the telegraph company; the waterfront is littered with the rotting hulks of the once great river fleet.

(573) The Northern Commercial Co. operates the only remaining trading post at St. Michael and maintains facilities for transfer of freight from ocean to river vessels. The village has a church and a school, but no hospital and no physicians; a traveling nurse from the Bureau of Indian Affairs calls at the school.

(574) Limited amounts of diesel fuel and supplies can be obtained at the trading post. Drinking water is usually hauled to the village by boat. Gasoline and lodging are also available in St. Michael. A marine railway operated by Yutana Barge Lines can handle vessels to 100 tons and 9 feet in draft, and has limited machine shop facilities.

(575) Telephone and radiotelephone services are maintained. Mail service and connections with an airline for transportation inland are maintained the year round; charter aircraft service is also available. Yutana Barge Lines runs boats in the summer on an irregular schedule from St. Michael to Nenana, on the Yukon River.

(576) **Anchorage.**–The harbor and anchorage for seagoing vessels is an open roadstead exposed to winds from NW through N to E. Larger vessels anchor in the offing between St. Michael Bay and Egg Island, and in heavy N gales shift their anchorage to get a lee under Egg Island or go to sea. Anchorage is found about 0.5 mile SE of Whale Island in 3½ to 4 fathoms, bottom dark-blue mud, and good holding ground. Care should be taken to avoid the 18-foot boulder.

(577) Good anchorage in 5 fathoms is 3 miles off Whale Island Light on the following bearings: Egg Island 038°, Crater Mountain 205°, Whale Island Light 227°, North Point of Stuart Island 294°. Use 45 fathoms of chain.

(578) Light-draft vessels and river steamers can find shelter from N and W winds by anchoring near the E side of the island, in 3 to 8 feet. The shores of St. Michael Bay are strewn with loose rocks that are often frozen in the ice in winter and dropped as it goes out in the spring. Light-draft vessels, when anchoring in shoal water, should be careful not to anchor over any of these loose, scattered rocks.

(579) **Tides.**–The tides of St. Michael are chiefly diurnal, the range being 3.9 feet. (See the Tide Tables for daily predictions.)

(580) **Currents.**–About 0.8 mile offshore in St. Michael Bay, the current velocity is about 0.8 knot. Like the tide itself, the tidal current is chiefly diurnal and sets SE on the flood and N on the ebb.

(581) (See page T-21 for dates of ice breakup and freezeup at St. Michael.)

(582) St. Michael being the end of deepwater navigation, all the Yukon traffic beyond this point has to be conducted with vessels drawing 5 feet or less. The larger launches leaving St. Michael Bay go around the N side of St. Michael Island and through Stephens Pass, between St. Michael and Stuart Islands. They give a wide berth to the reef off Rock Point, on the N side of St. Michael Island, and, after passing between the islands, make a straight course slightly W of Point Romanof. When the summit of Point Romanof is abeam, about 1.5 miles, the direction is changed and a course is steered for Apoon Pass. The most dangerous part of the passage is the 14 miles around the N end of St. Michael Island, which is exposed to the deepwater swell from the N. This can be avoided by small craft by going through St. Michael Canal.

(583) **Routes for small craft between Isanotski Strait (False Pass)** (55°05'N., 163°30'W.) **and St. Michael** (see chart 16006).- After passing out of Isanotski Strait, clear of the outlying breakers, the course is shaped for the E side of Amak Island. Shelter can be found on the S, SE, and E sides of the island.

(584) Leaving Amak Island, the next course is set for Cape Newenham. Shelter can be obtained on either side, according to the wind. From Cape Newenham the course is set for Nunivak Island. If heavy N or NE winds are encountered before the island is reached, shelter is sought in the depth of the bight on the S side. Weather conditions being good, it is only necessary to touch at this island if needing water. The anchorage on the N side, about 12 miles E of Cape Etolin, is considered the best. (See Nunivak Island earlier in this chapter.)

(585) From the N end of Nunivak Island the customary course is to cross over diagonally to a little N of Hazen Bay, and then coast along just outside the shoals in 3 to 5 fathoms of water until Cape Romanzof is reached. If the weather is unfavorable or water is required, an anchorage in Scammon Bay is made close inshore on the S side, in a bight where a stream empties.

(586) After leaving Scammon Bay, by giving the spit on the N side of the entrance a good berth, the remaining distance to St. Michael is made by skirting along on the outer part of the Yukon Flats, in 2 to 5 fathoms, where the courses are exclusively guided by sounding. On this crooked stretch, after the mountains of Cape Romanzof and the Kusilvak Mountains disappear, no land will be visible until the high peaks on the mainland S from Stuart Island are sighted; a little later the summits of Stuart and St. Michael Islands become visible. After Stuart and St. Michael Islands become defined, the course is shaped to go through the pass between them, and then skirt around the N side of St. Michael Island to St. Michael.

(587) In the summer, N and E winds prevail a large part of the time between Cape Newenham and Cape Romanzof. The tidal currents in Etolin Strait are strong and at times cause heavy tide rips.

(588) **Chart 16200.**–The coast from St. Michael Bay to Cape Darby is generally low and rock strewn, and the depths when approaching it shoal gradually from 6 fathoms toward the beach; a depth of 3 fathoms can be taken as close as 0.8 mile except in a few places. There are no outlying dangers, but a reef makes off about 0.5 mile from the shore 2 miles S of **Black Point,** about 26 miles E from St. Michael. **Tolstoi Point** and its vicinity are high and rocky, and from there to Unalakleet River the shore is low.

(589) **Anchorage** with good protection from S winds can be found in **Klikitarik Bay,** 15 miles E of St. Michael. There are several native campsites along this coast, but the only permanent settlement is Unalakleet.

(590) **Unalakleet** (63°53'N., 160°47'W.), at the E end of Norton Sound, is the largest village on the sound E of Nome. An Alaska Native Service nurse is stationed in the village, which also has a mission church, a school, and a store. Vessels can obtain supplies in limited amounts. Radiotelephone and radiotelegraph services are maintained. Air service for passengers and mail is available the year round from Anchorage.

(591) A shoal extends about 1.5 miles offshore from the mouth of the **Unalakleet River.** The approach to the river is navigable only by shallow-draft boats. During the navigation season **Unalakleet River South Spit Light** (63°52.1'N., 160°47.0'W.), 15 feet above the water, is seasonally shown from a skeleton tower with a red and white diamond-shaped daymark on a sandspit S of the river entrance. Seasonal buoys mark the approach. An aerolight is about 0.5 mile N of the entrance. The North River aero radiobeacon has been found valuable as an aid to surface navigation. Vessels have anchored in 5 fathoms with 60 fathoms of chain about 2 miles offshore. An alternate anchorage is about 6 miles N of Unalakleet.

(592) **Weather.**–Unalakleet does not fall into any single climatic regime. The proximity of Norton Sound places it principally under a marine influence during those months (late spring, summer, and early fall) that the sound is free of ice. The summer temperatures are cool with a relatively small number of days annually with readings above 70° F. The summer extreme of 86° F in June reflects the fact that occasionally in summer warm dry continental conditions prevail for brief periods. In winter the extreme temperatures are those of a cold continental climate, but the average minimums for the season are inbetween the normal values for marine and continental climates at this latitude.

(593) Precipitation also appears to be variable between marine and continental influences. The increased amount of precipitation in summer has an abrupt beginning and ending that closely coincides with the marine predominated period. The relatively low average annual snowfall relates to the dry continental winter. Because of the variable influences the coastal section of this W central part of Alaska is frequently described as being part of a transitional climatic zone between marine and continental climates.

(594) Even though the Unalakleet River Valley is broad with no extreme elevations on either side, surface winds are channeled by the valley such that prevailing directions are either E or W. Fall storms moving through the Bering Sea occasionally produce winds of several hours duration blowing from the W with velocities in excess of 50 m.p.h., and because of the low elevation, the village and airport may be

flooded by the wind-caused high tides. During winter, flooding does not occur because Norton Sound is frozen from November until about May. In the spring storms with sufficient intensity to produce wind caused floods are rare. Occurrences in summer are also quite rare, but more likely than in spring, especially during the latter part of the season.

(595) **Besboro Island** is 1,040 feet high and very prominent; on a clear day it can be seen from St. Michael. It affords a poor lee, as the wind draws all around the island. A shoal covered 4 to 4¾ fathoms makes off 2 miles in a NE direction from the N end of the island. The W side of the island is bold-to, and the E side can be approached as close as 0.5 mile, with a depth of over 5 fathoms.

(596) **Shaktoolik River Entrance Light** (64°22.8′N., 161°14.0′W.), 14 feet above the water, is seasonally shown from a skeleton tower with a red and white diamond-shaped daymark on the spit at the entrance to **Shaktoolik River,** 7.5 miles E of Cape Denbigh.

(597) **Shaktoolik** is 4 miles S of Shaktoolik River entrance. Vessels can anchor 4 miles off the village in 7 fathoms, mud bottom. Small boats can land at the gradually shoaling shale beach in front of the school, but the approach is extremely shallow and should be made with caution; W winds cause considerable surf. Mail is delivered by air from Unalakleet. Radiotelegraph service is maintained.

(598) **Cape Denbigh** is a moderately high rounded hill, joined to the mainland by a low narrow neck. The head of the bight, E of the cape, is shoal, but in the approach the water shoals gradually. A good anchorage in NE winds can be had E of the cape in depths suitable to the draft of the vessel. The S end of the cape is bold-to, and its W side, 2.5 miles N of the point, can be approached close-to in 4 fathoms. The water shoals rapidly inside to a depth of 4 fathoms when approaching the shore.

(599) **Norton Bay** is generally shoal. About midway between **Point Dexter** and **Bald Head** is a depth of about 6 fathoms, and from this depth the water shoals gradually as the shores are approached in any direction inside of Bald Head. In some places the 6-foot curve is 5 miles or more from the beach. The N shore of the bay for 15 miles W of Bald Head is comparatively low, and the water is shoal for some distance from the shore. From a point 15 miles W of Bald Head to Cape Darby the land is high and wooded along the coast; a few native villages are found in this stretch. For 20 miles NE from Cape Darby, a depth of 4 fathoms can be taken 0.3 mile from the shore, and in some places much closer. The water shoals gradually on approaching the coast, but the S and E sides of Cape Darby have deep water close-to. During strong N winds the water is lowered considerably in Norton Bay.

(600) At **Moses Point,** on the NW side of Norton Bay, food and water can be obtained and medical facilities are available. There is an aero radiobeacon near the village. Radiotelephone and radiotelegraph services are maintained. Biweekly plane service is maintained with Anchorage.

(601) Anchorage with hard bottom, good holding ground, is off the native village of **Elim** about 7 miles SW of Moses Point, in 4½ fathoms; use 60 fathoms of chain. The landing area is at **Iron Creek,** 3.5 miles NE of Elim. Mail is delivered by air several times a week. Protection from E winds is found in the lee of **Reindeer Hills.**

(602) (See page T-21 for dates of ice breakup and freezeup.)

(603) The entrance to **Koyuk River,** flowing into the NE end of Norton Bay, is marked by seasonal buoys.

(604) **Cape Darby** is the S extremity of **Kwiktalik Mountain.** The cape is high and rounded terminating at the water in steep rocky bluffs.

(605) **Rocky Point** is a high bold promontory with irregular rocky cliffs. **Rocky Point Light** (64°23.9′N., 163°09.0′W.), 175 feet above the water, is seasonally shown from a skeleton tower with a red and white diamond-shaped daymark at the W entrance to Golovnin Bay.

(606) **Golovnin Bay,** on the N side of Norton Sound, has its entrance between Cape Darby and Rocky Point, with a width of 10 miles. It extends in a general N direction for 12 miles to the entrance to Golovnin Lagoon. The E shore is high and bold, with occasional sand and gravel beaches.

(607) **Carolyn Island,** low and rocky, is 0.2 mile off the E shore, about 8 miles N of Cape Darby. **Golovnin Bay Light 2** (64°27.0′N., 162°52.6′W.), 55 feet above the water, is seasonally shown from a small house with a red triangular daymark on the S end of the island.

(608) The W shore of Golovnin Bay for about 3 miles N of Rocky Point is high and bold, but beyond this is a low sand beach with a prominent point about 5 miles N of Rocky Point. The head of the bay on the W side of the entrance to Golovnin Lagoon is between a sandspit projecting from the E shore and a low sand island extending N from the W shore and connected with it at low water.

(609) The tidal current in Golovnin Bay is chiefly diurnal. The current velocity is about 0.5 knot off Carolyn Island; floods N and ebbs S.

(610) Deep water can be carried close under Cape Darby and Rocky Point. E of Rocky Point is an extensive middle ground on which the least depth found was 23 feet; on its E edge it rises abruptly from 36 to 42 feet. Except for this middle ground, the bay is free from dangers S of the low point on the W shore, the deepest water being on the E side, and ranging from 66 feet close under Cape Darby to 24 feet 0.5 mile NW of Carolyn Island. In the S part of the bay the highland may be approached closely, but off the low land the 18-foot curve is in places nearly 1 mile offshore.

(611) In 1952 the Bureau of Indian Affairs ship NORTH STAR reported striking a submerged object in 64°20′N., 163°06′W., about 4 miles SSE of Rocky Point; the vessel was drawing about 21 feet.

(612) In the N part of the bay an extensive shoal, with 4 to 9 feet, makes out in a NE direction from the W shore to within 0.8 mile of the E shore; its extremity is about 2 miles 093° from the N point of South Spit on the S side of the entrance to Golovnin Lagoon. The channel leading to the entrance to Golovnin Lagoon is on the E side of the bay, passing around the E end of the shoal and following the E shore at a distance of 0.4 to 0.7 mile, with an average width of 800 yards. The least depth in the channel is 13 feet, but 15 feet has been taken in at high water. The diurnal range of the tide is 1.8 feet, but this is influenced by the prevailing winds, which have a tendency to bank up the water in heavy S weather and to lower it with N and NE winds.

(613) **Golovnin Bay Light 4** (64°31.2′N., 162°55.1′W.), 106 feet above the water, is seasonally shown from a skeleton tower with a red and white diamond-shaped daymark on the NE shore of the bay.

(614) **Cheenik Light 6** (64°32.4′N., 163°02.6′W.), 22 feet above the water, is seasonally shown from a skeleton tower with a red triangular daymark on the end of the spit W of Golovnin, marks the entrance to Golovnin Lagoon.

(615) **Anchorage.**–NW of the N end of South Spit, in the entrance to Golovnin Lagoon, anchorage may be had in 36 to 42 feet, with protection from all winds. For vessels whose size prevents the use of this anchorage, the best is off the point on the W side of the bay in about 24 feet. This is unsafe in S weather, but is the most convenient for communicating with the head of the bay. By shifting anchorage from

one side to the other in Golovnin Bay, good shelter is found from E or SW or W winds.

(616) An anchorage with good holding ground in 42 feet is on the following bearings: Rocky Point Light 253°, Golovnin Bay Light 2, 040°, and Golovnin Bay Light 4, 000°. Use 60 fathoms of chain. Keep at least 1 mile S of Carolyn Island.

(617) **Golovin,** on the N spit at the entrance to Golovnin Lagoon, is a distributing point for the mining district of the Fish River country. The village has a school, roadhouse, cold storage plant, two salteries, several stores, and an airport. Radiotelegraph service is maintained.

(618) **Golovnin Lagoon** is very shallow and is navigable for small vessels of 3½-foot draft to the mouth of the Fish River, which empties into the head of the lagoon. The channel through the lagoon is narrow and tortuous. **White Mountain,** on Fish River, is a fishing village with a school and a store. Radiotelegraph communication is maintained.

(619) (See page T-21 for dates of ice breakup and freezeup.)

(620) For about 22 miles, from Rocky Point to Topkok Head, the land is high and bold, in many places rising abruptly. Beyond this to Cape Nome the coast is low, with high land farther back. Immediately behind this lowland is a large shoal lagoon with two small entrances, the W one called Port Safety. Between Rocky Point and Cape Nome the water is deep and the bottom regular; by giving the shore a berth of 1 mile a depth of 6 fathoms or more will be found.

(621) **Topkok Head** is 22 miles W of Rocky Point, and is the first highland close to the coast E of Cape Nome. Its seaward face rises abruptly from the water 586 feet and is a well-known and conspicuous landmark.

(622) A yellow bluff, 572 feet high, on the E side of **Bluff,** about 6 miles E of Topkok Head, is conspicuous, but not as much so as Topkok Head.

(623) In 1968, it was reported that small craft could find some protection from W winds in indifferent weather in a small cove W of Bluff. The cove can be recognized by a small low house somewhat back from a point. Caution should be exercised in this area to avoid being swept into the cove as a result of sudden wind changes.

(624) **Solomon** is an abandoned mining village at the mouth of the **Solomon River,** 11 miles W of Topkok Head and 17 miles E of Cape Nome. A road runs N to Council and W to Nome via a ferry at Port Safety. The depth on the bar at the entrance and inside **Solomon River** is about 3 feet, but local knowledge is necessary to keep in the best water. In 1968, it was reported that no lights were visible from offshore, and that there were no good marks for entering the river. A large steel warehouse and a few old steel oil tanks were reported to stand on the N side of the river W of the entrance.

(625) It was further reported in 1968, that small craft should make a straight-in approach to the river entrance from well outside. When once inside, however, the river to the W was particularly good, and that small craft could tie up to the shore on either the N or S sides; the N side appeared to be a little deeper.

(626) An anchorage approximately 2 miles offshore in 8½ fathoms, hard gravel and sand bottom, is on the following bearings: Cape Nome 254°, largest house in village 358°, Topkok Head 079°. Use 45 fathoms of chain. The only protection against heavy winds is to stand out to seaward.

(627) (See page T-21 for dates of ice breakup and freezeup.)

(628) **Port Safety,** about 8 miles E of Cape Nome, is a small anchorage for vessels of less than 7-foot draft. The channel is narrow and has a depth of 7 feet. Small vessels can anchor in the narrow sloughs that lead between the flats inside the entrance.

(629) A cable ferry travels across the entrance to Port Safety; minimum vertical clearance of the cables is 3 feet. Sheltered anchorage for several small boats can be had in the entrance outside of the ferry cables.

(630) **Cape Nome** is a bluff about 650 feet high, 1 mile broad, and rounded down to the water on either side, where the land at the shore is low, with higher land farther back. The water off this cape is quite deep. The diurnal range of tide at Cape Nome is about 2 feet.

(631) From Cape Nome to Cape Rodney, the coast, except abreast of Sledge Island, is a comparatively straight stretch of low sand beach, with no projecting points, and higher land some distance back. Abreast of Sledge Island for a distance of several miles the hills slope down to the beach, giving this part of the coast the appearance of a point. The stretch of beach is broken by a number of small rivers. The entrances to **Nome River,** Snake River, **Penny River,** and **Sinuk River** have shifting bars, but there is generally enough water in the channel over these bars to permit boats of 3-foot draft to enter. When approaching the coast between Cape Nome and Sledge Island, the water shoals regularly and gradually until a depth of 5 fathoms is reached; inside this depth the bottom is irregular, especially near the mouths of the rivers.

(632) **Chart 16206.–Nome,** the metropolis of NW Alaska, is on the beach at the mouth of the **Snake River,** 11 miles W of Cape Nome. The harbor is a shallow, open roadstead. Large vessels anchor and the passengers and cargo are taken ashore in lighters. Traffic using the dredged channel is handled over the revetment, where transfer facilities that are open to public use are available.

(633) Jetties, marked at the outer ends by seasonal lights and distinguishable on radar to 4 miles, protect the entrance to Snake River. A seasonally maintained lighted **009°** range marks the entrance channel. A large dish-shaped communications antenna about 0.25 mile E of the entrance is prominent. An aero radiobeacon is 2.5 miles E of Nome (shown on charts 16200, 16206), and an aerolight is at the Nome Airport. A dredged channel leads to a turning basin at Nome, 0.3 mile above the mouth of Snake River. In June 1991-June 1992, the controlling depth was 7½ feet to the turning basin; thence in August 1992, 7 to 8 feet was available in the basin, except for lesser depths to 5 feet along the S and W edges. Rapid shoaling occurs at the entrance to the channel, requiring maintenance dredging during the open season. With heavy surf, boats crossing the bar before entering between the jetties will ground and are liable to overturn.

(634) In 1968, submerged obstructions consisting of concrete blocks were reported to exist about 850 yards ESE of the channel entrance; these obstructions extend 017° to shore from the charted obstruction in 64°29′39″N., 165°23′50″W.

(635) The bar is reported to shift its position from time to time because of storms and the alongshore drift, and except at low water, due to N winds, the bar is reported to be no problem for small craft.

(636) The general anchorage for deep-draft vessels is in 7 to 8 fathoms about 1 mile from the beach abreast of Nome. Vessels of less draft anchor in about 6 fathoms a little closer to the beach. In strong S winds vessels should anchor farther offshore.

(637) **Tides.**–The diurnal range of the tide is 1.6 feet. The water levels are influenced more by the wind than tide. An offshore wind sometimes causes a level of from 2 to 3 feet

below mean lower low water for days at a time; a level of 14 feet above mean lower low water has been noted as a result of storms.

(638) **Currents.**–About 2 miles offshore in Nome roadstead the tidal current averages about 1 knot at times of strength. It is chiefly diurnal. The flood sets E, and the ebb NW.

(639) **Weather.**–The moderating influence of the open water of Norton Sound is effective only from early June to about the middle of November. Storms moving through this area during these months result in extended periods of cloudiness and rain. The nearly continuous cloud cover during July and August results in an average of 45 cloudy, 12 partly cloudy, and only 5 clear days for the 2-month period. During the summer the daily temperature range is very slight. The freezing of Norton Sound in November causes a rather abrupt change from a maritime to a continental climate. Most low-pressure systems during this period take a path S of Nome, resulting in strong E winds, accompanied by frequent blizzards, with the winds later becoming N and reaching Nome across the colder frozen areas of N Alaska.

(640) Temperatures generally remain well below freezing from the middle of November to the latter part of April; January is usually the coldest month of the year. Temperatures usually begin to rise near the end of February and continue to rise until they reach a maximum in July. An unusual aspect of the yearly temperature trend is the short period of thawing weather in January. Despite the generally low temperatures, the maximum during the month is often above freezing and the "January thaw" generally expected by old time residents is a usual occurrence.

(641) Precipitation reaches its maximum during the late summer months and drops to a minimum in April and May. Snow begins to fall in September, but usually does not accumulate on the ground until the first part of November. The accumulated depth increases during November, December, and January, reaching a maximum depth usually in late February or early March. The snow cover decreases rapidly in April and May, and normally disappears by the middle of June.

(642) Average wind speeds for each month are not excessive, ranging from around 10 to 12 m.p.h. Severe windstorms do occur with winds over 70 m.p.h. recorded several times. Velocities exceeding 70 m.p.h. have been recorded during all months from October through March. These strong winds during the winter when there is snow cover produce blowing snow conditions that severely hinder transportation in the area.

(643) (See page T-11 for **Nome Climatological Table.**)

(644) Navigation is difficult because of the ice from early December to early June and is usually suspended from late December to mid-May.

(645) (See page T-21 for dates of ice breakup and freezeup.)

(646) The National Weather Service maintains a weather station at the Nome Airport and monitors VHF-FM channel 16 (156.80 MHz) and 2182 kHz.

(647) **Quarantine** is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) A hospital is in Nome.

(648) **Supplies.**–Water and some provisions can be obtained. Diesel oil is not available in large quantities.

(649) **Communications.**–Nome maintains radiotelephone and radiotelegraph communications with other parts of Alaska and the world. Air service for passengers, mail, and freight is available the year round. Steamship service is available during the summer. From Nome, roads extend to Council, Teller, and to the Kobuk River S of Taylor.

(650) **Chart 16200.–Sledge Island,** 31 miles W of Cape Nome and 4.5 miles offshore, is a rocky flat-topped island except near the S extremity where the highest point, a 760-foot jagged mountain, exists. Ruins of abandoned habitations are on the sandspit on the N end of the island and along the beach about midway of the E side. These are probably ruins of the former village of **Aziak.** Except for the sandspit, the shores of the island are rocky and steep.

(651) **Sledge Island Light** (64°30.0'N., 166°11.5'W.), 32 feet above the water, is seasonally shown from a skeleton tower with a red and white diamond-shaped daymark on the N point of the island. The island may be safely approached from any direction except the E where a depth of 3 fathoms is 0.9 mile E of the light. Small vessels seeking shelter close in on the N side are cautioned to stay clear of the submerged bar making off NW from the spit. It was reported that the cove just W of the spit provides a good anchorage. A depth of 6½ fathoms is about 3.7 miles offshore and about 7.5 miles E of Sledge Island. The passage between Sledge Island and the mainland has irregular bottom but has depths of 5 fathoms or more. Tide rips have been observed in the passage and on the E side of the island during heavy weather.

(652) With heavy S winds, vessels at anchor in the Nome roadstead usually seek shelter behind Sledge Island. Ice is reported to hang on longer in this area than to the E toward Nome.

(653) **Current** observations were made in the passage between Sledge Island and the mainland for a period of 6 days in July 1950. The tidal current is diurnal with average velocity at strength of NW current of 1 knot and average velocity at strength of SE current of 0.5 knot. Maximum velocity observed during the period of the observations was about 1.5 knots setting NW. (See Tidal Current Tables for predictions.) Vessels when in this vicinity should give special attention to the currents. Above Cape Rodney there is no perceptible current S or E; the general set is N and W.

(654) From **Cape Rodney** to **Cape Douglas,** the shore is a low sand beach, and the high land is farther inland from the beach than E of Cape Rodney. This coast is seldom approached close-to; the water is comparatively shallow and dangerous, shoals and ledges are found between Cape Douglas and Point Spencer.

(655) Vessels are cautioned to exercise care when approaching the shore S of Cape Rodney and to give the shore off Cape Douglas a berth of at least 15 miles; an irregular bottom with depths of 6 fathoms has been found by reconnaissance lines off this cape with indications of lesser depths inshore. From a point about 8 miles NE of Cape Douglas the area to the N, covering the approaches to Port Clarence, has been surveyed.

(656) **Cape Rodney Light** (64°38.5'N., 166°23.8'W.), 24 feet above the water, is seasonally shown from a skeleton tower with a red and white diamond-shaped daymark on the point.

(657) **King Island,** 1,196 feet high, is about 34 miles W of Cape Douglas. It is triangular in shape, about 1.5 miles long and about 1.2 miles wide, rugged and rocky, and has nearly perpendicular cliffs, deep water, and generally rocky bottom on all sides. **Ukivok** is a native village on the S side, the houses being built in the sides of the cliffs some distance above the water. Off the village, but close inshore, vessels may anchor in about 15 fathoms, muddy bottom, with good protection from NW winds. In clear weather the island is an excellent landfall for vessels coming from S and bound to Port Clarence.

(658) **Cape York** (65°25.0'N., 167°30.0'W.), is a high, rocky, nearly vertical cliff, with numerous ravines and a range of high rugged mountains immediately back of it. The

cliff is about 10 to 12 miles in extent. There is no distinct promontory, and no exact point along the cliff that can be defined as the cape.

(659) The area from Cape York to Port Clarence has been surveyed with no depth less than 6 fathoms being found 1.5 miles from the shore. The general depths fall off to a submarine valley about 2 miles offshore, extending E, with depths of not less than 10 fathoms, to within 6 miles of the entrance to Port Clarence. A rock is reported about 0.8 mile from the shore SE of **York** village.

(660) Between Cape York and the high land of Cape Prince of Wales is a bight, with comparatively low rolling land back of it, that extends across the peninsula to the N shore. The beach is low, and the water shoals gradually when approaching the shore. The E part of the bight is slightly shoaler than the W part; about 6 fathoms will be found 1 mile offshore; in the W part of the bight 8 fathoms will be found at the same distance from the beach. When standing W alongshore, and when abreast of Cape Mountain, the water deepens suddenly to 20 fathoms.

(661) **Chart 16204.–Port Clarence,** a large bay indenting the Seward Peninsula about 35 miles SE of Cape Prince of Wales, provides the only good harbor close to the Bering Strait. The bay is formed by a low sandspit which extends from the mainland in a N direction for about 10 miles to Point Spencer. The highest elevation on the spit is a round knoll near the S end, 24 feet above sea level. This knoll is inconspicuous except at close range. Near Point Spencer, at the broad part of the spit, are several buildings and structures of a loran station, the most prominent of which is a 1,365-foot loran tower. NOAA Ship DISCOVERER reported that the loran tower had a maximum useful radar range of 16 miles. The Coast Guard maintains a lighted airstrip year-round at the station and monitors 2182 kHz and VHF-FM channels 16 and 22. Four green fuel tanks on the spit are visible from the E.

(662) **Point Spencer Light** (65°16.6'N., 166°50.9'W.), 22 feet above the water, is shown seasonally from a skeleton tower with a red and white diamond-shaped daymark on the N end of the point at the entrance to Port Clarence. Except for the light and loran tower, there are no conspicuous landmarks to aid the navigator in making the entrance into Port Clarence.

(663) The channel between Point Spencer and **Point Jackson** on the N shore is 4 miles wide, free of dangers, and with depths of 42 to 48 feet. The N half of the bay has a general depth of 42 feet as close as 1 mile from shore. There are no dangers, and depths shoal gradually to the beach. The S half of the bay shoals gradually to the bars and flats along the low shoreline at the S end. Along the W side of the bay the sandspit may be approached fairly close except for the shoal 2 miles S of Point Spencer which makes into the bay from the spit with depths of 15 feet 1 mile off. To the E the water shoals to the entrance to **Grantley Harbor,** which is connected with Port Clarence by a narrow channel marked by **Grantley Harbor Light** (65°16.7'N., 166°20.8'W.), 15 feet above the water, which is seasonally shown from a tower with a red and white diamond-shaped daymark on the N side of the entrance to the harbor. The controlling depth in the channel is not more than 10 feet. The channel is subject to continual change; local knowledge is advised. The current is strong with many eddies and tide rips.

(664) **Anchorage** with good holding ground is available anywhere in Port Clarence. Being very careful in the entrance, shallow-draft vessels will find greater protection in Grantley Harbor.

(665) **Routes.**–In approaching Port Clarence from the S in fog or misty weather, the low sand and shingle spit forming the W side of Port Clarence is not visible until close-to. The best procedure is to make a landfall on King Island from the E keeping in depths greater than 60 feet to avoid the foul ground N from Cape Rodney. From King Island a course may be set a little E of Cape York to within 3 miles of the coast, thence on course **096°** through the entrance into Port Clarence, where good anchorage may be obtained.

(666) **Tides.**–The diurnal range of the tide at Port Clarence is 1.4 feet. This condition, however, is subject to radical changes due to meteorological conditions. Moderate to strong S or SW winds of several days' duration will raise the height of the tide in the area without appreciably increasing the range. This is actually a datum change and is appreciable along the entire S coast of the Seward Peninsula. It is reported that continued strong N winds produce a lowered datum, but to a lesser extent.

(667) **Currents.**–Along the outside coast W of Point Spencer and S of Cape York there is a general W set of 1 to 2 knots. This velocity is appreciably affected by direction, force, and duration of the wind.

(668) Current observations in the entrance to Port Clarence indicate that the velocity seldom exceeds 0.5 knot 2 to 3 miles N of Point Spencer. One mile E of the point, velocities up to 1 knot were observed, the larger velocities generally setting W or N.

(669) **Weather.**–The weather, in general, is better than in the Aleutian Island area, with less fog and fewer bad storms during the short summer navigation season. Fog and high winds are generally of short duration so that it is seldom that planes cannot land at Teller at least once a week. The winter weather is generally better than the summer for plane service, as there is little or no fog during cold weather.

(670) The first surface fog appears after the spring break-up and is of an intermittent character, generally local, and forming and disappearing at intervals as short as one-half hour. As the season advances, the fog is more prevalent, of greater density and longer duration, but in general it offers no serious obstacle to surface navigation.

(671) (See page T-21 for dates of ice breakup and freezeup.)

(672) **Brevig Mission** is on the N shore of Point Clarence 9.5 miles NE of Point Spencer.

(673) **Teller,** 12 miles E of Point Spencer is on the base of the S spit at the entrance to Grantley Harbor. There is a school and a mission, with two general merchandise stores and a suboffice and warehouse of a commercial company at Teller.

(674) **Wharves.**–Two ramp-type docks furnish facilities for unloading supplies from lighters and shallow-draft vessels on the Grantley Harbor side. Freighters must anchor well offshore in Port Clarence and lighter cargo to Teller.

(675) **Supplies.**–Food, coal, diesel oil, lubricating oil, and gasoline may be obtained in limited quantities from the two stores. Loading of oils and gasoline is by drum only. There is no connection for obtaining water. Shallow-draft vessels may obtain water through a hose at the mouth of **Fox Creek,** 3 miles S of **Cape Riley.** Larger craft may anchor 0.7 mile offshore in 25 to 30 feet and boat water from the beach.

(676) **Communications.**–Radiotelephone and radiotelegraph services are maintained. Passenger and light freight service is principally by plane, but occasionally freighters and tugs with lighters furnish transportation for heavier supplies during the short navigation season. An airstrip S of Teller provides mail service from Nome. A gravel road connects Teller with Nome.

(677) **Imuruk Basin** (see chart 16200) is a shallow body of water SE of Grantley Harbor; the two are connected by narrow, difficult **Tuksuk Channel.**

(678) **Kuzitrin River** rises in the Seward Peninsula and flows in a W direction about 75 miles to Imuruk Basin. The anchorage for oceangoing vessels is in Port Clarence, the head of navigation for powerboats and other vessels up to 12 feet in draft in the mouth of Kuzitrin River. Shallow-draft lighters can navigate the Kuzitrin for about 15 miles to **Shelton.** The river is open from June to October.

9. ARCTIC OCEAN

(1) This chapter describes the Arctic Ocean coastline of Alaska from the Bering Strait to Demarcation Point, at the boundary between the United States and Canada, and the waters of Kotzebue Sound and Prudhoe Bay. Also discussed are the Diomede Islands, Barter Island, and many of the offlying coastal islands, and the more important towns and communities in this area including Wales, Kotzebue, Wainwright, and Barrow.

(2) **Chart 16003.–Bering Strait,** 44 miles wide between Cape Prince of Wales, Alaska, and Cape Dezhneva, Siberia, is the gateway from the Bering Sea in the Pacific Ocean to **Chukchi Sea** in the **Arctic Ocean.** The N limit of Chukchi Sea is a line from Point Barrow, Alaska, to the northernmost point of Wrangel Island, Siberia.

(3) The Arctic coast of Alaska has a general length of 921 nautical miles and is mostly low; tidal shoreline totals 2,191 miles. The lowlands have their greatest depth in the wide triangular plain with its apex near Barrow and its base against the **Brooks Range,** 150 miles to the S. The W end of Brooks Range is near Cape Lisburne and the E end is near Demarcation Point; actually it is not one but a series of ranges, some reaching elevations of more than 8,000 feet.

(4) Most of the coastal plain is low, rolling tundra cut by numerous streams and lakes. The **tundra** is a cover of grasses, lichens, and shrubs which, for a short time during the summer, is brightened by flowers; during the rest of the year it presents a dreary aspect. Tundra is poorly drained and most of it is permanently frozen below the surface; this permanently frozen ground is known as **permafrost.** During the summer, the tundra thaws to a depth of a foot or more but is kept moist because water cannot penetrate the permafrost.

(5) The **frost mounds** seen occasionally along the coast are produced by frost action on the tundra and vary widely in size and duration. A large frost mound is known as a **pingo** and may reach a height of 300 feet; the summit is usually fissured and may emit drinkable water. **Frost blisters** usually form along sloping ground and may shift in position from year to year; they seldom exceed 25 feet in height.

(6) The native **sod houses** stand 6 to 10 feet above the ground and are built of logs with sod piled around the walls and on the roof. They can be distinguished from frost mounds by the steepness of their sides and the smoke pipe that usually projects from the center of the roof.

(7) There are few harbors, port facilities, or aids to navigation along the Arctic coast. Depths near shore may change as much as 6 feet because of ice gouging; storms also shift the sands in shallow water but there is little evidence of such shifts in the deeper water. **Abnormal refraction** is a common occurrence; a pingo may loom like a mountain, and landmarks may be sighted much farther from shore than the normal limit of visibility.

(8) **Loran.**–In September 1980, U.S. Coast Guard Cutter POLAR SEA reported that loran signals were unreliable above 68°00′N., and that the signals were completely lost above Cape Lisburne.

(9) **Omega.**–In September 1980, strong Omega signals were experienced in the Beaufort Sea by the U.S. Coast Guard Cutter POLAR SEA.

(10) **Racons,** radar beacons, have been established along the U.S. Arctic coast of Alaska from Point Lay (69°44.1′N., 163°00.6′W.) to Brownlow Point (70°09.6′N., 145°50.6′W.) as additional aids to navigation. The Racons are generally seasonally maintained from July 1 to September 15.

(11) **Currents.**–Observations totaling about 6 days were made in the Bering Strait off Cape Prince of Wales during the summer of 1950. When not opposed by N winds, the current flowed N with velocities that sometimes exceeded 2.5 knots.

(12) From Bering Strait to Point Barrow the current sets N along the shore and has a velocity of not less than 1 knot when not opposed by winds or stopped by ice. A current from Kotzebue Sound joins the current from Bering Strait N of Cape Krusenstern and the resultant velocity in July and August is 1.5 to 2 knots as far as Point Hope. After rounding Point Hope the velocity decreases to about 1 knot.

(13) N of Point Lay the current is stopped if the ice has not opened up from the shore; if the ice is open to Point Barrow, the current continues along the shore but, because of the constricted space between shore and ice, increases in velocity to 2 or 3 knots at Point Barrow. The general current is affected by the winds and may be decreased or even stopped by N winds, but when such winds abate the current resumes; when the wind is with the current the velocity is increased. Well offshore, the currents are variable and not so strong; they are influenced considerably by the winds but there is a definite general set N. E of Point Barrow the currents are irregular and unpredictable but seem to be caused mostly by winds and moving ice.

(14) **Weather.**–During July, August, and September, winds in the Bering Strait are most often out of the N or S at 13 to 15 knots. Gales blow less than 1 percent of the time, although winds reach 28 knots or more up to 5 percent of the time. This same flow is present over the open waters of the Chukchi Sea, where average windspeeds range from 14 to 18 knots, and gales occur about 2 percent of the time. In September, N winds become more frequent in the Bering Strait and Chukchi Sea, signaling a return to winter. At Kotzebue winds out of the SW through W are prevalent during the summer. In September, they return to the prevailing E winter flow; NE winds are also common in winter. Gales blow 2 percent of the time in December, January, and February, while winds at Kotzebue and Cape Lisburne reach 28 knots or more about 3 to 7 percent of the time in winter.

(15) Off the North Slope in July, August, and September, winds blow mainly out of the NE through E, at average speeds of 11 to 14 knots. Gales occur less than 1 percent of the time in July and August, but 1 to 2 percent of the time in September. SW through W winds are also common in summer. N through NE winds prevail during the winter. At Barrow, northeasterlies and easterlies blow the year-round at average speeds of 10 to 14 knots. Gales are infrequent. At Barter Island, winds from the NE through E and SW through W make up about 75 to 85 percent of the observations. Westerlies are slightly more frequent in midwinter, while easterlies, which are frequent at all times, reach a peak in early summer. Winds from the W are strongest, averaging 17 to 18 knots during the winter, when gales blow 2 to 4 percent of the time. Winds have exceeded 65 knots at Barter Island. Strong winter winds often blow parallel to the coast from Barrow to Barter Island.

(16) In these N seas, advection or sea fog is the primary restriction to visibility during the warmer months of the

year. It is most prevalent from June through September, affecting the exposed coasts as well as open seas. It is most dense during the morning hours. In July and August, visibilities drop below 2 miles 10 to 25 percent of the time in the Bering Strait, Chukchi Sea, and off the N coast of Alaska. They fall to 0.5 mile or less 5 to 20 percent of the time and are worst off the North Slope. At Barter Island, visibilities of 0.5 mile or less occur on 11 to 16 days per month from June through September, and visibilities of 0.25 mile or less occur both here and at Barrow on about 3 to 5 mornings per month during this period. Cape Lisburne is subjected to 3 to 7 days per month when visibilities fall to 0.5 mile or below. At Kotzebue, midsummer visibilities are good, while from November through June, poor visibilities occur on 3 to 7 days per month on the average. In winter, snow and blowing snow can reduce visibilities to less than 0.5 mile. The snow that accumulates is often so dry and powdery that a 10-knot wind can pick up enough to reduce visibilities to less than 5 miles. Ice fog and steam fog or arctic smoke also reduce visibilities in winter. Radiation fog can occur on calm, clear nights.

(17) Winters are cold and summers are cool along this coast. In November, average daily maximums drop to the low teens (°F) or below, while average minimums are around 0°F. February is generally the coldest month. Average maximums range from just above 0°F at Kotzebue to −13°F, E of Cape Lisburne. Low temperatures in the −20°F range are common. Extremes of −50°F or below have been recorded. The big increase in temperature starts in March. By April, daytime highs in the 10° to 20°F range, and nighttime lows in the −5° to 5°F range are common. By June, temperatures are often in the forties during the day and thirties at night. Warmest weather usually occurs in July. At Kotzebue, the average maximum is 59°F, while the average minimum is 47°F. Along the North Slope, these readings are 8° to 10°F cooler. Extremes can reach the midseventies to mideighties.

(18) Since the air in this region holds relatively little moisture, particularly in winter, annual precipitation amounts are light, ranging from 5 to 15 inches. The greatest amounts occur along the shores of the Chukchi Sea and Kotzebue Sound. While amounts are light, there are many snowy or rainy days. Some form of measurable precipitation falls on about 200 to 300 days each year. Snow falls in every month, but is the most frequent precipitation form from October through May. About 30 to 50 inches fall each year. Heaviest amounts of precipitation are most likely in July, August, and September, when 2 to 4 inches per month are common.

(19) **Ice.**–Unless there is an unusually late spring, the ice begins to break in Bering Strait and Kotzebue Sound by early June. Heavy drift ice from Kotzebue Sound is often found between Cape Blossom and Point Hope in late June.

(20) At Point Hope and Cape Lisburne, the pack ice breaks off from the shore ice in May and moves off and closes in again with changing winds, gradually working off to the N and W. Young ice forms in the spaces thus left but gradually gets thinner until it disappears in June.

(21) From Cape Beaufort to Point Barrow the pack moves gradually N, clearing from point to point. A shift of the wind to W brings the pack in on shore when a few hours before it was out of sight from the land.

(22) At Point Barrow, the pack breaks off from the flaw or shore ice in the spring and moves off and on until June. When the pack moves off in June, it begins to take a NW movement and continues to do so until it is out of sight. The movement of the pack, on and off, continues well into July, after which time heavily massed floe ice, much broken and heavily jammed together, may be expected. Mariners are cautioned that the prevailing N currents near Point Barrow will tend to carry vessels, which are beset, farther into the ice mass. The shore ice leaves the beach late in July but remains in sight until the middle of August, or perhaps all summer. In exceptional seasons the pack remains on the point the year-round. E of Point Barrow, ice conditions are very uncertain. When the pack ice moves offshore it does not go very far, and the shore and drift ice extend well inshore from its edge. The current along the W shore of Alaska sets NE from Point Barrow; the movements of the ice to the E of Point Barrow are due entirely to the winds.

(23) In the fall, young ice forms earlier to the E than to the W and can be seen as early as mid-August. The prevailing winds are NE and soon bring the pack down to the E of Point Barrow. When this ice movement commences vessels proceed to the W of the point.

(24) At Point Barrow young ice begins to form around heavy ice about mid-September and by the end of the month it forms in open water and makes rapidly along the beach. By this time the pack has moved close to shore. The young ice makes out to the pack during the first week of October, and then the ice is in for the winter. The pack shuts down on Icy Cape the first week in November, and after that time there is no open water between Point Barrow and Icy Cape except when the flaw opens.

(25) Freezeup normally begins at Kotzebue in late October, and a southbound vessel should try to clear Bering Strait by early November.

(26) (See page T-21 for dates of ice breakup and freezeup.)

(27) **Small-boat operation in ice.**–Launches usually can proceed through the looser-packed floe ice during calm weather, but slow speed and maneuverability are essential. Passage frequently can be made close to shore when large floes have been driven in to the beach. Large bergs may also make leads through the more solid floes. Small ice cakes can be pushed aside in the looser areas. Caution must be observed to avoid the underwater projections of the larger bergs and the growler type of berg which is low in the water and difficult to see. The bergs have a tendency to roll or break with disturbances of any sort. Native launches prefer to operate close-to and in the lee of ice floes to take advantage of the smoother seas and will sometimes leave the mainland to proceed in the lee of offshore ice.

(28) Aids to navigation are maintained only during the navigation season. (See Light List.)

(29) **Chart 16200.–Cape Prince of Wales,** on the Alaska side of Bering Strait, is the W extremity of **Seward Peninsula. Cape Mountain,** 2,289 feet high, is a mile back of the steep rocky shores on the SW side of the cape; a parabolic antenna is 1.7 miles ENE of the mountain.

(30) **Tin City,** an abandoned village, is on the beach about 2 miles SE of Cape Mountain. The bight off Tin City affords N weather anchorage in depths of 10 fathoms a mile from a sand beach which is steep enough for good landing. There is a Government airstrip near Tin City.

(31) **Wales,** 2.5 miles NW of Cape Mountain, is at the S end of a low sandy beach which extends 4 miles N, then turns NE toward Shismaref Inlet. The village has a mission, a school, a store, and radiotelephone communication. Small planes carrying mail and a few passengers land on the beach in front of the village.

(32) **Cape Prince of Wales Light**(65°38.0′N., 168°07.2′W.), 20 feet above the water, is shown seasonally from a skeleton tower with a red and white diamond-shaped daymark on the beach 2 miles N of Wales.

(33) Anchorage off Wales is in depths of 10 fathoms 0.8 mile from the beach. A narrow naval **restricted area** extends

nearly 4 miles due W from the beach midway between Wales and the light. (See **334.1330**, chapter 2, for limits and regulations). Caution is advised to avoid being dragged N over the restricted area and on to Prince of Wales Shoal by the nontidal current which usually has a velocity of more than 1 knot.

(34) **Ice.**–Average breakup in Bering Strait at Wales is in early June and average freezeup is about the first of December. (See page T-21 for dates of ice breakup and freezeup.) Navigation is difficult from early December to early June and is usually suspended from late December through April.

(35) **Prince of Wales Shoal** is a narrow ridge of sand, covered 3½ to 5 fathoms, that extends about 35 miles NNE from the W extremity of the cape. Vessels bound S through Bering Strait should be careful not to fall too far E and be caught between the shoal and the N shore of Seward Peninsula. The shoal is unmarked because of ice conditions and the remoteness of the locality.

(36) **Fairway Rock** (65°38'N., 168°44'W.), 15 miles W of Cape Prince of Wales, is 534 feet high, square headed, and steep sided. The rock has deep water on all sides, and there are no outlying dangers.

(37) The **Diomede Islands,** midway between Cape Prince of Wales and the Siberian mainland, have nearly perpendicular sides and are without beaches; the tops of the islands are broken tablelands. The waters around the islands are deep, the bottom is mostly rocky, and anchorage is poor. The U.S.–Russia boundary passes between the two islands.

(38) **Little Diomede Island** (Alaska), with an elevation of 1,308 feet, is 20 miles WNW of Cape Prince of Wales and 8 miles NNW of Fairway Rock. **Diomede,** the only village on the island, is just N of the sandspit midway along the W shore. A reef extends W from the sandspit toward the S end of Big Diomede Island. Vessels approaching Little Diomede Island from the S and E may run close along the S shore, keeping in depths greater than 14 fathoms until the village is sighted, and anchor S of the sandspit. Approach from E also has been made along N shore at distances decreasing from 1 mile to 0.4 mile and anchorage in depths of 17 fathoms 0.7 mile N of the spit.

(39) **Big Diomede Island** (Siberia), 2.1 miles NW of Little Diomede Island, rises to a height of 1,667 feet; close to the W shore are some bare rocks, and a light is shown from the N end. Deep water is reported between the two islands but passage should not be attempted by large vessels.

(40) **Chart 16005.–Cape Dezhneva,** 19 miles NW of Big Diomede Island, is the E extremity of the mountainous peninsula at the NE end of the Siberian mainland. This peninsula, which rises to a height of 2,638 feet, resembles an island when seen from the offing because of the low, marshy land back of it. The coasts of the peninsula consist mainly of dark-colored cliffs rising in jagged terraces steeply from the sea. Lights are shown from the N and S sides of the cape, and there are radiobeacons at the lights. A submerged rock is a mile off the NE face of the cape. Anchorage, with good proteciton from offshore winds, can be found in depths of 8 fathoms both N and S of the meeting place of lowlands and mountains. Anchorage is also possible in depths of 10 fathoms, muddy bottom, E of the cape.

(41) From Cape Prince of Wales to Shishmaref Inlet, 60 miles NE, the coast is a low sand beach backed by lagoons and marshes. The mountains in the interior can be seen on a clear day; **Potato Mountain** (65°40'N., 167°35'W.), 1,406 feet, and **Ear Mountain** (65°55'N., 166°19'W.), 2,329 feet, are distinguishable.

(42) **Shishmaref Inlet** is large and extends about 15 miles into the land. Across its mouth is **Sarichef Island,** narrow and about 5 miles long. **Shishmaref Light** (66°15.5'N., 166°02.4'W.), 18 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark about 0.5 mile from the NE end of the island.

(43) **Shishmaref,** at the light on Sarichef Island, is the most important settlement along this section of the coast. The village has a school, mission, store, radio station, and an airstrip; limited supplies of gasoline, diesel fuel, food, and water are available. The school building is reported to be conspicuous. Shishmaref uses Bering standard time.

(44) Anchorage can be had in depths of 5 fathoms 1.3 miles WNW of Shishmaref Light. Beach landings can be made only in calm weather on the seaward side of Sarichef Island because of the shallow water that extends 250 yards from shore.

(45) The navigable channel into Shishmaref Inlet rounds the NE end of Sarichef Island; a dangerous bar makes out 0.5 mile from the point on the N side of the channel. Vessels drawing as much as 7 feet may be beached on the channel side of the sandy NE end of Sarichef Island; drafts of 3 feet may be taken to within 100 yards of the inner beach SW of Shishmaref, and native skiffs have followed unmarked channels completely around the island. Native pilots are available at Shishmaref.

(46) **Ice.**–Average breakup at Shishmaref is in the latter part of June and average freezeup is about the second week of November. (See page T-21 for dates of ice breakup and freezeup.) Navigation is difficult from the first of December until late June and usually is suspended from late December until early June.

(47) For 60 miles NE and E from Shishmaref Inlet the coast is a line of low bluffs and small sand dunes that end in a very low spit at **Cape Espenberg,** which is difficult to make out. Native settlements are scattered along the coast from Cape Espenberg to Cape Prince of Wales.

(48) **Northwest Corner Light** (66°34.9'N., 164°24.2'W.), 75 feet above the water, is seasonally shown from a skeleton tower with a red and white diamond-shaped daymark 19 miles W of the cape. **Cape Espenberg Light** (66°33.5'N., 163°36.4"W.), 28 feet above the water, is shown seasonally from a skeleton tower with a red and white diamond-shaped daymark on the cape.

(49) **Kotzebue Sound,** at the NE end of Seward Peninsula, is entered between Cape Espenberg and Cape Krusenstern, 33 miles to the N; depths are 6 to 9 fathoms throughout most of the sound.

(50) The 30-mile W side of Kotzebue Sound from Cape Espenberg S is relatively shallow, with depths of 3 fathoms as far as 5 miles from shore; the land on this side is mostly low but a small hill is conspicuous about halfway between the cape and the S shore.

(51) The 45-mile S shore of Kotzebue Sound proper is higher, rockier, and bolder than the W shore; inshore depths too are greater, with 4 and 5 fathoms quite close to the promontories. **Cape Deceit Light** (66°06.0'N., 162°45.0'W.), 200 feet above the water, is shown seasonally from a skeleton tower with a red and white diamond-shaped daymark on the extremity of **Cape Deceit,** which is halfway along the S shore.

(52) **Deering,** on the E side of Cape Deceit, has a school, stores, and radio communication; anchorage is available in depths of 5 fathoms 1 mile E of Cape Deceit Light.

(53) **Kiwalik Lagoon,** in the SE corner of Kotzebue Sound, is shallow and has a mud bottom. A narrow channel winds through the lagoon to **Kiwalik River** which can be navigated only with local knowledge. Shallow-draft boats can operate in the lagoon during periods of high water, but

the lagoon is almost dry when the water is lowered by adverse winds.

(54) **Kiwalik,** on the gravel spit on the W side of the lagoon entrance, has a rough landing strip that will accommodate small planes; the diurnal range of tide is 2.7 feet at Kiwalik. (See Tide Tables for predictions.) **Candle,** about 6 miles upriver from Kiwalik, has stores, a school, and a gravel airstrip.

(55) **Spafarief Bay,** also in the SE corner of Kotzebue Sound but N of Kiwalik Lagoon, has depths of 3 to 5 fathoms.

(56) Tundra-covered **Chamisso Island,** 231 feet high and about 1 mile long, is 11 miles N across Spafarief Bay from Kiwalik Lagoon and 2.5 miles S of Choris Peninsula. The earth and rock bluffs that rim the island range in height from 15 feet at the S end to 80 feet at the NW end. The shores are mostly broken boulders separated by short stretches of sand beach. Shallow water extends 0.3 to 0.5 mile from the N and E sides of the island. Early in the open season freshwater can be obtained on Chamisso Island.

(57) Tiny **Puffin Island,** 0.3 mile NW of Chamisso Island, has steep rocky shores; there are two conspicuous rocks S of the island. The waters are deep on the N and W sides of Puffin Island but the passage between the islands is foul.

(58) **Choris Peninsula,** 300 feet in elevation, is a 6-mile S projection from much larger and longer Baldwin Peninsula. The N of two hills on the small peninsula is joined to Baldwin Peninsula by a narrow neck of land about 20 feet in elevation. The outer end of Choris Peninsula is the widest part, 2 miles, of the entire feature; the bluffs are 50 to 95 feet high and there are projecting rock ledges. The passage between Choris Peninsula and Chamisso Island has depths of 3½ to 6 fathoms.

(59) **Eschscholtz Bay,** behind Choris Peninsula, Chamisso Island, and Spafarief Bay, extends 20 miles E along the S side of Baldwin Peninsula and is mostly shallow. The shore at the head of the bay is rimmed with long muddy flats which bare at low water in some places as far as 0.3 mile from the beach. **Buckland River,** which empties into the head of Eschscholtz Bay, is large but shallow and has little traffic; **Buckland,** 10 miles upriver, has a radio station.

(60) N of Choris Peninsula, **Baldwin Peninsula** is low for some distance, then rises to low bluffs which continue to the mouth of Hotham Inlet, 40 miles to the NW. The faces of the bluffs are deeply furrowed by the gradual melting and sliding of the surface ice and frozen mud.

(61) **Cape Blossom** is a distinctive point in the Baldwin Peninsula bluffs, which are highest at the point and slope to either side.

(62) **Hotham Inlet** entrance, 15 miles N of Cape Blossom and 30 miles ESE of Cape Krusenstern, is obstructed by vast mud flats and sandbars, some of which are bare at low water; the 3-fathom curve extends as much as 9 miles from shore and nearly as far S as Cape Blossom. The inner waters of Hotham Inlet are 4 to 15 miles wide and extend 45 miles SE behind Baldwin Peninsula; charted depths are 1 to 2 fathoms in what passes for a channel through this inner expanse, which has been known locally as **Kobuk Lake.** Landings cannot be made at many places in Hotham Inlet because of the extensive mud flats. The waters are little influenced by tides and are mostly fresh because of the near absence of any E current; prolonged SE winds lower the level.

(63) **Kotzebue,** 11 miles N of Cape Blossom and on the outer S side of Hotham Inlet entrance, has a school, a hospital, missions, stores, banking facilities, fur farms, airstrips, an aerolight and an aero radiobeacon, and radiotelephone communication; the town uses Bering standard time. Vessels of less than 6-foot draft can reach the town if they know the channel, which is shifting and difficult to follow. Seasonal buoys mark the entrance channel. Local pilots are available at Kotzebue. It is reported that information on pilotage, docking, and the facilities and supplies at Kotzebue can be obtained from the B&R Tug Co. of Kotzebue. Out of season this information is available from Roy Heinrich, manager of the B&R Tug Co., 10116 SE 21st Street, Bellevue, Wash. 98004.

(64) Deep-draft vessels approach Kotzebue as closely as possible and lighter their freight ashore. The usual anchorage for deep-draft vessels is in depths of 5 to 6 fathoms 3 to 6 miles SW of Cape Blossom; protection is afforded from N and E winds. The trip by small boat from the anchorage to Kotzebue is about 15 miles and over many sandbars that are constantly shifting; local pilotage is advised.

(65) On July 14, 1967, a merchantman reported anchoring about 10 miles W of Kotzebue on the following bearings: Kotzebue aero radiobeacon tower, marked with a fixed red light and an alternating flashing green and white light, 078°; microwave "horns" or antennae, in about 66°50'N., 162°32'W., 094°; Cape Blossom Light, 121°; Igichuk Hills, 000°; and the left tangent of Cape Krusenstern (false cape), 325°. Caution is advised as vessels in this anchorage may be subject to ice damage during W winds.

(66) The report further stated that the vessel after passing through Bering Strait found Ear Mountain (65°55'N., 166°19'W.) and Midnight Mountain (65°47'N., 164°35'W.) to be good marks. Upon rounding Cape Lowenstern, the vessel attempted to enter Kotzebue Sound, but after encountering solid ice in the approach, had to turn about and head in a generally N direction keeping about 60 miles offshore to avoid broken ice and growlers to a point about 4 miles SW of Kivalina. From this point the vessel headed in a generally S direction keeping about 10 miles offshore to the anchorage.

(67) In addition to the aids used in anchoring, the following were reported good marks in the S approach to the anchorage; the 2,070-foot peak NW of Igichuk Hills; a tripod or post on Cape Krusenstern; and the old unlighted radio towers in about 67°18.5'N., 163°40.0'W.

(68) Cape Mountain, 2,289 feet high, at the W end of Seward Peninsula, and the bluffs behind Cape Krusenstern were reported to be good radar targets, but the actual cape and shoreline proved deceptive.

(69) **Currents.**–The average velocity of the tidal current is about 0.5 knot at the anchorage SW of Cape Blossom; the flood sets SE and the ebb NW. Observations at this location show a NW nontidal flow which sometimes has sufficient velocity to overcome the flood of the tidal current and produce a continuous NW current of varying velocity for days at a time. This NW flow attains maximum velocities of 1 to 2 knots at times of the tidal current's ebb strength.

(70) **Weather.**–Kotzebue is 26 miles inside the Arctic Circle and very near the N end of a long narrow peninsula bounded on the N and W by Kotzebue Sound and on the E by Hotham Inlet (known locally as Kobuk Lake). These water bodies produce a maritime type of climate when the water is ice-free, which is roughly from late May to late October, although the W portion of the sound is not completely frozen until about December and not completely free of ice again until the middle of July. Local topography is nearly uniform with a general low relief, so that there are no significant terrain barriers in the immediate area to impede surface air-flow or produce pronounced local variations in temperature and precipitation. The mountainous Seward

Peninsula to the S, however, does deflect some low pressure systems which originate in or beyond the Bering Sea area and move toward this region.

(71) During the ice-free period cloudy skies prevail, fog occurs, daily temperatures are relatively uniform, relative humidity is high, and W winds predominate. These normal conditions are altered only by cyclonic storms or by pressure systems strong enough to overcome local circulation tendencies.

(72) When the water surrounding the peninsula becomes frozen, the climatic characteristics approach the continental type. The change from maritime to approximately continental conditions becomes progressively more pronounced as the ice cover advances across the sound toward the Arctic Ocean. A similar, but inverse, change occurs as the ice diminishes.

(73) Average winter temperatures are not as severe as might be expected at this latitude. Cyclonic storms and the influence of the Arctic Ocean, which is often relatively free of ice, moderate the winter temperatures.

(74) Annual precipitation is very light. The total for a normal year is about eight inches, and over half of that usually occurs in three months; July, August, and September. Snow generally falls in every month of the year except July and August, but the average snowfall per year is less than fifty inches.

(75) (See page T-12 for **Kotzebue Climatological Table.**)

(76) **Ice.**–Average breakup in Kotzebue Sound at Kotzebue is about the last of May and average freezeup is in the latter part of October. (See page T-21 for dates of average ice breakup and freezeup.) Navigation is difficult from late October to the latter part of June and usually is suspended from the second week in November to mid-June.

(77) **Noatak River,** which empties into the N side of Hotham Inlet entrance, has numerous rapids and is not navigated for any great distance by anything larger than a canoe. The natives portage from the headwaters of Noatak River to Chipp River and follow the latter to Beaufort Sea. **Noatak,** about 35 miles upriver from Hotham Inlet, has an airstrip and a radio station.

(78) **Kobuk River** empties into the E side of Hotham Inlet through a many-mouthed delta which extends inland for about 30 miles; depths off the delta are 2 to 4 feet for as much as 3 miles. The delta channels are difficult to navigate but the river proper is comparatively wide and deep. The natives portage their canoes from the headwaters of Kobuk River to Koyukuk River, a tributary of the Yukon.

(79) **Noorvik,** 25 miles up Kobuk River from Hotham Inlet, has a hospital, airstrip, and radio station. **Kiana,** at the junction with **Squirrel River** 45 miles up the Kobuk from the inlet, has stores, a school, an airstrip, and a radio station. Much farther up Kobuk River from the inlet are **Shungnak,** 150 miles, and **Kobuk,** 155 miles; both have airstrips and Shungnak has a school, a mission, and a radio station.

(80) A narrow passage 4 miles long and 1 mile wide connects the SE end of Hotham Inlet with **Selawik Lake,** which extends 35 miles farther E and averages 15 miles in width. A depth of 2 fathoms can be taken around the lake by giving the shores a wide berth. **Selawik River,** which empties into the E end of the lake through a maze of islands, has several entrances that are obstructed by mud flats; navigable entrance depth is uncertain but presumably is shallow. **Selawik,** near one of the entrances, has a school, a mission, a radio station, and an airstrip.

(81) The coast is low from Hotham Inlet to Cape Krusenstern, and shallow water extends nearly half the distance from the mouth of the inlet toward the cape; the edge of the shoal is steep and should be approached carefully. For the rest of the distance there are depths of 4 to 6 fathoms close to the beach.

(82) Behind **Cape Krusenstern** is a high, prominent range of mountains which can be seen from great distances. On closer approach, the mountains are seen to fall away toward the cape in a series of steps and must not be mistaken for the low cape when shaping a course into Kotzebue Sound. A shoal extends 3 miles NW from the N side of the cape.

(83) N of Cape Krusenstern the coast is a low, shingle beach backed by numerous lagoons that discharge through small shallow openings. The high ground behind the cape continues at some distance inland to **Mulgrave Hills,** about 30 miles N of the cape. Beyond the hills is a wide plain that extends another 30 miles before the mountains again approach the coast and slope down to the water.

(84) About 38 miles NNW of Cape Krusenstern is the Cominco-Red Dog Mine port site and loading facility. A large red, white, and blue building with a dark blue roof depicting an Alaska State flag is predominant and visible well off-shore. The mining camp maintains radiotelephone communications year round. Air service is available. A racon (67°34.7'N., 164°03.2'W.), loading facility lights, and mooring buoys mark the site. Local knowledge is advised in approaching the area.

(85) About 42 miles NNW of Cape Krusenstern is the inlet to a lagoon that extends another 8 miles NW behind the barrier beach that separates it from the ocean. **Kivalina,** on the barrier beach N of the inlet, has a prominent school (largest brown building), a store, radiotelephone service, Public Health clinic, and an airstrip NW of the village. Small-craft anchorage is available along the inner side of the village where the channel bears in close to shore. Shifting shoals extend as much as 0.3 mile from either side of the inlet, and entrance should not be attempted without local pilotage.

(86) **Ice.**–Average breakup at Kivalina is in the latter part of May and average freezeup is in the latter part of October. (See page T-21 for dates of ice breakup and freezeup.)

(87) At **Cape Thompson** (68°07.0'N., 165°57.0'W.), 80 miles NW of Cape Krusenstern, the mountains drop directly to the water in a series of steep bluffs and cliffs about 500 feet high and 6 miles long. Thousands of sea birds nest along the bluffs and their eggs are an Eskimo source of fresh food supply in early summer.

(88) The coast is without distinct promontories. About midway along the Cape Thompson cliffs is a rugged mountain face that has at its S end a distinct series of strata in an irregular semicircle. In the ravine S of this point is a small stream from which freshwater can be easily obtained. Directly off the stream, anchorage can be had in depths of 5 fathoms, sandy bottom. At other places along the cliffs the bottom is mostly rocky.

(89) In the bight 1 mile N of Cape Thompson, the water is fairly deep close to shore and remains calm in the severest N and E storms. Good anchorage, with sand bottom, is available for small craft. A 69-ton vessel has been brought to within 75 yards of the shore without grounding. Good water can be obtained from any of several streams.

(90) **Charts 16124, 16005.**–From Cape Thompson the mountains continue N to Cape Lisburne, while the coast curves NW and W to Point Hope.

(91) **Point Hope,** 22 miles NW of Cape Thompson and 102 miles from Cape Krusenstern, is the seaward extremity of a low tongue of land that projects 16 miles W from the general line of the coastal mountains. The point has a steep shingle beach which is backed by numerous lagoons. The

village of **Point Hope** is the most important settlement along this part of the coast and has a school, a mission, a store, a radio station, and an airstrip. An aero radiobeacon (68°21.0'N., 166°47.2'W.) is about 1.4 miles NE of the tip of Point Hope.

(92) Depths of 4 fathoms are found as far as 5 miles WNW of Point Hope, and a 2¼-fathom shoal extends about 2 miles from shore 6 miles ESE of the point. Vessels have anchored in depths of 6 fathoms about 0.8 mile S of Point Hope and in 5 fathoms 0.5 mile NE of the tip of the point. The bottom is hard mud and only fair holding ground throughout the Point Hope area.

(93) **Ice.**–Average breakup at Point Hope is in the latter part of June and average freezeup is about the second week of November. (See page T-21 for dates of ice breakup and freezeup.) Navigation is difficult from the latter part of November until mid-July and usually is suspended from early December until the latter part of June.

(94) **Charts 16123, 16005.–Marryat Inlet,** 10 miles ENE of Point Hope, is the entrance to a large inlet; a draft of 5 feet can be taken through the inlet but those not familiar with the channel should be cautious about entering. When the ice breaks in the inlet, there is a strong outflowing current and the moving ice is more or less dangerous. Depths off the inlet range from 1½ fathoms near shore to 3½ fathoms at a distance of 4 miles.

(95) N of Marryat Inlet the mountains slope down to rugged shore cliffs. The few ravines in the cliffs have running streams with shore outlets where freshwater can be obtained.

(96) **Charts 16122, 16005.–Cape Lisburne** (68°52.9'N., 166°12.5'W.), 35 miles NNE of Point Hope, is a bare brown mountain 849 feet high. This rugged headland is distinctively marked by a parabolic antenna (68°52.2'N., 166°09.1'W.), an aero radiobeacon (68°52.0'N., 166°04.0'W.), pinnacles, and rocks near its summit, and its shore faces are very steep. The cliffs are rookeries, and during the summer months the sky is sometimes darkened by flights of birds. The wind rushes down from the mountains in gusts of great violence and varying directions, and at such times passing vessels should stay well off the cape.

(97) **Charts 16121, 16104, 16005.**–The coast turns abruptly E from Cape Lisburne. The land is lower; the hills are rounded and slope to the sea. Toward **Cape Sabine** (68°55.0'N., 164°36.0'W.), 35 miles E of Cape Lisburne, is a series of ridges that terminate at the coast in bluffs. Cape Sabine is the outer end of one of the ridges and projects but slightly from the general line of the coast. Veins of coal 1 to 4 feet thick show plainly along the tops of the bluffs at Cape Sabine; some of the veins have been worked but use of the coal is limited because of its poor quality and the difficulty of mining it.

(98) **Charts 16103, 16005.**–From Cape Sabine, the land continues of a rolling character until near **Cape Beaufort** (69°02.0'N., 163°50.0'W.), a dark mountain that comes down to the coast 52 miles E by N of Cape Lisburne. There is no appreciable break in the coast at Cape Beaufort, and it probably was named a cape because it is the most N extension of high ground along the coast of Alaska. At this point the mountains recede inland and the coast continues low.

(99) **Charts 16102, 16101, 16088, 16087, 16005.**–About 18 miles N of Cape Beaufort is the S extremity of **Kasegaluk Lagoon,** which extends to within a few miles of Wainwright Inlet. S and E of Icy Cape the lagoon is blocked by an extensive area of marsh; there is no passage behind the cape even for native skin-boats. Separating the lagoon from the ocean is a narrow sand barrier, only a few feet above the water; S of Icy Cape are several small, shallow passages through the barrier and there are two larger openings N of the cape. The land on the inner side of the lagoon is mostly low but there are some small bluffs with rolling terrain behind them. S of Icy Cape, Kasegaluk Lagoon has **Kukpowruk River, Kokolik River, Utukok River,** and several smaller streams emptying into it but its whole expanse is filled with flats and bars that make it scarcely navigable even for native canoes.

(100) **Charts 16102, 16005.–Kukpowruk Pass,** 41 miles NNE of Cape Beaufort, has a controlling depth of about 6 feet into Kasegaluk Lagoon and S for about 2 miles through a narrow channel along the inner side of the barrier beach; the channel leads to fair anchorage, protected from all directions. NE winds will lower the water level about 3 feet, and the pass changes from year to year because of ice scouring. There is no channel N through the lagoon to Point Lay.

(101) **Charts 16101, 16005.–Point Lay** is a slight bend in the barrier beach 49 miles NNE of Cape Beaufort. The village of **Point Lay** is on the beach 3 miles S of the point. Anchorage is in depths of 6 fathoms 1.5 miles off the village. There is a prominent aero radiobeacon (69°44.1'N., 163°00.6'W.) at the airport on the mainland 2 miles SSE of the village.

(102) A radar beacon (Racon) is at Point Lay Airport (69°44.1'N., 163°00.6'W.). The Racon, on a 120-foot-high tower with an orange radar reflector, has an effective range of 19 miles and is seasonally maintained.

(103) **Ice.**–Average breakup at Point Lay is in late June and average freezeup is in early November. (See page T-21 for dates of ice breakup and freezeup.) Navigation is difficult from early November to late June and usually is suspended from mid-December to late June.

(104) **Charts 16088, 16087, 16005.–Icy Cape Pass,** 2 miles SW of the cape, has a controlling depth of about 5 feet but entrance requires knowledge of bar and channel conditions. Fair anchorage is available in depths of 5 to 7 feet in Kasegaluk Lagoon SW of the pass. A radar tower and an airstrip are on the mainland opposite the pass. Water can be obtained from a stream SW of the tower.

(105) **Icy Cape** (70°19.9'N., 161°53.0'W.), 40 miles NE of Point Lay and 125 miles from Cape Lisburne, is a sharp turning point in the low flat barrier beach that separates Kasegaluk Lagoon from the ocean. A house and a tank are near the point of the cape.

(106) A radar beacon (Racon) is 2.5 miles S of Icy Cape (70°17.3'N., 161°54.5'W.). The Racon, on a 200-foot-high tower, has an effective range of 19 miles and is seasonally maintained.

(107) **Blossom Shoals,** which extend 6 to 8 miles off Icy Cape, are a number of ridges that parallel the coast. In the approach to the shoals, the bottom is lumpy and depths are irregular. The shoals are usually given a wide berth, and it is recommended that vessels rounding the cape stay in depths greater than 12 fathoms.

(108) The shoals are the approximate S limit of the inshore ice during the July-September season for navigation in this area. The ice moves inshore and offshore with the winds and, as the shoals form a salient at this part of the coast, open water may extend N or S of them, but access from one open-water area to another may be blocked by ice on the other side of the shoals.

(109) Blossom Shoals show evidence of ice scour and probably change from year to year. Surveys made in 1948-1950 found depths of 10 feet 0.9 mile off Icy Cape, 16 feet 2 miles off, 20 feet 3.3 miles off, 19 feet 4.4 miles off, 26 feet 6.4 miles off, and 37 feet 7 miles off.

(110) There are deep channels between the outer shoals. One that has been recommended by the survey party, rounds the cape at a distance of 3.8 miles with no depths less than 35 feet. About 6 miles off the cape, and just inside the outermost shoal, is a passage with minimum depths of 10 fathoms.

(111) Behind the barrier beach that extends E from Icy Cape, **Kasegaluk Lagoon** has midchannel depths of 9 to 11 feet; numerous shoals project from both sides of the lagoon. The ice in the lagoon breaks up about 10 to 15 days after the sea ice has moved out. New ice forms about the middle of September and soon becomes about 6 inches thick. Launches not more than 4½ feet in draft may pass around **Nokotlek Point,** on the mainland 18 miles E of Icy Cape, through a very narrow channel.

(112) **Akoliakatat Pass,** 12 miles E of Icy Cape, has a narrow channel close to shore on the W side; a controlling depth of about 7 feet can be carried into Kasegaluk Lagoon at normal tide levels. Anchorage can be found back of the pass in depths of 7 to 10 feet, good holding ground. The current in the pass may reach a velocity of 2 knots with strong SW or NE winds. A continuous period of NE winds will lower the water as much as 3 feet below normal levels.

(113) **Charts 16086, 16005.–Pingorarok Pass,** 22 miles E of Icy Cape, has a controlling depth of 5 feet into Kasegaluk Lagoon through a very narrow channel on the E side. Breakers usually mark the shoals on both sides of the entrance.

(114) **Charts 16085, 16005.–Wainwright Inlet** (70°36.5'N., 160°06.5'W.), 39 miles ENE of Icy Cape, is the entrance to **Wainwright Lagoon.** The narrow winding channel between **Point Collie** on the E and **Point Marsh** on the W has a controlling depth of 6 feet at normal water level, but passage should not be attempted without the aid of local guides. Shoals extend 0.7 mile off the inlet and are well defined by breakers during moderate weather; during W storms the breakers stretch across the channel. Ice, that may enter the inlet during SW storms, follows the channel, where the current reaches a maximum velocity of about 2 knots. The mean range of tide is only about 0.5 foot.

(115) **Wainwright,** on the beach 2.5 miles NE of the inlet, has stores, a school, a church, and an airstrip.

(116) An aerolight (70°38.2'N., 160°01.6'W.) is close S of Wainwright. An aerolight, aero radiobeacon, and a radar beacon (Racon) are at the Wainwright airstrip (70°36.6'N., 159°51.9'W.). The Racon, on a 120-foot-high tower with an orange radar reflector, has an effective range of 19 miles and is seasonally maintained.

(117) **Ice.**–Average breakup at Wainwright is about the last of June and average freezeup is about the first of October. (See page T-21 for dates of ice breakup and freezeup.) Navigation is difficult from early November to mid-July and usually is suspended from early December to early July.

(118) **Kuk River,** that empties into the head of Wainwright Lagoon, has an even bottom and no definite channel. Depths decrease gradually from 10 feet at the lagoon to a reported 4 feet some 30 miles upriver. Three outcroppings of usable coal are 8 to 18 miles from the mouth.

(119) **Charts 16084, 16005.–Point Franklin** (70°54.4'N., 158°47.2'W.), 70 miles ENE of Icy Cape, is the E end of the barrier sand beach that extends 8 miles along the NW side of Peard Bay. A prominent 120-foot steel tower is about 2 miles W of the point.

(120) A mile E of Point Franklin is the N extremity of the narrow barrier **Seahorse Islands,** that extend SSE for 3 miles. The largest island has an elevation of about 20 feet, and is the greatest along this series of barriers. Between Point Franklin and the Seahorse Islands is a narrow, winding channel with a least depth of about 4 feet; this channel may vary from year to year.

(121) A shoal makes out to N from Point Franklin. Depths less than 1 fathom extend out 1.2 miles; the 5-fathom curve is about 2 miles offshore, and the 10-fathom curve is 2.6 miles offshore.

(122) Protection from S to W weather is available NE of Point Franklin and the Seahorse Islands. This shelter does not afford protection from ice.

(123) A current sets NE along the shore except during strong NE winds. It is estimated that the velocity is 1 to 2 knots under ordinary conditions. This NE current forms a big eddy which circulates in a clockwise direction in the bight E of Point Franklin. The eddy extends about 20 miles to the NE of the point and 5 to 6 miles from shore.

(124) When there is ice in this vicinity **abnormal refraction** can be expected at any time. A large amount of refraction can be expected at all times, whether or not ice is present.

(125) **Peard Bay,** behind the barrier beaches of Point Franklin and the Seahorse Islands, has uniform depths of about 20 feet over the greater part of its area. The bottom, which is mud and clay, is excellent holding ground. A depth of 12 feet can be carried into Peard Bay through a narrow channel just off the S end of the Seahorse Islands. A depth of about 8 feet can be carried into the bay on either side of the 4-foot shoal that is about 1 mile SE of the S end of the islands. The bay affords good protection from heavy S and SW winds. A small spit in the SE part of the bay affords protection for small boats from winds from any direction.

(126) At the SW end of Peard Bay is **Kugrua Bay,** into which **Kugrua River** empties. A draft of about 4 feet can be carried into Kugrua Bay; depths in the middle of the bay are 10 to 12 feet. In the NE corner of the bay is a sandspit that affords good protection from all weather for small boats.

(127) **Charts 16083, 16082, 16005.**–From Peard Bay E and NE to Barrow the coast is rimmed with mud bluffs 25 to 90 feet high and furrowed by numerous small streams; the highest is **Skull Cliff** (70°56'N., 157°30'W.), 20 miles E of the bay. The coast has no projecting points or shoals and the 5-fathom curve is 0.5 to 1 mile from shore, but depths may vary as much as a fathom from year to year because of ice gouging. There is no protection from heavy weather.

(128) A radar beacon (Racon) is on Skull Cliff (70°54.8'N., 157°37.3'W.). The Racon, on a 50-foot-high tower, has an effective range of 16.5 miles and is seasonally maintained.

(129) **The Will Rogers Memorial** (71°09.3'N., 157°03.5'W.) is a 12-foot concrete monument on the NE side of a wide stream 10 miles SW of Barrow.

(130) **Barrow,** 8.5 miles SW of Point Barrow, has a hospital, a school, a church, a radio station, and several stores; limited quantities of supplies include gasoline, diesel fuel, food, and clothing. Air-freight service is available throughout the year. An aerolight (71°17'17"N., 156°46'18"W.) is at the airport and an aero radiobeacon (70°18'17"N., 156°43'29"W.) is about 2 miles NE of Barrow. Three miles NE of Barrow is the Naval Arctic Research Laboratory (NARL) and an aerolight (71°19'40"N., 156°40'38"W.). About 0.8 mile NE of the Naval Arctic Research Laboratory are the NARL airstrip and an aerolight (71°20'08"N.,

156°38'20"W.). The dome (71°19'40"N., 156°37'57"W.) NE of the laboratory is also very prominent.

(131) Barrow is a **customs station.**

(132) A radar beacon (Racon) is on Point Barrow (71°23.2'N., 156°27.2'W.). The Racon, on a 50-foot-high tower with two orange daymarks, has an effective range of 14.5 miles and is seasonally maintained.

(133) **Charts 16082, 16004.–Point Barrow** (71°23'N., 156°28'W.), the northernmost point of land in the United States, is the seaward end of a gravelly sandspit that extends 3 miles NE from the rest of the mainland. The point is also the NE corner of Chukchi Sea and the SW corner of Beaufort Sea. The N limit of **Beaufort Sea** is a line from Point Barrow to Lands End, Prince Patrick Island, Canada.

(134) **Tides and currents.**–The diurnal range of tide is about 0.4 foot at Point Barrow. During the survey of May-August 1945, the current NW of the point was observed to flow constantly in a NE direction at an estimated strength of 3 to 4 knots; along the NE side of the point the current flowed in a NW direction at an estimated strength of 1 knot. Judging from the movement of the icebergs, there seemed to be an eddy centered several miles NE of the point.

(135) **Caution.**–Mariners are advised that in the shallow waters of the Beaufort Sea, water levels are strongly influenced by meteorological conditions. Strong offshore winds can produce water depths up to 2½ feet less than those shown on the charts.

(136) A number of oil drilling platforms are in the Beaufort Sea between 151°W and 147°W. These platforms are generally manmade gravel islands about 500 feet in diameter. In 1992, a majority of the platforms were reported abandoned and the lights marking the structures were removed. A few are reported completely awash. The status of all known platforms is periodically published in the 17th Coast Guard District Local Notice to Mariners.

(137) **Weather.**–Barrow is the most N first-order station operated by the National Weather Service. Although this station generally records one of the lowest mean temperatures for the winter months, the surrounding topography prevents the establishment of the lowest minimum for the state. With the Arctic Ocean to the N, E, and W, and level tundra stretching 200 miles to the S, there are no natural wind barriers to assist in stilling the wind, permitting the lowering of temperatures by radiation, and no downslope drainage areas to aid the flow of cold air to lower levels. Consequently, temperature inversions in the lower levels of the atmosphere are not as marked as those observed at stations in the central interior.

(138) Temperatures at this N station remain below the freezing point through most of the year, with the daily maximum reaching higher than 32° F on an average of only 109 days a year. Daily minimums drop below the freezing point 324 days of the year, and freezing temperatures have been observed in every month of the year. February is generally the coldest month, with a normal mean of –18° F, and the lowest temperature at the station on record is –56° F reached in February 1924. March temperatures are but little higher than those observed in the winter months. In April, temperatures begin a general upward trend, with May becoming the definite transitional period from winter to the summer season. During the latter month an average of five daily maximum temperatures climb above the freezing point. July is the warmest month of the year, with a normal mean of 39° F. During late July or early August, the Arctic Ocean is generally ice-free for the first time in summer. The end of the short summer is reached in September. By November about half of the daily mean temperatures are zero or below.

(139) **Ice.**–Average breakup at Barrow is in late July and average freezeup is in early October. (See page T-21 for dates of ice breakup and freezeup.) Navigation is difficult from mid-October to late July and usually is suspended from early December to early July.

(140) The ice barrier that extends from 0.5 mile off Barrow to 1.5 miles NW of Point Barrow can be dangerous to navigation. Formed when onshore winds drive icebergs aground, the barrier may break and drift seaward during heavy offshore winds. While aground the barrier it keeps the main ice pack from drifting onto the beach and often gives protection along its inner side to shallow-draft vessels. During periods of offshore winds, leads may open in the barrier through which, when winds reverse to onshore, small bergs sometimes drift to block the inshore waters and stop all navigation. **Caution:** A vessel beset in the ice near Point Barrow will tend to drift N and farther into the ice mass.

(141) During the 1945 survey the main ice pack was never out of sight from Point Barrow. When the pack opened to the W it closed to the E and vice versa. Icebergs 30 to 50 feet high floated around continuously; some grounded at about the 5-fathom curve and remained stationary for a week or more until the wind changed with sufficient force to dislodge them.

(142) In general, the main ice pack drifts with the winds and currents during July through September and permits intermittent navigation outside the ice barrier. Outside navigation is impossible when the pack drifts shoreward; inside passage possibly can be made behind the barrier but charted depths may not be too reliable because of berg gouging.

(143) Medium-draft vessels should be able to round Point Barrow at a distance of 1 mile; 30-foot drafts should stay at least 3 miles off. **Caution:** A 1957 report places a 25-foot shoal 7 miles NE of Point Barrow; this may indicate a possible NE extension of Point Barrow spit. If passage must be made E of Point Barrow, August is the best month for the attempt.

(144) **Charts 16082, 16081, 16004.–Elson Lagoon** extends from Point Barrow to **Christie Point,** on the mainland 21 miles to the SE. The lagoon is 2 to 5 miles wide and has depths of 8 to 11 feet. Between the lagoon and Beaufort Sea are the barrier **Plover Islands** which are low and difficult to distinguish except in periods of good visibility. The islands and the mainland are barren stretches as viewed from offshore and are covered by snow and ice most of the year; there is nothing distinctive in the area. In January 1980, numerous obstructions were reported throughout the lagoon with the heaviest concentration in the cove at the W end, SW of Point Barrow.

(145) **Eluitkak Pass,** the most W entrance to Elson Lagoon, is between tiny **Doctor Island** and the spit that extends 2.5 miles SE from Point Barrow; depths in the pass equal or exceed those in the lagoon. **Deadmans Island** and **Tapkaluk Islands** are SE of Doctor Island.

(146) **Ekilukruak Entrance,** 15 miles SE of Point Barrow, is between Tapkaluk Island and **Cooper Island,** 4 miles to the SE; the passage into Elson Lagoon has depths of 5 to 7 feet. Cooper Island is one of the largest of the Plovers and is midway along the chain.

(147) **Sanigaruak Pass** (71°11.5'N., 155°23.5'W.), 24 miles SE of Point Barrow, is a narrow and poorly defined channel

through the Plover Islands at the W end of **Sanigaruak Island;** the controlling depth is about 6 feet into Elson Lagoon. **Igalik Island,** last major island of the Plover group, is between Sanigaruak Island and Tangent Point to the SE.

(148) **Dease Inlet,** behind the SE Plover Islands, is 10 miles wide between Christie Point and Tangent Point and extends inland about 20 miles. The inlet has depths of 8 to 10 feet except for the shallows near the beaches. The principal entrances are from Elson Lagoon and Sanigaruak Pass. **Tiny Island** and **Oarlock Island,** known as the **Kikiktak Islands,** are 10 to 15 miles up Dease Inlet from Christie Point; on Tiny Island is a small freshwater lake. **Admiralty Bay,** at the head of Dease Inlet, has depths and bottom similar to the outer part of the inlet; several rivers empty into the bay.

(149) During the 1945 survey of this area, the winter ice did not breakup in Elson Lagoon until July 28 and started forming again on September 13. The survey launches had a difficult time getting out of Dease Inlet on September 15 as the entire inlet and lagoon were frozen over to a thickness of 1 inch. In the winter, the ice freezes to a thickness of 6 to 10 feet.

(150) **Charts 16081, 16067, 16004.–Tangent Point** (71°08.8'N., 155°05.8'W.), 30 miles SE of Point Barrow, is the low, flat, tundra promontory on the E side of the entrance to Dease Inlet. There is a shallow entrance channel between the point and the islands to the NW.

(151) The islands along the coast from Tangent Point to the SE end of Fatigue Bay are low sand barriers separated from the mainland by mud flats and shallow lagoons. These rapidly changing islands have steep beaches on their seaward sides, with depths of 8 feet or more only 100 yards off. Deep channels open and close through the islands during summer storms.

(152) **Fatigue Bay (McKay Inlet)** extends SE for about 6.5 miles from Tangent Point. The SE part of the bay, S of Tulimanik Island, is the only shelter for small boats between Tangent Point and Cape Simpson. This shelter, however, is extremely limited because of the shallowness of the lagoons behind the islands. Remarks concerning frequent changes in channels are particularly applicable to the SE part of Fatigue Bay.

(153) The bluffs along the coast from near the SE end of Fatigue Bay to Cape Simpson vary in height from 4 to 15 feet; the land behind is marshy and has numerous lakes. Launches may proceed safely along this stretch of coast at a distance of about 100 yards.

(154) **Cape Simpson** (70°59.4'N., 154°34.0'W.), is a low promontory 14 miles SE of Tangent Point. There are shoals and sandbars near the cape but no shelter for small boats.

(155) A radar beacon (Racon) is N of Cape Simpson (71°03.4'N., 154°43.6'W.). The Racon, on a 200-foot-high tower, has an effective range of 22 miles and is seasonally maintained.

(156) **Smith Bay,** between Cape Simpson and Drew Point, 14 miles to the SE, extends 8 miles back of the entrance points and has general depths of 3 to 10 feet. Along the W shore of the bay, rapid erosion of the 10- to 20-foot bluffs has caused shoaling, and launches drawing 3 to 4 feet must stay 0.2 to 0.5 mile off, but there is still some protection from W weather.

(157) The delta of **Ikpikpuk River,** which empties into the head of Smith Bay, is building out steadily. Extensive shoals are forming as much as 3 miles out, and the 3-foot curve is 1 to 2 miles off the delta. The SE side of the bay is very shallow; the 3-foot curve is 2 to 3 miles offshore.

(158) Along the E side of Smith Bay are intermittent bluffs. The only possible landing place for small craft is on **Drew Point,** at the entrance. Boats drawing less than 2½ feet can anchor S of the sandspit at the point.

(159) A radar beacon (Racon) is on Drew Point (70°51.9'N., 153°54.8'W.). The Racon, on a 50-foot-high tower, has an effective range of 16.5 miles and is seasonally maintained.

(160) **Charts 16066, 16004.–Pitt Point** (70°55.5'N., 153°08.2'W.), 69 miles ESE of Point Barrow, is about halfway between Smith Bay and Harrison Bay. An aero radiobeacon (70°54.6'N., 153°15.4'W.) is on the W side of the point. On the SE side is a large, shallow lagoon that is separated from Beaufort Sea by a narrow sand barrier. Heavy seas open and close passages that have been used by native launches. There are depths of 8 to 10 feet 200 yards off Pitt Point.

(161) **Charts 16065, 16004.–Cape Halkett** (70°48.0'N., 152°11.0'W.), is a low promontory 20 miles ESE of Pitt Point. A 1-foot shoal is 0.7 mile E of the cape; between the shoal and the cape are depths of 5 feet. In January 1984, a submerged obstruction covered about 18 feet was reported about 6.1 miles E of the cape in about 70°47'57"N., 151°53'18"W.

(162) A radar beacon (Racon) is on Cape Halkett (70°49.8'N., 152°17.4'W.). The Racon, on a 50-foot-high tower with an orange radar reflector, has an effective range of 14.5 miles and is seasonally maintained.

(163) **Charts 16064, 16063, 16004.–Harrison Bay** is between Cape Halkett and Oliktok Point, 50 miles to the ESE; the inland extent is about 15 miles from the general line of the coast. The inner part of the bay is very shallow, and the Colville River delta projects several miles from the SE side. **Pacific Shoal,** 3 to 5 feet deep and 5 miles in N-S length, is centered about 8 miles SE of Cape Halkett. In 1969, a vessel with a draft of 26 feet reported touching bottom in 70°57.5'N., 150°33.5'W. (See chart 16004.) In 1992, a shoal with a depth of 7 feet was reported in about 70°40'56.8"N., 150°55'28.6"W. (See chart 16003.)

(164) **Saktuina Point** (70°34.9'N., 152°02.3'W.), 14 miles S from Cape Halkett, is the easternmost tip of the narrow peninsula that forms the N side of Kogru River. The **Eskimo Islands,** 1 mile E of Saktuina Point, have bluffs up to 20 feet in height.

(165) **Kogru River** is a series of connected lakes that form a 10-mile-long lagoon that empties into Harrison Bay between Saktuina Point and the Eskimo Islands. Entrance depth is about 4 feet and greater depths are reported inside.

(166) **Atigaru Point,** 7 miles E of Saktuina Point, is a low headland with extensive bars and shoals to the E and SE. Natives report fair anchorage for small craft 3 miles S of the point.

(167) A radar beacon (Racon) is on Atigaru Point (70°33.3'N., 151°42.5'W.). The Racon, on a 50-foot-high tower with an orange radar reflector, has an effective range of 14.5 miles and is seasonally maintained.

(168) **Colville River,** the largest along the Arctic coast of Alaska, has a delta that extends 20 miles along the SE side of Harrison Bay. There are three major channels and numerous minor channels through the delta. It is probable that a draft of 3 feet can be taken over the entrance bars and upriver to the rapids a few miles below the mouth of **Anaktuvuk River,** which empties into the Colville River 75 miles from Harrison Bay.

(169) A radar beacon (Racon) is on the Colville River delta (70°28.1'N., 150°38.0'W.). The Racon, on a 50-foot-high

tower, has an effective range of 16.5 miles and is seasonally maintained.

(170) **Charts 16062, 16004.–Oliktok Point,** the first prominent mainland point E of Colville River, is a triangular sandflat with elevations of as much as 5 feet. There is an aero radiobeacon (70°29.8′N., 149°53.2′W.) on the point. Excellent small-boat anchorage is found in depths of 5 feet behind the small bar that extends NW from the point; this anchorage is exposed to SW weather, but protection from such can be found E of the point.

(171) **Thetis Island** is 6 miles NW of Oliktok Point and 5 miles off the Colville River Delta. Good anchorage, with protection from SW winds, is found in depths of 12 feet E of the island.

(172) **Spy Island,** 3 miles N of Oliktok Point and 4 miles E of Thetis Island, is the westernmost of the **Jones Islands;** the island is very low and floods during storm high waters. **Pingok Island,** largest and highest of the Jones group, is 6 miles long in an E-W direction and has several dunes or mounds. **Bertoncini Island** and **Bodfish Island** are about 2 miles E of Pingok Island; both are tundra covered and have bluffs along their shores. **Cottle Island,** 1.5 miles N of Beechey Point, is 3 miles long and is the easternmost of the Jones group. Bars and shoals obstruct the passages between Pingok and Cottle Islands. An artificial island is about 4.5 miles NNE of Cottle Island in about 70°35′05″N., 149°05′45″W.

(173) On the mainland back of the Jones Islands is **Milne Point,** which is 8 miles E of Oliktok Point and is rimmed with bluffs about 5 feet high. **Beechey Point** is 14 miles E of Oliktok Point; launches can find fair shelter in depths of 4 feet behind the small sandbar that extends NW from Beechey Point.

(174) **Simpson Lagoon,** between the Jones Islands and the mainland, has depths of 6 feet and affords protected passage from Oliktok Point to Beechey Point.

(175) **Charts 16062, 16061, 16004.**–The **Return Islands** begin 0.5 mile SE of Cottle Island and continue SE another 11 miles. **Long Island** is the westernmost and longest, about 5 miles, of the Return group; the passage between Cottle Island and Long Island has depths of 2 feet. Off the SE end of Long Island are bars and shoals that extend back into Gwydyr Bay, but depths of 5 feet can be carried into the bay between the bars and low, crescent-shaped **Egg Island,** next island to the SE. Southeasternmost of the Return group is **Stump Island,** which is about 2 miles long and extends to within 0.5 mile of mainland Point McIntyre. The passage between Egg Island and Stump Island has depths of 3 feet, but there is little water between Stump Island and Point McIntyre.

(176) **Gwydyr Bay,** the lagoon area between the Return Islands and the mainland, has depths of 3 to 5 feet as far E as low **Storkersen Point,** which is 10 miles from Beechey Point; the best entrance to the bay is W of Egg Island. **Kuparuk River** empties into the S side of Gwydyr Bay W of Storkersen Point. There is little water between Storkersen Point and **Point McIntyre,** 3 miles to the SE.

(177) From the Return Islands to Brownlow Point, barrier islands parallel the coast and are separated from it by **Stefansson Sound,** an extensive lagoon. The mainland is low tundra with very little relief except for three prominent mounds W and SW of Tigvariak Island. The mainland shore consists of low bluffs, up to 35 feet in height, cut by river flood plains and deltas. The barrier islands are low sand and gravel reefs less than 8 feet in elevation; the larger islands have some sparse vegetation. Between the islands are many shoals and bars that are awash. The lagoon between the island and the mainland has depths of as much as 30 feet but also has many areas too shallow for navigation by small boats. The lagoon is 2 to 10 miles wide and extends in a continuous line from the Return Islands to Brownlow Point. Vessels following the coast may avoid the heavy ice that is nearly always present off the barrier islands by passing inside the islands by way of one of the deeper entrances. Ice frequently blocks these entrances, but passage usually can be made through leads.

(178) The **Midway Islands,** 7.5 miles NE of Point McIntyre, are very low and have little driftwood on them; good anchorage for vessels drawing up to 6 feet can be found behind **Reindeer Island,** the W island of the group.

(179) A radar beacon (Racon) is on Reindeer Island (70°29.1′N., 148°21.5′W.). The Racon, on a 30-foot-high tower, has an effective range of 14.5 miles and is seasonally maintained.

(180) **Cross Island** is 6 miles E of the Midway Islands. Somewhat protected anchorage for vessels drawing up to 10 feet can be found behind the crescent-shaped island and the several small islets that extend to the S. Large ice floes remain hinged to the N and E sides of the island during the entire open season. Two miles SE of Cross Island is a shoal that extends 4 miles in a SE direction. **Dinkum Sands,** a gravel reef that bares, is halfway along the shoal.

(181) A radar beacon (Racon) is on Cross Island (70°29.7′N., 147°57.5′W.). The Racon, on a 60-foot-high tower with an orange radar reflector, has an effective range of 11 miles and is seasonally maintained.

(182) **Prudhoe Bay** (70°20′N., 148°20′W.), SE of Point McIntyre, has shoals across most of its entrance. **Gull Island,** a small island midway along the shoals, is a conspicuous radar target. The bay proper has depths of 6 to 9 feet and affords good holding anchorage with protection from all but NW weather. The best access route has depths of 4 feet and parallels the W shore at a distance of 0.4 mile. In 1967, a large oil strike was made in the Prudhoe Bay area. This oil strike has made necessary the movement of large amounts of cargo by barge to this area during the short summer shipping season.

(183) On the NW side of Prudhoe Bay, about 1.5 miles SE of Point McIntyre, a causeway extends about 2.2 miles offshore. A barge dock is on the E side of the causeway and a seawater treatment plant is near the outer end. Private daybeacons mark the intakes and outfalls of the seawater treatment plant. In 1969, a 360-foot wharf connected to the shore by a 1,200-foot causeway was constructed in the SE corner of the bay, about 3.3 miles from Heald Point. Depths of 4½ feet are reported along the wharf.

(184) Cargo is hauled from Seattle by oceangoing tugs and barges which anchor about 6 miles offshore; the cargo is transferred to shallow-draft barges and moved to the wharf for transfer to shore.

(185) **Heald Point,** on the E side of Prudhoe Bay entrance and 8 miles from Point McIntyre, is a 15-foot-high tundra bluff with a narrow sand beach at its base. Three small sand islets extend NW from the point. The submerged remains of an artifical island with a reported depth of 1 foot is about 2.9 miles N of the point. Put River aero radiobeacon (70°13′25″N., 148°24′50″W.) is about 8 miles SSW of Heald Point.

(186) The delta of **Sagavanirktok River** extends the 9 miles from Heald Point to Foggy Island. The waters off the delta are extremely shallow and small boats find landing very difficult. **Howe Island,** 5 miles E of Heald Point, is near the middle of the delta area and is prominent from seaward; the island is 1 mile long, 0.2 mile wide, and has an elevation of

35 feet near its E end. A mile E of Howe Island is **Duck Island,** a small silt mound, and 4 miles E of Howe Island is **Point Brower,** the N extremity of tundra-covered **Foggy Island,** which is part of the delta and separated from the mainland by two branches of the river.

(187) **Charts 16046, 16004.–Foggy Island Bay,** which extends 12 miles along the mainland between Foggy Island and Tigvariak Island, has depths of as much as 20 feet but has wide shallow areas along its E and W sides.

(188) **Tigvariak Island,** close to the mainland, is 2 miles long, 1 mile wide, and has elevations up to 30 feet. The tundra of Tigvariak Island is dotted with lakes and ponds from which freshwater is obtainable; the shores of the island are mostly sand beaches backed by bluffs ranging in height from 5 to 30 feet. At the E end of the island is **Reliance Point,** a sandspit that extends 0.8 mile to the S, and on the NE side is a large sea-level lake which is separated from the ocean by a sand barrier. **Lion Point** is the outer end of a long sandbar that begins 0.3 mile from the N end of Tigvariak Island and continues 0.8 mile to the NW.

(189) **Mikkelsen Bay,** between Tigvariak Island and **Bullen (Savakvik) Point,** 7 miles to the ESE, has depths of as much as 18 feet which decrease gradually as the beach is approached.

(190) A radar beacon (Racon) is on Bullen Point (70°10.5'N., 146°51.4'W.). The Racon, on a 120-foot-high tower with an orange radar reflector, has an effective range of 19 miles and is seasonally maintained.

(191) Returning to the island chain off the mainland, **Narwhal Island,** northwesternmost of the **McClure Islands,** is 10 miles SE of Cross Island and 8 miles NE of mainland Foggy Island. Narwhal Island has some vegetation and there is some driftwood on it; near the center of the island are several small ponds. Protected anchorage is available in depths of 15 feet behind the NW end of Narwhal Island; depths of 7 feet extend 0.5 mile SW from the middle. Little ice is encountered during the open season, and the anchorage can be approached from the SW. The SE end of Narwhal Island, a low, narrow, sand strip, has been cut through in numerous places by storms and ice. The passage between Narwhal Island and Jeanette Island, 1 mile to the SE has irregular depths but can be navigated without difficulty by vessels drawing less than 7 feet.

(192) **Jeanette Island** and **Karluk Island,** 2.5 miles apart, are at opposite ends of the crescent-shaped series of small sand islets, some as much as 5 feet high, that forms the SE part of the McClure group. These islets are exposed to vigorous ice and wind action, and there is continuous change in the shorelines and in the shallower depths. Protected anchorage is available in depths of 9 to 15 feet S of the islets.

(193) **Newport Entrance** is between Karluk Island of the McClure group and Pole Island, W of the two major **Stockton Islands,** 5 miles ESE of the McClures. A sandbar is 1 mile SSE of Karluk Island, and a second sandbar is 2.3 miles SE of the island; the two bars are only a few yards in width and are awash during storm high waters. Shoals extend 1.5 miles W from Pole Island. Vessels drawing less than 7 feet can pass between Karluk Island and the two sandbars, but caution is advised because of the current action and berg gouging. The principal passage through Newport Entrance is between the sandbars and the Pole Island shoal; least depth is 16 feet over a width of 1 mile.

(194) **Pole Island,** 5 miles NE of mainland Tigvariak Island, is a narrow sand barrier 2 miles long and has elevations up to 5 feet; the island has some vegetation, a few small ponds, and a considerable amount of driftwood. **Belvedere Island,** E of the Stockton Islands, also is a narrow sand barrier about 2 miles long. The passage between the two islands is 0.2 mile wide and has a controlling depth of 5 feet.

(195) **Charts 16045, 16004.–Challenge Entrance** is between Belvedere Island and Challenge Island, 6 miles to the SE. The W side of the opening and the area immediately S of Belvedere Island are shallow and dotted with tiny islets and bare shoals. The best water is 0.8 mile W of Challenge Island where vessels drawing 10 feet or less can enter with safety.

(196) **Challenge Island,** the westernmost of the **Maguire Islands,** is a strip of sand about 0.5 mile long and 3 feet high. **Alaska Island,** that begins 0.2 mile E of Challenge Island and continues 3 miles farther E, is a very narrow sand and gravel formation; the easternmost third has been cut through in several places and is a series of sandbars, shoals, and islets. There is no channel between Challenge and Alaska Islands.

(197) **Duchess Island,** 1 mile E of Alaska Island, is 1 mile long and 5 feet high. There is a narrow channel between Duchess and Alaska Islands but it is not recommended.

(198) **North Star Island,** 0.2 mile SE of Duchess Island and easternmost of the four principal Maguires, is another narrow sand barrier about 1 mile long and has extensive shoals on the S and SE sides. There are narrow channels at both ends of the island but they are shallow and subject to constant change.

(199) **Mary Sachs Entrance,** between North Star Island and Flaxman Island, has extensive shoals on both E and W sides. There is a 0.7-mile-wide passage with depths of 10 feet about midway between the two islands.

(200) **Flaxman Island,** which begins 2 miles ESE of North Star Island and continues 6 miles to within 2 miles of mainland Brownlow Point, is the largest barrier island between the Return Islands and the point. The W part of the island is mostly sand and gravel; the E part has tundra bluffs up to 20 feet in height and numerous small ponds, but freshwater is not available in any substantial quantity.

(201) Passage has been made between Flaxman Island and Brownlow Point by staying close to the E end of the island until well into the lagoon; the channel has depths of 8 feet which shoal to 4 feet in the lagoon. The shoals that stretch from Brownlow Point to the E side of the narrow channel usually are marked by breakers or ice.

(202) The mainland between Bullen Point and Brownlow Point has numerous other points, sandspits, and bluffs. The W branch of Canning River empties into the lagoon SW of Brownlow Point; the river delta forms extensive shoals in the E part of the lagoon.

(203) **Brownlow Point** (70°09.8'N., 145°51.0'W.), 20 miles E of Bullen Point, is the most N feature of **Canning River** delta; the tundra point has elevations up to 25 feet. A sand and gravel bar, partly bare at high water, extends from Brownlow Point SE past Canning River E branch to within 2 miles of Konganevik Point. (See chart 16044.)

(204) A radar beacon (Racon) is on Brownlow Point (70°09.6'N., 145°50.6'W.). The Racon, on a 50-foot-high tower, has an effective range of 14.5 miles and is seasonally maintained.

(205) From Brownlow Point to Canning River E branch, the lagoon between the delta and the barrier bar is about 0.5 mile wide and has depths of 2 to 3 feet. The discharge from the river discolors the sea water for many miles. SE of the river's E branch is a lagoon that provides excellent small-craft anchorage in depths of 8 to 10 feet; the best approach from seaward is around the SE end of the barrier bar at a distance of 0.3 mile. A covered ridge that extends halfway

from Konganevik Point to the bar protects the lagoon from NE wind-driven ice. The lagoon was ice free in mid-August 1976.

(206) **Charts 16044, 16004.–Konganevik (Kangigivik) Point** (70°01.5'N., 145°10.5'W.), 16 miles SE of Brownlow Point, projects 2 miles NE from the mainland and is the W limit of **Camden Bay.** About 1 mile N of the point are extensive shoals that are partly awash; between the shoals and the point is a channel with depths of 7 to 17 feet. The lee provided by the shoals might be helpful in some conditions.

(207) Launch anchorage has been reported E of Konganevik Point, but there are large boulders in the area and boulders are seen along the entire shore of the point; natives use this anchorage in preference to Simpson Cove, to the ESE, to avoid the ice that moves back and forth across Camden Bay with the winds. A better small-craft anchorage is in the lagoon 2 miles S of the point; the lagoon affords ample protection from all winds in depths of 4 feet. Entrance to the lagoon can be made through the break in the barrier bar across the mouth by staying close to the S shore.

(208) **Katakuruk (Katakturak) River** empties into the S side of Camden Bay on the W side of **Simpson Cove,** and is 6 miles ESE of Konganevik Point. The cove has excellent holding ground and affords protection from ice and wind for vessels drawing up to 6 feet; approach should be made from NE of **Collinson Point,** the W end of the long narrow sandspit that extends from the mainland on the E side of the entrance. The best water is about 0.3 mile from the point; once past the point, there are depths of 9 to 11 feet in the greater part of the cove. Vessels should anchor as close to the weather shore as their drafts will permit. Simpson Cove was ice free in mid-August 1976.

(209) **Anderson Point** (70°01.5'N., 144°27.8'W.), 15 miles E of Konganevik Point, is the E limit of Camden Bay. The point is low and flat but behind it is a bluff that ranges in height from 4 to 30 feet and is prominent from W; from E the bluff blends with the hills and is hard to see. W of Anderson Point the bottom slopes to depths of 10 to 12 feet very close to shore; N of the point the slope is gradual to depths of 2 or 3 feet, then sharp to depths of 12 to 30 feet.

(210) **Charts 16043, 16004.**–Low, narrow, gravelly **Arey Island** (70°07.3'N., 143°54.0'W.) begins about 10 miles NE of Anderson Point and extends 3 miles NE, then 2.5 miles ESE. The water is deep close to the outer shore of the island except at the SW end. Incoming ice hits the northernmost part of Arey Island before any other place in the vicinity. A vessel can navigate very close to this part of the island if a lead can be found through the ice.

(211) **Barter Island,** close E of Arey Island and about 45 miles E of Brownlow Point, is roughly triangular in shape, each side being 3 to 4 miles in length. The island rises to an elevation of 58 feet, is the highest ground in this general area, and has bluffs along its seaward side. **Kaktovik** is the Barter Island village. Small amounts of food and other supplies are stocked for sale to the natives and are available to outsiders only in emergencies. An aero radiobeacon (70°07.9'N., 143°38.5'W.) and an aerolight (70°08.2'N., 143°35.2'W.) are on the island.

(212) Kaktovik is a **customs station.**

(213) Off the NE end of Barter Island is **Bernard Spit,** a sand barrier that extends nearly 4 miles in an ESE direction. Between the over-lapping ends of Barter Island and Bernard Spit is **Bernard Harbor,** that has depths of 5 to 7 feet over good holding bottom but can only be entered by drafts of 4 feet or less. The N part of the harbor is out of the way of drifting bergs; ice does not get to this part of the harbor during W winds. Vessels entering Bernard Harbor from W should favor the Barter Island shore; this passage may become blocked soon after the ice starts in.

(214) Protection from ice and wind is available just E of the sandspit at the NW end of Barter Island. The anchorage is not recommended for vessels drawing more than 5 feet.

(215) **Weather.**–The climate is determined by the surrounding open Arctic water surface. The island terrain and the terrain of the mainland S of Barter Island is low, flat, and generally marshy tundra with numerous lakes, and with no elevations of consequence until the Brooks Range 65 miles to the S of the station. Consequently, there are no topographic features to affect temperature and precipitation.

(216) During the long Arctic night, temperatures along this Arctic coastal region do not drop to the extreme low readings reached in Alaska's interior. The modifying effect of the surrounding ocean area, although frozen during the winter months, is one of the factors preventing extremely low temperatures. During the warmest months of the summer the more open water surface is still more effective in modifying the warming effects of a continuous period of possible sunshine which continues almost from the middle of May to the end of July. High readings reaching 70° F or above have occurred on only 5 days during the 23-year record period; these were in July 1953, 1967, 1969, and August 1957. Freezing temperatures are reached, as a general rule, during all months of the year. Diurnal temperature ranges are confined within relatively narrow limits, reaching monthly maximums of around 17°F in April and diminishing to their minimums of slightly less than 8° F in June during the period of continuous daylight.

(217) Snow covers the ground about eight months of the year, and snow usually falls every month of the year. The relatively strong winds experienced from October through February make accurate measurement of snowfall and precipitation difficult because of drifting and blowing snow. The winds, combined with relatively high humidities, are prime factors in producing uncomfortable weather conditions during the winter months. The sun remains below the horizon from late November until mid-January.

(218) Ice formation and movement is an important factor in the Barter Island area. The dates of the appearance of ice in the fall varies greatly from year to year, but the breakup dates in the late spring, or early summer, appears to be better confined. Ice on the Beaufort Sea and in the lagoon near the station have become safe for man as early as September 24, but has remained unsafe as late as mid-November. The ice appears to remain safe for vehicles until the first of June and, sometimes, almost to the end of June. It has become unsafe for man as early as June 10, but remained safe as late as mid-July. Tidal action often makes travel over ice or through the broken ice quite hazardous for considerable periods during the freezeup in the early winter and, particularly, during the breakup of late spring or early summer.

(219) **Ice** records of the National Weather Service for Barter Island are meager but indicate a similarity to conditions at Barrow. Observations of National Ocean Survey field parties from 1948 through 1953 show that the ice usually breaks off from shore in late July or early August. After the breakup, ice is present in varying amounts and moves on and off the shore with the winds until mid-September or early October when it freezes up for the winter. (See page T-14 for **Barter Island Climatological Table,** and page T-21 for dates of ice breakup and freezeup.)

(220) **Manning Point** is a barrier spit that projects N from the mainland to within 0.2 mile of the NE end of Barter Island. **Kaktovik (Kaktoavik) Lagoon,** between the spit and

the island, and **Jago Lagoon,** on the E side of the spit, have depths of 9 to 12 feet but, like Bernard Harbor, cannot be entered by drafts greater than 4 feet.

(221) **Martin Point** (70°07'N., 143°16'W.), low and irregular, is on the E side of the entrance to **Jago River** and 53 miles E of Brownlow Point. The W end of a barrier island is 2 miles NW of Martin Point.

(222) From Martin Point ESE to Griffin Point, a distance of about 9 miles, the low, narrow barrier islands are less than 5 feet high and are separated from the mainland by shallow lagoons. Considerable driftwood has been deposited on the higher parts of the islands. The mainland shores of the lagoons have tundra bluffs with elevations up to 20 feet. There is deep water along the seaward sides of the barrier islands, and small boats can navigate within a few yards of the beach except near the inlets.

(223) **Charts 16042, 16004.–Griffin Point** (70°03.6'N., 142°52.4'W.) is a low sandspit that projects out from the mainland. A mile WNW of the point is **Oruktalik Entrance,** a narrow barrier passage through which a depth of about 5 feet can be taken into **Oruktalik Lagoon.**

(224) The barrier islands off Griffin Point continue SE for 3 miles; thence to Pokok Bay are 25-to 30-foot bluffs fronted by narrow, steep sand beach except for the last 1.5 miles. Small boats can navigate very close to the beach between Griffin Point and Pokok Bay.

(225) **Pokok Bay,** 17 miles SE of Martin Point, is about 1 mile across. Bars extend out from both sides of the entrance. Depths are about 7 feet in the entrance and 10 to 12 feet in the bay proper. The entrance should be approached from the W, but care must be taken to stay off the sandbar that makes out from the NW side. The bay has good holding bottom and good protection from ice and winds.

(226) Tundra-covered **Humphrey Point** (69°58.3'N., 142°30.9'W.), on the SE side of Pokok Bay, has a low bluff and a narrow sand beach. SE of Siku Point are low barrier islands that cover in many places at high water. The seaward sides of the islands are irregular, and small boats must stay well offshore.

(227) **Angun Lagoon,** behind the barrier reef between Humphrey Point and **Angun Point,** 4 miles to the SE has depths of 10 to 11 feet. There is a 10-foot bluff at Angun Point. The lagoon entrance, 1 mile NW of Angun Point, is 75 to 100 yards wide and has a controlling depth of 8 feet. The barrier islands are subject to change; entrance must be made with caution.

(228) **Beaufort Lagoon,** with depths of 5 to 12 feet in the middle, extends about 14 miles SE behind the barrier reef from Angun Point to Siku Point. The SE part of the lagoon from the delta of Aichilik River to Siku Point has not been surveyed but the entrances are known to be very shallow and subject to change. The principal entrance to the lagoon is a narrow channel with a depth of 2 to 5 feet about 1.8 miles SE of Angun Point; caution is advised.

(229) **Nuvagapak Lagoon,** with depths of 8 to 10 feet in the middle, is S of Beaufort Lagoon and extends SE to the delta of **Aichilik River** from **Nuvagapak Point,** a high tundra 1 mile back of the reef and 3.5 miles SE of Angun Point. **Egaksrak Lagoon,** S of Beaufort Lagoon between the delta of Aichilik River and Siku Point, has not been surveyed.

(230) **Charts 16041, 16004.–Siku Point** (69°49.0'N., 141°54.7'W.), 16 miles SE of Humphrey Point, is the NW end of **Icy Reef,** a barrier that extends 13 miles SE to Demarcation Bay without a break. Icy Reef has elevations of 1 to 10 feet and is more prominent than the barrier islands to the NW; the reef is a combination of several ridges built by wave action and has considerable driftwood along its entire length.

(231) Broken ice can be expected along the seaward side of Icy Reef during most of the open season. Small boats usually can push through the ice by staying close to the beach or by taking advantage of the loosely packed ice farther offshore. There are depths of 15 feet within 100 yards of the beach and 30 feet within 0.3 mile.

(232) The NW part of the mainland behind Icy Reef is low and relatively flat. Halfway along the mainland shore is a large ice field, about 3 miles long, which the Eskimos say never melts; observations from Icy Reef indicated that the ice field was fairly uniform and that it stood a few feet above the surface of the lagoon.

(233) The SE half of the mainland shore behind Icy Reef has bluffs with elevations of as much as 25 feet. Four miles NW of Demarcation Bay is bluff **Pingokraluk Point** (69°43.7'N., 141°32.0'W.), about 0.3 mile SE of the point is a 49-foot-high tundra mound that is very prominent.

(234) **Demarcation Bay,** 30 miles SE of Humphrey Point, is about 5 miles in width by 3 miles in inland extent. **Demarcation Point** (69°41.2'N., 141°17.5'W.), on the E side of the entrance, is low tundra that rises gradually to a 30-foot bluff.

(235) A depth of about 13 feet can be carried into Demarcation Bay 0.5 mile W of Demarcation Point; the bay has depths of 13 to 16 feet, sticky bottom, and good protection from all weather. Along the shores of the bay are bluffs with elevations up to 25 feet.

(236) From Demarcation Point, Alaska, to **Clarence Lagoon,** 10 miles to the ESE in Canada, the narrow, steep sand beach is backed by irregular bluffs. Small boats can navigate within a few yards of the beach, and there are depths of 30 feet 0.3 mile off.

(237) **Alaska-Canada Boundary Monument No. 1** (69°38.8'N., 140°59.8'W.) is 6.5 miles ESE of Demarcation Point; the 4-foot obelisk is 100 feet inland from the top of the bluff and is fairly conspicuous.

(238) There is an aero radiobeacon (69°35'N., 140°11'W.) about 17 miles E by S of the boundary monument.

(239) **Herschel Island,** Canada, about 40 miles E of the boundary, rises to an elevation of 550 feet. The island has an extent of about 10 miles from E to W and 7 miles from N to S. Thetis Bay, on the SE side of the island, affords fairly good anchorage, sheltered from N and W winds, for vessels drawing up to 18 feet.

APPENDIX

(1) **Sales Information.**–National Ocean Service (NOS) and unclassified Defense Mapping Agency Hydrographic/ Topographic Center (DMAHTC) publications and nautical charts are sold by NOS and its sales agents in many U.S. ports and in some foreign ports. Mail orders should be addressed to:

(2) National Ocean Service,
(3) Distribution Branch (N/CG33),
(4) 6501 Lafayette Avenue,
(5) Riverdale MD 20737-1199,
(6) and accompanied by a check or money order payable to NOS, Department of Commerce. Remittance from outside the United States should be made either by an International Money Order or by a check payable on a U.S. bank. Chart catalogs, which include a listing of authorized sales agents, are free upon request. The National Ocean Service maintains over-the-counter cash sales offices at Distribution Branch, Riverdale (see address above), and at 701 C Street, Box 38, Anchorage, Alaska 99513.

(7) **National Ocean Service Offices**

(8) **Washington, DC (Headquarters)**: Assistant Administrator, National Ocean Service, NOAA, Herbert C. Hoover Bldg., 14th Street and Constitution Avenue, NW, Room 5805, Washington, DC 20230-0001.

(9) **Silver Spring:** Director, Coast and Geodetic Survey, National Ocean Service, NOAA, 1315 East-West Highway, Silver Spring, MD 20910-3233.

(10) **Norfolk:** Director, Atlantic Marine Center, National Ocean Service, NOAA, 439 West York Street, Norfolk, VA 23510-1114.

(11) **Seattle:** Director, Pacific Marine Center, National Ocean Service, NOAA, 1801 Fairview Avenue East, Seattle, WA 98102-3767.

(12) **Charts and Publications-National Ocean Service.**

(13) **Nautical Charts** (See Chart Catalogs)

(14) United States Coastal and Intracoastal waters, and possessions.

(15) Great Lakes, Lake Champlain, New York State Canals, and the St. Lawrence River-St. Regis to Cornwall, Canada.

(16) **Publications** (See Chart Catalogs for latest editions and prices)

(17) **Coast Pilot**

(18) U.S. Coast Pilot 1, Atlantic Coast, Eastport to Cape Cod.

(19) U.S. Coast Pilot 2, Atlantic Coast, Cape Cod to Sandy Hook.

(20) U.S. Coast Pilot 3, Atlantic Coast, Sandy Hook to Cape Henry.

(21) U.S. Coast Pilot 4, Atlantic Coast, Cape Henry to Key West.

(22) U.S. Coast Pilot 5, Atlantic Coast-Gulf of Mexico, Puerto Rico, and Virgin Islands.

(23) U.S. Coast Pilot 6, Great Lakes, Lakes Ontario, Erie, Huron, Michigan and Superior, and St. Lawrence River.

(24) U.S. Coast Pilot 7, Pacific Coast, California, Oregon, Washington, and Hawaii.

(25) U.S. Coast Pilot 8, Pacific Coast Alaska, Dixon Entrance to Cape Spencer.

(26) U.S. Coast Pilot 9, Pacific and Arctic Coasts, Alaska-Cape Spencer to Beaufort Sea.

(27) **Distance Tables**

(28) Distances Between United States Ports.

(29) **Tide Tables**

(30) Europe and West Coast of Africa, including the Mediterranean Sea.

(31) East Coast, North and South America, including Greenland.

(32) West Coast, North and South America, including the Hawaiian Islands.

(33) Central and Western Pacific Ocean and Indian Ocean.

(34) Supplemental Tidal Predictions, Anchorage, Nikiski, Seldovia, and Valdez, Alaska.

(35) **Tidal Current Tables**

(36) Atlantic Coast, North America.

(37) Pacific Coast, North America and Asia.

(38) **Tidal Current Charts**

(39) Boston Harbor.

(40) Narragansett Bay to Nantucket Sound.

(41) Narragansett Bay.

(42) Long Island and Block Island Sounds.

(43) Delaware Bay and River.

(44) Upper Chesapeake Bay.

(45) Charleston Harbor, S.C.

(46) Tampa Bay.

(47) Puget Sound, Northern Part.

(48) Puget Sound, Southern Part.

(49) **Charts and Publications-Other U.S. Government Agencies**

(50) A partial list of publications and charts considered of navigational value is included for ready reference of the mariner. In addition to the agents located in the principal seaports handling publication sales, certain libraries have been designated by the Congress of the United States to receive the publications as issued for public review.

(51) **Government Printing Office.**-Publications of the U.S. Government Printing Office may be ordered from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325. Orders may be charged to Visa, Mastercard or Choice by calling (202) 783-3238 during normal business hours.

(52) **Defense Mapping Agency Procurement Information.**-Unclassified publications and charts of the Defense Mapping Agency Hydrographic/Topographic Center (DMAHTC) are available from National Ocean Service Distribution Branch (see Sales Information, beginning of this Appendix). Classified DMAHTC publications and charts are available to authorized users from Defense Mapping Agency Combat Support Center (Attn: PMSR), Washington, DC 20315-0020. DMA Customer Assistance Officer may be contacted at 1-800-826-0342 or 287-2495 (Autovon).

(53) **Nautical Charts**

(54) U.S. Waters:

(55) Apalachicola, Chattahoochee and Flint Rivers Navigation Charts, Alabama River Charts, and Black Warrior-Tombigbee Rivers River Charts: Published and for sale by U.S. Army Engineer District Mobile, P.O. Box 2288, 109 St. Joseph Street, Mobile, Ala. 36628.

(56) Flood Control and Navigation Maps of the Mississippi River, Cairo, Ill. to the Gulf of Mexico: Published by Mississippi River Commission and for sale by U.S. Army Engineer District Vicksburg, P.O. Box 60, U.S. Post OFfice and Courthouse, Vicksburg, Miss. 39180.

(57) Upper Mississippi River Navigation Charts (Mississippi River, Cairo, Ill. to Minneapolis, Minn.): Published by U.S. Army Engineer North Central Division and for sale by U.S. Army Engineer District St. Louis, 210 N. Tucker Boulevard, St. Louis, Mo. 63101.

(58) Charts of the Illinois Waterway, from Mississippi River at Grafton, Ill. to Lake Michigan at Chicago and Calumet Harbors: Published and for sale by U.S. Army Engineer District Rock Island, Clock Tower Bldg., Rock Island, Ill. 61201.

(59) Foreign Waters: Published by Defense Mapping Agency Hydrographic/Topographic Center (see Defense Mapping Agency Procurement Information above).

(60) **Marine Weather Services Charts**: Published by the National Weather Service; for sale by NOS Distribution Branch (see Sales Information above).

(61) **Publications**

(62) **Notices to Mariners**:

(63) The Local Notice to Mariners is available without charge upon application to the appropriate Coast Guard District Commander (see address further on). The Defense Mapping Agency Notice to Mariners is available without charge by operators of ocean-going vessels (see Defense Mapping Agency Procurement Information above).

(64) **Special Notice to Mariners** are published annually in Defense Mapping Agency Notice to Mariners 1. These notices contain important information of considerable interest to all mariners. Interested parties are advised to read these notices.

(65) **Light Lists (United States and Possessions)**: Published by U.S. Coast Guard; for sale by the Government Printing Office. (See Government Printing Office, early this appendix.)

(66) **List of Lights (Foreign Countries)**: Published by Defense Mapping Agency Hydrographic/Topographic Center (see Defense Mapping Agency Procurement Information above).

(67) **Sailing Directions (Foreign Countries)**: Published by Defense Mapping Agency Hydrographic/Topographic Center (see Defense Mapping Agency Procurement Information above).

(68) **Radio Navigational Aids**, Pub. 117: Published by Defense Mapping Agency Hydrographic/Topographic Center (see Defense Mapping Agency Procurement Information above).

(69) The **Nautical Almanac**, the **Air Almanac**, and **Astronomical Almanac**: Published by U.S. Naval Observatory; for sale by Government Printing Office (see Government Printing Office, early this appendix.)

(70) **American Practical Navigator (Bowditch)** (Pub. 9): Published by Defense Mapping Agency Hydrographic/Topographic Center (see Defense Mapping Agency Procurement Information above).

(71) **International Code of Signals** (Pub. 102): Published by Defense Mapping Agency Hydrographic/Topographic Center (see Defense Mapping Agency Procurement Information above).

(72) **Selected Worldwide Marine Weather Broadcasts**: Published by National Weather Service; for sale by the Government Printing Office. (See Government Printing Office, early this appendix.)

(73) **Navigation Rules**: Navigation Rules, International-Inland (COMDTINST M16672.2 series): Published by the U.S. Coast Guard; for sale by Government Printing Office. (see Government Printing Office, early this appendix.)

(74) **Federal Requirements for Recreational Boats:** Published by U.S. Coast Guard; available without charge by contacting the toll free Boating Safety Hotline (telephone, 800-368-5647).

(75) **Port Series of the United States**: Published and sold by Corps of Engineers, U.S. Army, Water Resources Support Center, Port Facilities Branch, Casey Building, Fort Belvoir, VA 22060-5586.

(76) **Maritime Radio Users Handbook**: Published and sold by Radio Technical Commission for Maritime Services, 655 Fifteenth Street, N.W., Suite 300, Washington, DC 20005-5701.

(77) **Corps of Engineers Offices**

(78) **Alaska District Office:** Bldg. 21–700, Elmendorf Air Force Base, Box 898, Anchorage, Alaska 99506-0898.

(79) The Alaska District includes the coastal and tributary waters of the State of Alaska.

(80) **Environmental Protection Agency (EPA) Offices.**–Regional offices and States in the EPA coastal regions:

(81) **Region I** (New Hampshire, Vermont, Maine, Massachusetts, Connecticut, Rhode Island): J.F. Kennedy Federal Bldg., Boston, Mass. 02203.

(82) **Region II** (New Jersey, New York, Puerto Rico, Virgin Islands): 26 Federal Plaza, New York, N.Y. 10278.

(83) **Region III** (Delaware, Maryland, Virginia, District of Columbia, Pennsylvania): 841 Chestnut Street, Philadelphia, Pa. 19107.

(84) **Region IV** (Alabama, Florida, Georgia, Mississippi, South Carolina, North Carolina): 345 Courtland Street NE, Atlanta, Ga. 30365.

(85) **Region V** (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin): 230 South Dearborn Street, Chicago, Ill. 60604.

(86) **Region VI** (Louisiana, Texas): First International Bldg., 1201 Elm Street, Dallas, Tex. 75270.

(87) **Region IX** (California, Hawaii, Guam): 215 Fremont Street, San Francisco, Calif. 94105.

(88) **Region X** (Alaska, Oregon, Washington): 1200 Sixth Avenue, Seattle, Wash. 98101.

(89) **Coast Guard District Offices**

(90) Commander, Seventeenth Coast Guard District, Federal Bldg., Box 25517, Juneau, AK 99802-5517. The coastal and tributary waters of the state of Alaska.

(91) **Note:** A Marine Safety Office combines the functions of the Captain of the Port and Marine Inspection Office.

(92) The symbol **(D)** preceding an office indicates that a Documentation Office is at the same address.

(93) **Coast Guard Marine Safety Offices**

(94) Anchorage, Alaska: Federal Building & U.S. Courthouse, 222 West 7th Avenue 99513-7565.

(95) (D) Juneau, Alaska: 2760 Sherwood Lane 99801-8545.

(96) **Coast Guard Stations.**–The stations listed are in Alaska. They have search and rescue capabilities and may provide lookout, communication, and/or patrol functions to assist vessels in distress. The National VHF-FM Distress System provides continuous coastal radio coverage outwards to 20 miles on 156.80 MHz (channel 16). After contact on channel 16, communications with the Coast Guard should be on 157.10 MHz (channel 22). If channel 22 is not available to the mariner, communications may be made on 156.60 MHz (channel 12). Selected stations guard the International Radiotelephone Distress, Safety and Calling Frequencies.

(97) **Alaska:**

(98) Juneau (58°17.9'N., 134°24.6'W.). On the NW side of the harbor at the U.S. Government Wharf (Subpart).
(99) Ketchikan Base (55°19.9'N., 131°37.4'W.). On the NE side of Tongass Narrows about 0.6 mile SE of Ketchikan.
(100) Kodiak Support Center (57°44.3'N., 152°30.4'W.). On N side of Womens Bay about 4.5 miles SW of Kodiak.
(101) Kodiak Air Station (57°44.3'N., 152°30.4'W.). At Kodiak Support Center.
(102) Sitka Air Station (57°03.2'N., 135°21.9'W.). On Japonski Island.
(103) **Coast Guard Radio Broadcasts.**–Urgent, safety, and scheduled marine information broadcasts are made by Coast Guard radio stations. In general, these broadcasts provide information vital to vessels operating in the approaches and coastal waters of the United States including Puerto Rico and U.S. Virgin Islands. Transmissions are as follows:
(104) **By radiotelephone:** (a) upon receipt; (b) repeated 15 minutes later, (for urgent messages only); (c) text only on the first scheduled broadcast unless cancelled; (d) additional broadcasts at the discretion of the originator.
(105) **Urgent broadcasts** are preceded by the urgent signal PAN-PAN. Both the urgent signal and message are transmitted on 2182 kHz, and VHF-FM channel 16.
(106) **Safety broadcasts** are preceded by the signal SECURITY. After the preliminary safety signal is broadcast on 2182 kHz and VHF-FM channel 16, broadcast stations will shift to 2670 kHz and VHF-FM channel 22A, respectively.
(107) **Scheduled broadcasts.**–The following Coast Guard radio stations make scheduled broadcasts, preceded by a preliminary call on 2182 kHz and VHF-FM channel 16 at the times and frequencies indicated (VHF-FM channel 22A control stations are given, followed by remote antenna sites.):
(108) NMJ-2, Ketchikan, Alaska:
(109) Gravina Island (55°22'N., 131°48'W.), 0615 and 1815 Ak.s.t.
(110) Cape Decision (56°00'N., 134°08'W.), 0533 and 1733 Ak.s.t.
(111) Zarembo Island (56°21'N., 132°52'W.), 0515 and 1715 Ak.s.t.
(112) Sukkwan Island (55°06'N., 132°46'W.), 0515 and 1715 Ak.s.t.
(113) Mary Island (55°05'N., 131°10'W.), 0533 and 1733 Ak.s.t.
(114) NOU, Sitka, Alaska:
(115) Mud Bay (57°09'N., 135°39'W.), on Kruzof Island, 0030, 0450, 1203, and 1603 Ak.s.t.
(116) NMJ, Juneau, Alaska:
(117) Cape Fanshaw (57°12'N., 133°28'W.), 0503 and 1703 Ak.s.t.
(118) Mount Althorp (58°05'N., 136°24'W.), NE side of Lisianski Inlet, 0533 and 1903 Ak.s.t.
(119) Mount Robert Barron (58°14'N., 134°50'W.), 0603 and 1803 Ak.s.t.
(120) Yakutat (59°31'N., 139°46'W.), 0503 and 1703 Ak.s.t.
(121) NMJ-3, Valdez, Alaska:
(122) Cape Hinchinbrook (60°15'N., 146°39'W.), 1633 and 2233 Ak.s.t.
(123) Boswell Bay (60°25'N., 146°08'W.), 0415 and 1215 Ak.s.t.
(124) Naked Island (60°38'N., 147°20'W.), 0415 and 1215 Ak.s.t.
(125) Point Pigot (60°49'N., 148°22'W.), 0433 and 1233 Ak.s.t.
(126) Valdez (61°08'N., 146°16'W.), 1615 and 2215 Ak.s.t.
(127) NOJ, Kodiak, Alaska:
(128) Diamond Ridge (59°42'N., 151°34'W.), about 4.3 miles NW of Homer Airport, 0533 and 1633 Ak.s.t.
(129) Rugged Island (59°56'N., 149°24'W.), 0703 and 2033 Ak.s.t.
(130) Site Summit (61°15'N., 149°32'W.), about 9.5 miles ENE of Anchorage, 0903 and 1733 Ak.s.t.
(131) Narrow Cape (57°26'N., 152°25'W.), 0703 and 2033 Ak.s.t
(132) Pillar Mountain (57°47'N., 152°27'W.), 0533 and 1633 Ak.s.t.
(133) Sitkinak Dome (56°33'N., 154°10'W.), 0903 and 1733 Ak.s.t.
(134) Cape Gull (58°09'N., 154°09'W.), 0533 and 1633 Ak.s.t.
(135) Tuklung Mountain (58°51'N., 159°27'W.), about 6 miles ENE of Kulukak Point, 0903 and 1733 Ak.s.t.

(136) **Rescue Coordination Centers.**–Listed below are the location of the centers in Alaska; refer to the local telephone directory for numbers.
(137) Juneau, Alaska: U.S. Coast Guard Station.
(138) Anchorage, Alaska: Elmendorf Air Force Base.
(139) Kodiak, Alaska: U.S. Coast Guard Support Center.
(140) Adak, Alaska: Adak Naval Air Station.

(141) **Customs Ports of Entry and Stations**
(142) Vessels may be entered and cleared at any port of entry or customs station, but at the latter only with advance authorization from the Customs Service district director.
(143) **Pacific Region**
(144) Anchorage District:
(145) Ports of Entry: Anchorage, Dalton Cache (59°27.1'N., 136°21.6'W.), Juneau, Ketchikan, Sitka, Skagway, Valdez, Wrangell.
(146) Customs Stations: Barrow (supervised by Fairbanks port of entry); Dutch Harbor (supervised by Anchorage port of entry); Haines (supervised by Dalton Cache port of entry); Hyder (supervised by Ketchikan port of entry); Kaktovik (Barter Island) (supervised by Fairbanks port of entry); Kenai (Nikiski), Kodiak (supervised by Anchorage port of entry); Pelican (supervised by Juneau port of entry); Petersburg (supervised by Wrangell port of entry).

(147) **National Weather Service Offices.**–The following offices will provide forecasts and climatological data or arrange to obtain these services from other offices. They will also check barometers in their offices or by telephone; refer to the local telephone directory for numbers.
(148) Anchorage, Alaska: 222 W. 7th Avenue; International Airport.
(149) Barrow, AK: Wiley Post-Will Rogers Field, 99723.
(150) Bethel, AK: Airport, 99559.
(151) Cold Bay, AK: Airport, 99571.
(152) Homer, AK: 2100 Kachemak Dr., Suite 4, 99603.
(153) King Salmon, AK: Airport, 99613.
(154) Kodiak, AK: Airport, 99619.
(155) Kotzebue, AK: Ralph Wein Memorial Airport, 99752.
(156) Nome, AK: Airport, 99762.
(157) St. Paul Island, AK: Airport, 99660.
(158) Unalakleet, AK: Unalakleet Airport, 99684.
(159) Valdez, AK: Coast Guard VTS Bldg., 99686.
(160) Yakutat, AK: Airport, 99689.
(161) **Radio Weather Broadcasts.**–Taped or direct broadcasts of marine weather forecasts and storm warnings are made by commercial and Coast Guard radio stations in the area covered by this Coast Pilot. These broadcasts usually are made several times a day; the transmission schedules are

shown on the **Marine Weather Services Chart** for Alaskan Waters.

(162) The weather broadcasts schedules of Coast Guard radio stations are also listed in the descriptions of Coast Guard marine services found elsewhere in this appendix.

(163) The National Weather Service offices in Alaska broadcast marine forecasts and warnings for coastal waters on the frequencies and at the times (Alaskan standard time when the state is observing standard time, and Alaskan daylight saving time when the state is observing daylight saving time) indicated.

(164) **KDG-58**, Annette: 4125 kHz, 0700 and 1645;

(165) **KDG-91**, Yakutat: 4125 kHz, 0930 and 1930;

(166) **KCI-98**, King Salmon: 4125 kHz, 1100 and 1715; seasonal April 1 through October 15;

(167) **KCI-95**, Cold Bay: 2512 kHz (April 1 through October 15), 4125 kHz (October 16 through March 30), 1030 and 2030;

(168) **WBH-29**, Kodiak: 4125 kHz, 0800 and 1800;

(169) **KCI-94**, Nome: 4125 kHz, 1130 and 2130.

(170) **NOAA Weather Radio.**–National Weather Service VHF-FM radio stations provide mariners with continuous FM broadcasts, radar reports, and surface weather observations. These stations usually transmit on 162.55 or 162.40 MHz. Reception range is up to 40 miles from the antenna site, depending on the terrain, type of receiver, and the antenna used. The following VHF-FM radio stations with location of antenna are located in Alaska.

(171) WML–18, Haines (59°17'N., 135°27'W.), 162.40 MHz.

(172) WXK–69, Yakutat (59°30'N., 139°39'W.), 162.40 MHz.

(173) WXJ–79, Cordova (60°33'N., 145°45'W.), 162.55 MHz.

(174) WXJ–63, Valdez (61°08'N., 146°21'W.), 162.55 MHz.

(175) KEC–81, Seward (60°07'N., 149°27'W.), 162.55 MHz.

(176) KEC–43, Anchorage (61°13'N., 149°53'W.), 162.55 MHz.

(177) WXJ–24, Homer (59°45'N., 151°37'W.), 162.40 MHz.

(178) WXJ–78, Kodiak (57°47'N., 152°26'W.), 162.55 MHz.

(179) WXJ–62, Nome (64°30'N., 165°25'W.), 162.55 MHz.

(180) **National Weather Service Forecasts Offices (WSFOs).**–Scheduled coastal marine forecasts are issued four times daily by Weather Service Forecast Offices. (See National Weather Service, chapter 1, for further details.) Individual WSFOs and their specific areas of broadcast coverage are as follows:

(181) Anchorage, AK: (1) North Gulf Coast, (a) Cape Suckling to Gore Point, (b) Prince William Sound, (c) Resurrection Bay; (2) Cook Inlet and Kachemak Bay; (3) Kodiak Island waters, Gore Point to Castle Cape; (4) coastal waters south of the Alaska Peninsula, Castle Cape to Cape Sarichef; (5) Bristol Bay, (a) south portion, Cape Sarichef to Port Heiden, (b) north portion, Port Heiden to Cape Newenham; (6) Cape Sarichef to Adak; (7) Adak to Attu; (8) Cape Newenham to Dall Point; (9) Pribilof Island waters.

(182) Fairbanks, Alaska: (1) Dall Point to Wales including Norton Sound and the St. Lawrence Island waters; (2) Wales to Point Hope including Kotzebue Sound; (3) Point Hope to Point Barrow to the Canadian border (July 1–October 1, only). **Note.**–Broadcast coverage for Alaskan Coastal waters extends 60 miles out.

(183) **National Weather Service Port Meteorological Officers (PMOs).**–Port Meteorological Officers provide assistance on matters of weather chart interpretation, instruments, marine weather communications, and requirements affecting ship operations. (See National Weather Service, chapter 1, for further details.) The nearest PMO to the area covered by this Coast Pilot is at:

(184) Seattle, Wash.: 7600 Sand Point Way, NE 98115.

(185) Anchorage, AK: 701 C Street 99513

(186) Anchorage, AK: 222 W. 7th Avenue 99513.

(187) Valdez, AK: National Weather Service Office 99686

(188) **Public Health Service Quarantine Stations.**–For ports in Alaska, quarantine and/or medical examinations are usually performed by Public Health Service Contract Physicians. For information where examinations are performed contact:

(189) U.S. Public Health Service, Sea-Tac International Airport, Seattle, WA 98158.

(190) **Food and Drug Administration (FDA) Regional Offices**

(191) **Northeast Region** (New York, Maine, Connecticut, New Hampshire, Vermont, Rhode Island): 830 Third Avenue, Brooklyn, NY 11232.

(192) **Mid-atlantic Region** (Delaware, Pennsylvania, Virginia, Maryland, Ohio, New Jersey): U.S. Customhouse, 2nd and Chestnut Streets, Philadelphia, PA 19106.

(193) **Southeast Region** (South Carolina, North Carolina, Georgia, Alabama, Louisiana, Mississippi, Florida, Puerto Rico): 60 Eighth Street, N.E., Atlanta, GA 30309.

(194) **Midwest Region** (Illinois, Indiana, Michigan, Wisconsin): 20 N. Michigan Avenue, Chicago, IL 60602.

(195) **Southwest Region** (Texas): 3032 Bryan Street, Dallas, TX 75204.

(196) **Pacific Region** (California, Hawaii, Alaska, Washington, Oregon): 50 U.N. Plaza, San Francisco, CA 94102.

(197) **Department of Agriculture, Animal and Plant Health Inspection Service (APHIS) Offices.**–Listed below are ports covered by this volume where APHIS inspectors are available to inspect plants, and plant and animal products, and locations of Animal Import Centers where livestock and birds are inspected.

(198) Information on importation of plants, animals, and plant and animal products is available from APHIS, Department of Agriculture, Federal Building, 6505 Belcrest Road, Hyattsville, Md. 20782. The specific offices to contact are as follows: for plants, including fruits and vegetables, and plant products, Plant Protection and Quarantine, Room 635, telephone 301-436-6799; for animal products, Import-Export Animals and Products Staff, Room 756A, telephone 301-436-7885; and for live ruminants, swine, equines, and poultry and other birds, Veterinary Services, Import-Export Animal and Products Staff, room 764, telephone 301-436-8590.

(199) **Alaska:**

(200) Anchorage: Anchorage International Airport; Box 6191, Annex Post Office 99502.

(201) **Animal Import Centers:**

(202) Honolulu, Hawaii: 300 Ala Moana Boulevard, Room 4320, 96850.

(203) Miami, Fla.: 8120 NW 53rd Street, Suite 102, 33166.

(204) Rock Tavern, N.Y.: New York Animal Import Center, Stewart Airport, Rural Route 1, Box 74, 12575.

(205) **Immigration and Naturalization Service Offices**

(206) **Alaska:**

(207) Anchorage: Federal Bldg., 701 C Street 99513.

(208) Haines: Mile 41 Haines Highway (Dalton Cache), 99827.
(209) Ketchikan: 111 Main Street 99901.
(210) Skagway: P.O. Box 475, 99840.

(211) **Federal Communications Commission Offices**
(212) **District field offices:**
(213) Anchorage, Alaska: 6721 West Raspberry Road 99502.

(214) **Radio shore stations providing medical advice.**–Messages to shore stations may be transmitted in code groups or plain language; messages should be signed by the master and be prefixed "**RADIOMEDICAL**>". The following stations will provide radio services for medical advice. (See Medical advice, chapter 1.)
(215) NOJ, Kodiak, AK, U.S. Coast Guard on HF single-sideband radiotelephone channels 424 (4134 kHz), 601 (6200 kHz), 816 (8240 kHz), or 1205 (12242 kHz).
(216) WKN, Ketchikan, AK, Alascom, Inc.
(217) WKQ, Point Lena, Juneau, AK, Alascom, Inc.
(218) WKR, Nome, AK, Alascom, Inc.: 1000-1900 A.K.s.t. Sunday and holidays, maintain a continuous guard on 500 kHz.

CLIMATOLOGICAL TABLES

These tables were prepared by the National Environmental Satellite Data, and Information Service. Station level pressure refers to the actual pressure taken at the elevation of the station. Where it has been reduced to sea level, the term sea level pressure is used. Time given is local standard time.

* means less than 0.5 percent.
** means less than 0.5 day.
t means trace (not measurable) of precipitation.

YAKUTAT, ALASKA (59°31'N., 139°40'W.) Elevation 28 ft. (8.5m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1008.4	1007.2	1009.0	1011.1	1014.9	1015.2	1016.8	1014.6	1011.0	1004.0	1004.8	1003.6	1010.1	26
TEMPERATURE (DEGREES F)														
Mean	24.2	26.0	30.3	36.1	43.3	49.7	53.4	52.9	48.4	40.7	32.2	26.7	38.8	29
Mean Daily Maximum	31.2	35.0	37.9	43.6	50.8	56.4	59.3	59.6	55.4	47.3	38.2	32.7	45.6	29
Mean Daily Minimum	17.1	20.9	22.6	28.5	35.7	43.0	47.4	46.1	41.4	34.1	26.2	20.7	32.0	29
Extreme Highest	48	54	55	66	79	81	84	86	77	63	54	52	86	30
Extreme Lowest	-22	-20	-13	3	9	30	35	30	25	6	-10	-24	-24	30
RELATIVE HUMIDITY														
Average Percentage	83.4	85.3	82.6	82.9	82.9	84.8	87.4	88.7	89.1	87.2	85.9	86.0	85.5	30
CLOUD COVER														
Average Amount (Tenths)	7.3	7.6	7.4	7.5	6.1	6.5	8.6	8.3	8.3	8.1	7.9	7.9	8.0	25
PRECIPITATION														
Mean Amount (Inches)	10.36	9.28	9.57	7.65	8.02	5.68	8.46	10.81	15.45	19.52	14.80	12.86	132.46	29
Greatest Amount (Inches)	23.98	32.13	18.86	12.93	18.95	16.24	21.49	23.89	27.10	36.89	43.88	28.54	0	32
Least Amount (Inches)	1.59	2.42	2.06	0.75	2.73	0.52	1.70	2.85	9.04	6.68	4.36	4.58	0	32
Maximum in 24 hrs. (Inches)	5.11	4.99	5.26	3.93	4.96	4.42	5.36	5.56	6.38	6.97	7.13	6.10	7.13	27
Mean Amount of Snow (Inches)	39.9	40.1	42.8	18.7	2.0	t	0.0	0.0	t	5.3	21.7	43.4	213.9	25
Mean Number of Days with Precipitation	21	21	22	20	22	21	23	23	23	25	23	24	269	25
Snow(Mean Number of Days)	16	17	16	12	2	0	0	0	**	5	12	19	103	25
WIND														
Percent of Observations with Gales	0.6	0.2	0.2	0.3	0.2	*	*	*	0.3	0.7	0.8	0.5	0.3	29
Mean Wind Speed (Knots)	7.6	7.3	6.9	6.6	6.8	6.6	6.1	6.0	6.5	6.0	7.9	8.1	7.0	29
Direction (Percentage of Obs.)														
North	0.7	0.8	1.2	1.8	2.0	2.0	1.7	1.5	1.6	1.4	0.8	0.5	1.3	29
North Northeast	0.8	1.0	1.1	1.3	1.4	1.0	1.0	0.9	1.2	1.6	1.2	0.8	1.1	29
Northeast	5.2	4.4	4.4	3.5	2.7	1.6	1.4	1.7	3.3	4.6	5.0	6.0	3.6	29
East Northeast	14.3	12.7	11.0	9.0	5.7	3.4	3.8	6.3	10.6	14.9	16.7	15.6	10.3	29
East	26.2	24.9	24.0	19.6	12.5	9.0	12.4	15.5	20.2	24.5	28.9	27.9	20.5	29
East Southeast	15.2	16.0	16.8	14.3	14.1	11.0	14.4	15.7	15.0	16.0	14.9	15.0	12.1	29
Southeast	5.4	6.2	5.3	6.8	7.9	7.8	7.4	6.8	6.4	5.5	5.1	5.7	6.3	29
South Southeast	2.2	1.9	2.3	2.9	4.3	4.2	4.2	3.6	3.5	3.5	2.3	2.5	3.1	29
South	1.3	1.4	1.7	2.1	3.4	3.5	3.1	2.9	2.2	2.2	1.7	1.9	2.3	29
South Southwest	1.1	1.3	1.1	1.6	2.0	2.6	2.4	2.0	1.7	1.5	1.0	1.2	1.6	29
Southwest	1.3	1.5	1.8	2.3	3.3	4.6	3.8	3.0	2.1	1.8	1.0	1.3	2.3	29
West Southwest	1.2	1.8	2.1	3.9	5.1	8.4	7.2	4.8	2.9	1.7	1.2	1.3	3.5	29
West	0.9	1.2	2.0	2.9	5.5	9.7	7.5	5.2	2.8	1.4	0.8	0.8	3.4	29
West Northwest	0.6	1.1	1.4	3.0	5.6	7.5	6.1	4.8	2.9	1.0	0.5	0.8	2.9	29
Northwest	0.7	0.9	1.7	3.0	5.9	5.9	5.2	4.9	2.9	1.4	0.7	0.8	2.8	29
North Northwest	0.4	0.6	1.0	1.8	2.7	3.0	2.3	2.1	1.7	1.3	0.5	0.3	1.5	29
Calm	22.4	22.4	21.2	20.1	16.1	14.8	16.2	18.4	19.0	15.6	17.4	16.8	18.3	29
Direction (Mean Speed, knots)														
North	4.7	4.5	4.4	5.1	5.1	5.5	4.6	4.5	4.5	4.4	4.0	4.0	4.7	29
North Northeast	4.7	5.1	4.6	4.5	4.8	5.0	4.1	4.0	4.9	4.5	5.0	5.1	4.7	29
Northeast	6.6	6.1	6.5	5.4	5.0	4.6	3.9	4.4	4.9	5.5	5.6	6.7	5.8	29
East Northeast	7.6	7.8	8.0	7.0	6.6	5.6	5.9	6.1	6.6	7.4	7.7	7.8	7.3	29
East	8.8	9.0	9.0	8.2	7.8	7.9	7.4	7.2	7.8	8.8	8.8	9.3	8.5	29
East Southeast	12.5	11.0	10.7	11.3	11.2	10.3	9.4	9.9	10.6	12.5	11.9	11.2	11.1	29
Southeast	13.9	13.2	10.3	11.8	11.7	10.5	9.2	10.2	11.9	14.6	15.3	14.3	12.1	29
South Southeast	14.5	12.0	10.9	9.5	9.0	9.0	8.4	8.2	10.4	14.0	15.1	14.1	10.8	29
South	10.8	10.0	8.3	7.1	7.6	6.9	6.6	6.9	8.4	10.8	11.9	13.3	8.6	29
South Southwest	12.6	11.4	8.4	6.7	7.0	6.2	5.9	5.9	7.5	10.4	11.9	12.4	8.2	29
Southwest	11.6	10.3	7.7	6.5	6.6	6.5	6.2	6.1	6.6	10.0	10.4	10.3	7.6	29
West Southwest	12.3	9.8	8.5	7.1	7.6	7.6	7.1	6.8	7.2	9.9	11.8	11.9	8.0	29
West	9.8	8.4	7.5	6.1	6.6	7.2	6.7	5.9	6.2	6.7	7.7	9.2	6.9	29
West Northwest	7.7	6.9	6.5	6.3	6.1	6.6	6.3	5.5	5.5	5.7	5.8	7.8	6.2	29
Northwest	5.0	4.9	5.3	6.2	6.4	6.3	5.8	5.7	5.1	5.2	4.5	5.4	5.8	29
North Northwest	4.2	4.8	5.1	5.9	6.3	6.1	5.7	5.5	5.0	4.8	4.3	4.4	5.6	29
VISIBILITY														
Mean Number of Days with Fog	11	14	14	14	15	16	21	22	18	14	12	12	185	25
Days with Visibility less than 1/2 mile	5.7	4.9	7.1	2.0	3.0	4.9	2.4	5.9	4.6	1.0	1.4	3.8	46.7	8

CORDOVA, ALASKA (60°30'N., 145°30'W.) Elevation 41 ft. (12.5m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1007.1	1005.5	1008.0	1010.0	1013.8	1014.5	1015.8	1013.5	1009.1	1001.5	1002.7	1001.8	1008.7	24
TEMPERATURE (DEGREES F)														
Mean	23.0	26.7	29.2	36.0	43.7	50.4	53.4	53.0	48.0	39.6	30.6	24.6	38.2	29
Mean Daily Maximum	30.1	34.3	37.2	43.6	51.5	57.9	60.6	61.1	55.8	46.8	37.4	31.6	45.7	24
Mean Daily Minimum	13.4	17.3	20.0	27.6	35.1	42.3	46.2	44.5	39.8	32.0	23.5	16.8	29.9	24
Extreme Highest	58	52	52	65	82	84	84	84	71	70	55	54	84	24
Extreme Lowest	-27	-33	-24	4	20	29	34	30	20	8	-17	-23	-33	24
RELATIVE HUMIDITY														
Average Percentage	82.5	82.7	79.3	78.5	80.1	81.5	85.2	85.0	84.8	83.6	84.8	83.8	82.7	24
CLOUD COVER														
Average Amount (Tenths)	6.7	7.1	6.8	7.2	6.1	6.4	6.7	6.1	6.1	7.8	7.4	7.2	7.6	24
PRECIPITATION														
Mean Amount (Inches)	6.14	6.42	5.89	5.71	5.99	4.67	7.08	8.94	13.53	12.34	8.37	7.45	92.53	29
Greatest Amount (Inches)	14.21	18.97	12.41	11.63	10.85	9.68	18.28	18.31	27.72	26.63	21.13	18.67	0	24
Least Amount (Inches)	0.64	1.07	1.26	0.08	1.91	0.69	3.02	2.57	4.32	5.82	1.46	1.87	0	24
Maximum in 24 hrs. (Inches)	2.28	3.70	2.45	2.64	2.85	2.60	4.62	4.41	5.99	4.96	4.48	4.50	5.99	24
Mean Amount of Snow (Inches)	22.4	23.5	25.1	14.4	2.2	0.0	0.0	0.0	t	3.5	10.2	26.5	127.8	24
Mean Number of Days with Precipitation	18	19	19	20	23	22	24	23	22	24	22	22	260	24
Snow (Mean Number of Days)	15	16	17	12	3	**	0	0	**	5	12	17	97	24
WIND														
Percent of Observations with Gales	*	0	*	0	0	0	0	0	0	*	*	*	*	29
Mean Wind Speed (Knots)	4.2	4.5	4.6	4.8	4.8	4.1	3.6	3.5	4.4	5.1	4.5	4.5	4.4	24
Direction (Percentage of Obs.)														
North	4.9	3.9	4.1	4.0	2.3	1.9	2.0	2.7	3.2	3.6	4.4	4.7	3.5	24
North Northeast	3.3	2.8	2.8	1.9	1.6	1.8	2.0	2.1	2.8	3.3	3.2	3.0	2.5	24
Northeast	4.1	4.0	3.7	3.5	3.4	3.8	5.4	5.8	6.3	5.7	4.8	4.8	4.6	24
East Northeast	7.8	7.0	6.7	5.8	5.4	7.8	9.2	9.9	12.2	11.6	8.9	8.9	8.4	24
East	13.8	14.2	12.0	12.6	12.0	10.2	12.0	12.8	15.4	16.8	16.3	16.2	13.8	24
East Southeast	10.6	12.4	11.8	12.4	11.8	6.8	6.3	6.0	9.6	12.2	11.6	11.5	10.2	24
Southeast	3.9	4.0	5.4	7.0	7.5	5.6	4.5	4.1	5.0	3.9	4.1	4.0	4.9	24
South Southeast	0.7	1.2	1.6	2.3	3.1	2.9	2.1	1.8	1.6	1.2	0.9	0.7	1.7	24
South	0.7	1.0	1.9	2.6	3.3	3.5	2.6	2.1	1.3	1.0	0.9	0.8	1.8	24
South Southwest	0.4	0.7	1.4	2.4	2.6	3.6	3.2	2.3	1.3	0.7	0.4	0.3	1.6	24
Southwest	0.6	1.2	2.8	3.6	5.1	7.2	6.2	4.8	2.1	1.2	0.7	0.5	3.0	24
West Southwest	0.4	0.7	1.5	2.2	3.8	5.1	3.8	3.3	2.0	0.8	0.3	0.4	2.0	24
West	1.0	1.9	2.4	2.4	3.6	4.3	2.9	2.6	2.1	1.4	1.1	0.9	2.2	24
West Northwest	1.2	2.0	2.5	2.5	2.6	2.8	1.5	1.6	1.5	1.6	1.3	1.2	1.9	24
Northwest	1.9	2.3	2.0	2.3	1.7	1.7	1.2	1.5	1.6	2.0	1.8	1.9	1.8	24
North Northwest	2.6	2.5	2.1	2.4	1.5	1.0	1.0	1.4	1.7	1.7	2.4	2.3	1.9	24
Calm	42.4	38.0	35.3	30.0	28.6	30.0	34.1	35.4	30.1	29.2	36.7	37.9	34.0	24
Direction (Mean Speed, KTS)														
North	5.8	5.5	5.3	4.8	4.3	3.8	3.6	4.0	4.6	4.6	5.6	5.9	5.0	24
North Northeast	5.7	7.3	6.3	4.8	4.4	3.7	3.5	4.0	4.4	4.7	5.8	5.8	5.2	24
Northeast	5.9	5.9	5.9	5.3	4.4	4.2	3.8	4.1	4.5	5.3	5.3	5.8	5.0	24
East Northeast	7.4	7.5	7.5	6.9	5.6	5.0	4.7	5.1	5.9	7.0	6.9	7.1	6.3	24
East	8.3	8.5	8.1	7.8	7.2	5.5	5.1	5.6	6.9	8.3	7.8	8.0	7.4	24
East Southeast	9.9	9.5	9.7	9.4	9.1	7.2	7.2	7.0	8.9	10.1	10.0	9.8	9.2	24
Southeast	7.1	7.8	7.4	8.0	8.1	7.1	6.6	6.3	7.5	7.4	7.2	7.6	7.4	24
South Southeast	5.9	6.3	5.9	7.0	7.2	6.5	6.2	5.7	6.6	6.4	6.4	6.6	6.5	24
South	4.3	5.0	5.2	5.6	5.9	5.7	5.3	5.1	5.4	5.1	4.8	5.0	5.4	24
South Southwest	5.0	5.0	4.8	5.5	5.8	6.0	5.6	5.6	5.4	5.6	5.5	5.2	5.6	24
Southwest	3.8	3.9	4.7	5.4	6.3	6.4	6.3	5.7	5.2	5.2	4.4	4.3	5.8	24
West Southwest	4.9	4.6	5.0	5.8	6.3	6.7	6.6	5.9	5.6	5.0	4.8	4.9	6.1	24
West	4.3	4.7	4.8	5.3	5.8	6.2	5.7	5.1	5.2	5.0	4.9	4.7	5.4	24
West Northwest	4.7	4.7	5.3	5.5	5.4	6.6	5.6	5.9	5.4	6.0	5.2	5.2	5.5	24
Northwest	4.2	4.4	4.2	4.6	4.0	4.1	3.8	3.6	3.7	4.4	4.3	4.5	4.2	24
North Northwest	5.5	5.6	5.3	5.2	4.2	4.0	3.7	4.2	4.7	4.6	4.9	5.6	5.0	24
VISIBILITY														
Mean Number of Days with Fog	8	7	6	7	8	11	17	14	11	8	8	7	112	24
Days with Visibility less than 1/2 mile	2.9	2.7	1.8	1.6	1.1	1.6	1.1	1.6	0.5	0.2	0.4	2.2	17.7	12

VALDEZ, ALASKA (61°08'N., 146°15'W.) Elevation 49 ft. (14.9m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
TEMPERATURE (DEGREES F)														
Mean	17.8	22.4	26.8	35.6	43.8	51.2	53.3	52.0	46.5	37.5	26.1	19.5	36.0	29
Mean Daily Maximum	25.4	29.1	33.8	42.9	51.3	58.5	60.2	59.5	53.3	43.5	32.3	26.7	43.0	42
Mean Daily Minimum	11.5	13.8	17.4	25.8	34.3	41.9	45.3	43.8	38.6	31.3	20.6	13.7	28.2	42
Extreme Highest	55	59	57	68	79	87	84	84	82	69	59	54	87	56
Extreme Lowest	-24	-28	-11	4	6	27	33	29	14	5	-9	-18	-28	56
PRECIPITATION														
Mean Amount (Inches)	5.06	5.30	4.33	3.06	3.20	2.70	4.31	5.80	7.74	6.75	5.67	5.39	59.31	29
Greatest Amount (Inches)	15.17	14.24	13.55	10.11	5.90	5.90	8.28	17.41	16.74	17.23	17.38	16.66	83.39	32-42
Least Amount (Inches)	0.41	0.23	0.40	0.41	0.33	0.46	0.88	1.07	1.23	2.22	0.32	0.14	39.12	32-42
Maximum in 24 hrs. (Inches)	3.07	4.00	3.30	2.36	1.80	1.66	2.41	2.97	3.71	3.00	4.30	5.10	5.10	54
Mean Amount of Snow (Inches)	56.3	47.2	36.7	13.1	2.1	0.0	t	0.0	0.1	8.4	31.0	49.6	244.5	48
Maximum Snowfall in 24 hrs. (Inches)	32.5	43.0	25.0	17.0	12.0	0.0	t	0.0	2.0	35.0	26.0	30.0	43.0	48
0.01 Inch or More, Mean Number of Days	12	11	11	11	14	13	18	19	19	18	13	13	170	38
WIND														
Prevailing Wind Direction	NE	NE	NE	NE	SW	SW	SW	SW	SW	NE	NE	NE	NE	33

ANCHORAGE, ALASKA (61°10'N., 150°01'W.) Elevation 114 ft. (34.8m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1010.2	1006.7	1009.8	1010.5	1012.2	1012.4	1014.8	1012.1	1009.1	1002.0	1002.8	1003.5	1008.9	12
TEMPERATURE (DEGREES F)														
Mean	11.8	17.8	23.7	35.3	46.2	54.6	57.9	55.9	48.1	34.8	21.1	13.0	35.0	29
Mean Daily Maximum	20.0	26.6	32.8	43.8	55.2	62.9	65.6	63.8	55.7	41.8	28.3	20.6	43.1	29
Mean Daily Minimum	3.5	8.9	14.6	26.8	37.2	46.2	50.1	48.0	40.4	27.8	13.9	5.3	26.9	29
Extreme Highest	50	44	49	62	75	77	81	76	73	60	51	47	81	12
Extreme Lowest	-23	-26	-22	6	17	33	36	34	20	-5	-21	-30	-30	12
RELATIVE HUMIDITY														
Average Percentage	72.7	70.5	63.5	64.4	60.8	65.5	71.9	74.6	76.1	73.5	74.2	73.9	70.1	12
CLOUD COVER														
Average Amount (Tenths)	6.6	6.8	5.9	6.8	7.2	7.7	7.7	7.8	7.7	7.1	6.9	6.8	7.1	12
PRECIPITATION														
Mean Amount (Inches)	0.84	0.84	0.56	0.56	0.59	1.07	2.07	2.32	2.37	1.43	1.02	1.07	14.74	29
Greatest Amount (Inches)	2.09	3.07	1.48	1.78	1.52	3.40	4.44	3.26	5.43	2.81	2.71	2.07	0	12
Least Amount (Inches)	0.27	0.07	0.19	0.01	0.02	0.26	0.72	1.60	0.83	0.35	0.11	0.19	0	12
Maximum in 24 hrs. (Inches)	0.84	1.16	0.47	0.50	0.45	1.62	2.00	1.30	1.21	0.88	1.16	1.39	2.00	12
Mean Amount of Snow (Inches)	10.1	14.9	9.5	7.5	0.4	t	0.0	0.0	t	8.3	12.6	14.7	78.0	12
Mean Number of Days with Precipitation	20	17	15	14	16	16	19	20	21	18	19	22	217	12
Snow (Mean Number of Days)	18	17	13	12	1	0	0	0	1	10	17	20	112	12
WIND														
Percent of Observations with Gales	*	0.1	0	0	0	0	0	0	0	0	0	*	*	11
Mean Wind Speed (Knots)	4.8	5.6	5.9	6.1	7.2	6.7	5.9	5.4	4.9	5.2	5.0	4.8	4.9	11
Direction (Percentage of Obs.)														
North	13.4	14.8	15.8	10.2	4.8	2.9	3.7	5.4	8.9	14.5	16.3	14.9	15.7	11
North Northeast	12.7	14.1	12.4	8.5	3.7	2.5	3.8	6.0	9.0	11.6	12.8	12.4	12.1	11
Northeast	8.8	10.3	9.6	6.5	3.3	2.3	3.5	5.1	6.1	8.7	9.6	9.0	6.9	11
East Northeast	6.1	4.5	3.0	2.0	1.4	1.1	1.2	2.0	2.8	4.1	5.3	5.7	3.2	11
East	4.1	3.0	1.8	1.5	1.0	0.8	1.2	1.6	1.9	2.5	4.2	4.5	2.7	11
East Southeast	2.7	2.6	1.5	1.7	1.4	1.4	1.4	2.0	2.1	2.4	2.7	2.8	2.2	11
Southeast	3.2	3.3	4.0	4.7	6.6	5.2	5.5	6.1	5.1	3.7	2.4	3.3	3.1	11
South Southeast	2.8	2.8	3.8	6.3	13.2	13.3	10.9	11.2	8.8	5.2	3.4	2.4	2.8	11
South	4.1	5.4	5.0	10.6	18.2	16.7	14.9	12.2	9.3	6.4	4.3	3.5	6.1	11
South Southwest	2.6	3.5	2.9	5.3	7.1	7.2	7.1	8.1	5.4	3.5	2.5	2.5	4.9	11
Southwest	1.8	1.8	2.1	4.0	5.3	7.0	6.1	4.7	3.2	2.1	1.8	1.7	3.5	11
West Southwest	1.7	1.8	2.6	3.8	4.3	6.4	5.9	3.8	2.7	1.8	1.5	1.8	2.5	11
West	2.9	2.5	3.6	6.3	6.7	7.9	8.0	5.0	3.8	2.6	1.8	2.5	3.2	11
West Northwest	3.3	3.0	3.9	7.9	8.9	11.1	10.3	6.6	4.4	3.4	2.8	2.7	3.9	11
Northwest	4.6	3.8	6.2	6.5	4.8	5.2	5.1	4.9	5.0	5.2	3.9	4.3	4.7	11
North Northwest	5.8	6.3	9.2	5.9	3.3	2.4	2.6	3.1	5.5	7.1	7.1	6.7	6.8	11
Calm	19.1	16.5	12.7	8.4	5.8	6.6	8.9	12.2	16.1	15.2	17.9	19.3	15.6	11
Direction (Mean Speed, knots)														
North	7.2	8.2	7.3	6.9	6.5	4.8	4.9	4.7	5.4	6.6	7.1	7.8	6.5	11
North Northeast	7.0	8.5	7.6	6.8	6.4	5.5	5.5	5.1	5.7	6.5	6.8	7.5	6.5	11
Northeast	5.9	6.3	6.6	6.1	5.2	5.2	5.3	4.9	5.0	5.3	5.3	5.2	5.4	11
East Northeast	4.6	4.6	4.4	4.9	4.6	4.6	4.2	4.3	4.3	4.3	4.4	4.2	4.2	11
East	3.5	3.7	3.8	4.3	4.4	4.1	3.9	3.8	3.9	4.1	3.4	3.7	3.4	11
East Southeast	4.1	3.5	4.0	5.1	5.6	4.5	4.1	4.6	4.6	4.2	3.5	3.7	3.8	11
Southeast	5.1	4.8	6.5	7.9	8.1	7.0	6.4	6.4	6.4	6.6	4.5	4.2	4.6	11
South Southeast	6.8	7.1	8.5	9.4	10.1	9.7	9.3	8.8	8.2	8.1	7.7	5.3	8.1	11
South	6.6	8.2	7.3	8.1	9.7	9.3	8.1	7.7	7.5	7.6	7.9	6.6	7.1	11
South Southwest	7.0	8.0	6.9	6.7	7.2	6.6	6.3	7.4	7.1	7.6	7.8	6.7	7.2	11
Southwest	5.3	5.6	5.1	5.4	6.1	5.7	5.9	5.1	5.4	4.9	5.3	4.8	6.2	11
West Southwest	4.0	4.3	4.6	5.3	6.1	6.3	5.7	4.9	4.0	4.0	4.3	4.0	5.1	11
West	4.4	4.9	4.5	5.2	6.2	6.2	5.7	5.2	4.6	4.6	4.7	4.5	4.9	11
West Northwest	5.0	5.4	5.0	5.6	6.8	6.6	6.2	5.4	4.7	4.9	5.3	4.8	4.8	11
Northwest	4.9	5.3	6.6	6.5	6.4	6.0	5.5	4.8	4.8	5.5	5.5	4.9	4.8	11
North Northwest	6.7	7.1	8.6	6.7	6.3	5.0	4.7	4.9	5.2	6.3	6.6	6.8	5.5	11
VISIBILITY														
Mean Number of Days with Fog	12	9	5	4	1	2	4	5	7	6	8	12	76	12
Days with Visibility less than 1/2 mile	7.7	4.5	1.5	1.1	0.3	0.1	0.6	0.1	1.7	2.5	5.4	6.9	33.3	14

KING SALMON, ALASKA (58°41'N., 156°39'W.) Elevation 49 ft. (14.9m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1006.9	1005.1	1006.8	1009.5	1010.4	1012.1	1014.0	1011.4	1006.7	1001.1	1003.2	1004.0	1007.8	28
TEMPERATURE (DEGREES F)														
Mean	13.4	16.6	20.4	31.5	42.6	50.7	54.5	53.6	47.3	33.6	22.1	11.7	33.2	29
Mean Daily Maximum	21.0	24.6	28.6	39.1	51.3	59.7	62.5	60.9	54.8	40.8	29.0	18.6	41.0	29
Mean Daily Minimum	5.7	8.6	12.1	23.8	33.8	41.7	46.4	46.7	39.7	26.3	15.1	3.8	25.3	29
Extreme Highest	53	51	56	65	75	88	83	84	74	67	50	48	88	28
Extreme Lowest	-39	-40	-35	-19	4	29	30	31	16	-11	-25	-38	-40	28
RELATIVE HUMIDITY														
Average Percentage	77.5	77.9	77.7	76.4	74.5	74.9	79.6	82.5	81.3	81.7	80.2	76.8	78.4	28
CLOUD COVER														
Average Amount (Tenths)	5.9	6.2	6.3	7.0	7.8	8.3	8.5	8.6	7.8	7.0	6.3	6.3	7.2	24
PRECIPITATION														
Mean Amount (Inches)	0.94	0.99	1.16	0.90	1.13	1.44	2.18	3.46	3.07	2.00	1.43	1.05	19.75	29
Greatest Amount (Inches)	3.02	3.00	2.41	2.99	2.40	3.78	4.32	6.44	7.30	6.35	2.96	3.42	0	31
Least Amount (Inches)	0.16	0.11	0.04	t	0.11	0.00	0.32	1.95	1.00	0.20	t	0.12	0	31
Maximum in 24 hrs. (Inches)	0.87	1.29	1.03	1.41	0.80	0.87	1.06	2.00	1.69	1.52	0.91	0.82	2.00	31
Mean Amount of Snow (Inches)	6.3	7.1	8.6	4.4	0.8	*	0.0	0.0	0.1	3.2	6.5	8.5	45.5	24
Mean Number of Days with Precipitation	17	16	19	16	20	21	22	24	22	20	19	19	237	24
Snow (Mean Number of Days)	14	14	17	14	5	**	0	0	1	9	14	16	104	24
WIND														
Percent of Observations with Gales	0.5	0.6	0.4	0.2	0.1	0.1	*	0.1	0.3	0.4	0.7	0.5	0.4	28
Mean Wind Speed (Knots)	9.7	10.2	9.9	9.2	9.4	8.7	7.7	8.7	8.7	9.2	9.5	9.1	9.1	28
Direction (Percentage of Obs.)														
North	19.7	18.9	15.5	11.2	5.1	2.8	2.8	3.1	9.2	14.3	18.9	21.4	11.8	28
North Northeast	8.3	10.8	7.8	5.9	3.9	2.3	2.3	2.2	5.6	8.1	9.4	10.0	6.3	28
Northeast	6.4	5.1	4.3	6.0	5.0	3.1	2.5	2.9	4.9	5.5	5.0	4.6	4.6	28
East Northeast	4.2	4.0	3.6	4.4	5.3	3.0	2.4	2.4	3.8	4.1	3.9	3.0	3.7	28
East	9.2	8.6	7.3	8.0	11.3	7.2	4.2	4.6	6.3	6.5	7.7	6.8	7.3	28
East Southeast	6.6	5.4	5.1	5.4	7.0	6.6	4.0	4.0	6.1	5.9	7.3	4.3	5.6	28
Southeast	4.9	4.6	4.2	4.3	6.2	6.5	4.6	5.4	6.1	4.5	5.7	4.6	5.2	28
South Southeast	4.8	5.4	4.8	5.4	8.2	7.8	7.0	9.1	8.9	6.2	6.1	4.2	6.5	28
South	3.4	4.1	4.9	4.9	9.6	11.5	12.9	11.5	8.1	4.9	3.9	3.4	7.0	28
South Southwest	2.6	3.1	4.1	4.7	7.3	11.7	14.9	12.4	5.9	4.7	2.8	3.1	6.5	28
Southwest	2.0	2.5	4.1	4.6	5.9	10.4	12.4	11.3	5.1	2.9	1.4	1.9	5.4	28
West Southwest	1.7	2.1	3.1	4.8	4.3	6.1	7.5	8.9	4.0	2.3	1.3	1.6	4.0	28
West	1.3	1.6	2.9	4.7	4.3	6.0	5.9	6.0	4.1	3.3	1.5	1.3	3.6	28
West Northwest	1.3	1.7	2.3	3.3	3.3	4.2	4.2	3.7	3.6	3.3	1.6	1.6	2.9	28
Northwest	3.0	3.5	4.4	4.3	2.7	2.4	2.5	2.8	4.4	5.3	3.7	3.6	3.5	28
North Northwest	7.5	7.7	11.1	9.4	3.3	2.4	2.3	2.4	6.2	9.3	9.2	10.4	6.7	28
Calm	13.0	10.8	10.6	8.7	7.3	6.0	7.7	7.3	7.6	8.8	10.7	14.0	9.4	28
Direction (Mean Speed, knots)														
North	11.5	11.3	11.3	10.1	9.3	7.2	6.5	7.8	9.4	10.5	10.9	10.7	10.6	28
North Northeast	9.9	10.3	10.2	9.4	8.5	6.9	6.8	7.8	8.8	9.9	10.2	9.9	9.6	28
Northeast	9.6	8.4	7.7	9.5	8.2	6.9	6.4	7.1	8.0	8.5	8.5	8.2	8.3	28
East Northeast	12.5	11.0	10.3	9.4	9.8	9.1	7.6	9.1	8.6	10.6	10.8	11.0	10.1	28
East	14.7	16.2	14.2	12.3	13.9	13.2	10.5	11.1	11.4	12.2	14.3	14.7	13.5	28
East Southeast	13.9	12.8	13.1	11.3	12.4	11.9	8.8	9.5	10.6	11.8	13.5	13.4	12.1	28
Southeast	9.6	11.4	10.1	10.3	9.3	8.3	6.6	8.8	8.9	9.0	10.0	9.2	9.2	28
South Southeast	11.9	13.9	13.8	12.8	11.8	9.7	8.9	11.1	10.8	10.2	10.4	11.0	11.2	28
South	9.5	11.4	10.4	8.9	10.6	9.9	9.4	10.3	10.2	9.3	9.3	9.3	9.9	28
South Southwest	10.1	10.5	10.2	8.9	9.2	8.9	8.9	9.3	8.8	9.3	8.8	10.2	9.2	28
Southwest	9.4	10.3	10.6	9.0	8.6	8.6	8.2	9.0	8.0	8.7	7.3	9.0	8.8	28
West Southwest	10.0	11.2	11.2	10.0	9.1	8.7	8.3	9.6	8.9	10.4	10.0	9.6	9.4	28
West	8.9	9.3	9.9	9.8	8.4	8.4	8.0	8.9	8.8	10.0	9.2	8.0	8.9	28
West Northwest	7.5	8.1	9.1	8.4	7.7	8.1	7.5	8.1	7.6	8.7	8.0	7.6	8.0	28
Northwest	7.4	8.2	9.3	8.5	7.7	7.2	7.0	7.4	8.6	8.8	8.0	8.1	8.2	28
North Northwest	9.8	10.4	11.3	10.6	9.3	7.9	7.3	8.2	9.3	10.2	10.0	10.6	10.1	28
VISIBILITY														
Mean Number of Days with Fog	9	7	9	8	9	12	17	20	12	10	11	11	133	24
Days with Visibility less than 1/2 mile	2.6	2.0	2.6	1.7	2.4	3.8	4.8	4.2	2.0	2.1	3.3	3.5	35.0	12

COLD BAY, ALASKA (55°12'N., 162°43'W.) Elevation 96 ft. (29.3m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1005.6	1004.0	1008.4	1010.1	1009.3	1012.3	1014.9	1013.0	1007.8	1002.6	1001.4	1003.7	1007.8	28
TEMPERATURE (DEGREES F)														
Mean	28.2	28.2	29.0	33.1	39.5	45.4	50.1	51.3	47.3	39.6	34.3	29.0	37.9	29
Mean Daily Maximum	32.6	32.8	33.7	37.6	44.2	49.8	54.4	55.3	51.6	44.0	38.6	33.4	42.3	29
Mean Daily Minimum	23.8	23.6	24.2	28.5	34.8	40.9	45.7	47.3	43.0	35.1	30.0	24.5	33.5	29
Extreme Highest	50	50	54	60	65	69	77	78	70	69	54	54	78	29
Extreme Lowest	- 5	- 9	- 13	4	18	29	36	33	27	12	1	- 9	- 13	30
RELATIVE HUMIDITY														
Average Percentage	85.6	85.4	84.2	85.3	86.2	87.4	90.3	90.7	87.4	84.8	85.4	85.1	86.5	26
CLOUD COVER														
Average Amount (Tenths)	7.9	8.1	8.0	8.5	8.9	9.0	9.3	9.3	8.9	8.3	8.0	8.0	8.5	22
PRECIPITATION														
Mean Amount (Inches)	2.42	2.59	1.93	1.54	2.19	1.84	2.22	3.89	3.95	4.31	3.90	2.45	33.23	29
Greatest Amount (Inches)	8.46	7.87	3.89	3.83	6.37	6.98	4.63	9.97	9.79	8.02	8.94	6.49	0	28
Least Amount (Inches)	0.60	0.08	0.41	0.02	0.62	0.12	0.28	1.40	0.91	1.88	1.46	0.19	0	28
Maximum in 24 hrs. (Inches)	2.49	2.49	1.34	1.76	2.22	2.10	1.74	2.17	3.43	4.90	3.43	1.94	4.90	28
Mean Amount of Snow (Inches)	10.5	9.6	9.9	5.0	1.1	t	0.0	t	t	2.5	6.4	10.4	55.4	22
Mean Number of Days with Precipitation	26	24	27	26	27	26	27	28	27	28	26	27	320	20
Snow (Mean Number of Days)	17	18	19	16	8	**	**	**	**	10	15	19	124	20
WIND														
Percent of Observations with Gales	15.7	15.8	15.8	15.1	14.1	13.7	13.1	14.2	13.8	14.9	14.9	14.8	14.6	25
Mean Wind Speed (Knots)	4.3	4.5	3.4	2.2	1.8	1.6	1.3	1.6	1.5	2.7	3.7	3.2	2.5	23
Direction (Percentage of Obs.)														
North	6.9	10.4	9.4	7.4	5.1	3.5	3.1	2.6	4.5	5.3	7.9	10.3	6.3	26
North Northeast	5.7	7.1	5.3	4.1	3.0	2.0	1.6	1.7	3.0	3.0	4.8	6.8	3.9	26
Northeast	1.6	1.7	1.5	1.5	2.0	1.2	1.4	0.8	0.9	1.4	2.5	1.7	1.5	26
East Northeast	1.5	1.0	0.8	1.3	1.9	1.4	0.8	0.9	1.0	0.7	1.1	1.0	1.1	26
East	2.1	1.8	1.2	1.4	2.7	2.0	1.3	1.1	1.1	1.0	1.6	1.7	1.6	26
East Southeast	5.2	4.6	3.7	3.5	6.0	6.1	4.4	4.9	3.4	3.0	3.5	3.4	4.3	26
Southeast	12.7	12.6	10.6	11.4	15.8	16.5	14.1	15.5	10.7	7.8	9.0	7.7	12.0	26
South Southeast	15.5	15.3	13.6	12.4	15.3	18.4	18.1	15.5	15.3	9.1	11.8	11.7	14.3	26
South	4.7	4.6	3.9	3.5	5.4	2.6	2.8	2.6	3.2	3.2	4.9	4.4	3.8	26
South Southwest	1.5	1.9	1.4	1.1	1.4	0.4	0.3	0.6	0.9	1.4	1.7	1.6	1.2	26
Southwest	1.9	2.5	2.5	1.4	1.7	0.9	1.2	1.6	2.4	3.7	3.4	2.9	2.2	26
West Southwest	5.2	4.8	5.7	4.2	3.7	3.5	5.5	11.3	9.5	12.0	8.3	6.8	6.8	26
West	4.3	4.1	5.1	7.2	6.4	7.6	12.9	14.4	10.6	9.7	6.4	5.7	8.0	26
West Northwest	6.0	5.9	7.1	11.0	9.4	13.5	14.0	13.4	11.8	10.5	7.8	7.6	9.9	26
Northwest	8.1	7.6	9.9	12.6	8.6	10.5	8.7	5.8	9.4	11.5	8.9	8.4	9.1	26
North Northwest	12.3	10.1	14.2	12.2	7.4	6.0	5.1	3.3	8.5	11.9	11.7	13.1	9.6	26
Calm	5.0	4.2	4.1	3.8	4.4	3.8	4.7	3.9	3.7	4.7	4.8	5.1	4.4	26
Direction (Mean Speed, knots)														
North	14.3	15.2	14.7	14.0	11.6	9.7	8.4	9.2	11.3	13.7	14.8	15.8	13.6	26
North Northeast	17.7	15.9	16.7	13.3	11.5	8.6	6.6	8.7	12.3	14.8	15.2	18.1	14.7	26
Northeast	12.6	11.9	9.3	8.2	9.1	6.8	5.5	5.9	9.0	10.3	15.2	12.4	10.3	26
East Northeast	17.6	13.0	9.6	11.1	11.2	13.0	6.9	8.2	14.7	11.9	13.9	13.7	12.4	26
East	18.1	16.2	11.3	13.9	13.5	14.8	10.2	10.1	10.8	12.2	15.5	17.3	14.1	26
East Southeast	20.4	18.9	21.1	18.4	17.6	18.2	19.2	17.3	16.2	16.5	16.6	18.7	18.3	26
Southeast	20.4	20.6	19.6	18.7	18.1	18.0	16.7	18.5	15.9	17.5	18.0	17.6	18.3	26
South Southeast	19.3	20.2	19.5	19.4	18.5	18.0	17.7	18.8	17.5	18.5	18.5	19.3	18.7	26
South	14.3	16.1	15.3	17.1	14.6	13.1	12.7	14.5	13.5	13.5	13.6	13.7	14.4	26
South Southwest	10.7	15.1	14.2	12.9	12.1	6.7	8.2	10.3	7.0	9.7	10.6	10.6	11.3	26
Southwest	11.9	15.9	15.7	11.0	12.1	11.8	13.7	11.0	10.8	11.7	11.1	12.7	12.5	26
West Southwest	16.0	15.6	18.7	16.3	13.4	14.3	15.1	16.2	14.3	16.2	15.6	15.6	15.7	26
West	12.3	13.3	14.6	14.5	13.2	12.7	13.3	13.5	13.4	14.9	14.4	12.6	13.6	26
West Northwest	11.8	11.6	13.8	14.2	12.4	11.5	11.2	12.3	13.1	14.6	13.3	11.4	12.6	26
Northwest	14.4	13.6	15.8	14.7	12.3	10.7	10.3	10.7	14.2	15.9	14.7	14.2	13.6	26
North Northwest	16.3	14.7	15.2	15.1	13.5	10.8	9.7	9.7	13.9	17.6	17.6	15.6	15.0	26
VISIBILITY														
Mean Number of Days with Fog	13	13	13	14	14	18	24	25	18	13	13	13	192	20

ADAK, ALASKA (51°53'N., 176°39'W.) Elevation 17 ft. (5.2m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1002.2	999.9	1006.0	1010.4	1009.0	1010.6	1014.1	1011.9	1008.9	1007.7	1003.8	1002.6	1007.3	22
TEMPERATURE (DEGREES F)														
Mean	34.0	33.2	35.1	37.8	41.2	45.0	49.4	51.7	48.3	42.7	37.4	34.4	40.9	22
Mean Daily Maximum	37.6	37.1	39.1	41.8	45.2	48.8	53.8	56.1	52.3	46.6	41.2	38.0	44.8	22
Mean Daily Minimum	29.9	28.0	30.0	33.3	30.7	40.6	44.6	46.5	43.9	36.4	33.1	30.3	36.4	22
Extreme Highest	50	50	51	56	65	65	72	75	66	61	57	55	75	22
Extreme Lowest	3	3	13	21	25	29	33	33	28	26	12	13	3	22
RELATIVE HUMIDITY														
Average Percentage	83.1	82.1	82.5	81.7	82.7	86.5	89.7	88.8	85.9	82.3	82.6	84.1	84.3	22
CLOUD COVER														
Average Amount (Tenths)	8.3	8.4	8.5	8.7	9.1	9.4	9.4	9.2	8.8	8.3	8.0	8.2	8.7	22
PRECIPITATION														
Mean Amount (Inches)	6.43	5.05	6.22	4.74	4.44	3.40	3.05	3.54	5.74	6.99	6.23	7.70	65.83	22
Greatest Amount (Inches)	14.45	9.57	13.31	10.17	16.10	9.37	6.10	9.65	11.30	13.25	13.72	13.58	0	22
Least Amount (Inches)	3.13	1.97	2.33	1.70	0.64	1.36	0.60	0.98	2.52	3.02	2.94	2.58	0	22
Maximum in 24 hrs. (Inches)	3.59	2.25	3.22	4.76	4.85	2.52	1.92	2.46	3.52	3.36	2.94	4.68	4.85	22
Mean Amount of Snow (Inches)	17.0	19.5	18.9	10.0	2.1	t	0.0	t	0.1	1.8	12.1	19.2	100.7	22
Mean Number of Days with Precipitation	28	26	29	28	28	26	27	28	27	30	29	29	335	22
Snow (Mean Number of Days)	21	25	23	20	8	**	0	**	**	8	18	22	145	22
WIND														
Percent of Observations with Gales	1.5	2.3	3.0	1.8	1.4	0.3	0.2	0.6	1.1	2.3	2.1	2.9	1.7	23
Mean Wind Speed (Knots)	12.5	12.7	13.4	13.3	12.1	10.3	10.2	10.8	11.7	13.5	13.2	13.0	12.2	22
Direction (Percentage of Obs.)														
North	5.9	7.1	7.4	7.1	11.9	10.5	6.3	6.1	9.7	7.2	6.7	5.5	7.6	22
North Northeast	9.5	9.9	6.5	5.8	6.9	7.3	5.0	3.8	6.0	4.6	4.6	6.7	6.4	22
Northeast	5.6	4.4	3.7	2.8	3.1	5.4	4.7	3.4	4.6	2.7	2.8	4.6	4.0	22
East Northeast	6.8	5.9	5.8	3.3	3.7	6.4	5.2	3.1	3.5	2.5	2.6	5.4	4.5	22
East	7.7	7.6	5.8	3.8	3.7	6.6	6.1	3.4	3.3	3.1	3.1	4.7	4.9	22
East Southeast	3.9	4.0	3.8	2.7	2.0	3.1	2.6	2.1	2.1	1.6	1.5	2.8	2.7	22
Southeast	3.2	3.1	3.6	2.4	2.7	2.8	3.0	2.4	2.1	1.8	1.6	2.7	2.6	22
South Southeast	6.4	4.6	5.1	4.4	5.8	5.8	5.2	4.5	4.0	2.6	3.4	5.3	4.8	22
South	7.4	6.0	6.8	7.4	6.4	6.6	6.9	6.8	5.4	5.0	6.3	5.9	6.4	22
South Southwest	4.9	6.0	6.7	6.3	4.8	3.4	3.7	4.8	4.2	4.9	6.2	5.6	5.1	22
Southwest	6.3	7.2	6.8	8.8	7.5	5.8	5.9	7.0	7.0	9.5	10.9	7.3	7.5	22
West Southwest	7.3	7.3	8.9	14.2	11.5	11.5	15.1	16.2	13.0	14.3	14.6	10.1	12.0	22
West	6.0	6.3	7.9	11.4	10.0	10.6	20.1	23.1	15.1	14.9	11.6	9.4	12.2	22
West Northwest	3.5	3.0	4.8	5.4	4.8	2.9	2.3	3.1	4.7	7.2	5.4	5.0	4.3	22
Northwest	2.0	2.9	3.4	3.5	3.4	1.9	0.6	1.3	3.5	5.3	4.7	3.3	3.0	22
North Northwest	2.9	4.1	4.7	4.9	5.0	3.2	1.1	1.7	5.6	6.1	5.6	4.1	4.1	22
Calm	10.7	10.5	8.2	5.7	6.8	6.4	6.3	7.2	6.3	6.7	8.6	11.6	7.9	22
Direction (Mean Speed, knots)														
North	13.2	11.9	13.0	12.8	12.2	10.9	9.9	11.1	12.0	13.5	12.2	12.8	12.1	22
North Northeast	13.7	13.0	13.7	13.0	12.2	9.7	7.9	8.9	10.7	13.1	12.8	13.9	12.1	22
Northeast	13.9	13.7	13.5	12.2	10.6	9.2	7.4	7.0	10.6	13.5	13.1	15.9	11.7	22
East Northeast	14.4	13.8	15.2	12.1	9.7	8.9	6.6	7.5	9.4	12.4	12.2	15.0	11.7	22
East	14.1	14.6	11.8	10.3	8.5	8.4	6.5	6.7	8.5	13.4	12.4	13.1	10.9	22
East Southeast	14.3	14.8	13.7	11.9	8.1	9.4	6.6	6.5	11.5	15.3	12.6	12.8	11.8	22
Southeast	12.9	14.5	14.2	12.2	9.7	9.0	7.9	8.9	11.1	12.6	12.1	13.0	11.6	22
South Southeast	14.4	14.9	14.8	12.0	11.2	10.6	9.5	9.9	11.9	13.2	14.3	15.4	12.6	22
South	13.8	13.5	13.3	12.8	12.0	11.3	10.7	10.9	11.2	12.8	14.8	12.7	12.5	22
South Southwest	14.1	15.4	15.5	15.5	14.2	12.0	11.9	12.2	13.7	14.7	15.1	15.4	14.4	22
Southwest	15.2	16.9	17.5	16.1	16.1	12.7	13.2	13.6	14.9	16.0	16.2	15.5	15.5	22
West Southwest	14.9	16.7	17.3	16.6	16.3	13.3	13.9	13.7	13.9	15.0	16.6	17.1	15.4	22
West	13.2	13.8	13.9	14.6	14.1	12.3	13.3	13.1	12.6	14.3	14.3	14.5	13.6	22
West Northwest	15.5	13.9	16.0	15.2	15.0	12.3	12.9	13.3	14.9	15.8	15.0	16.4	15.0	22
Northwest	12.5	11.4	13.5	13.4	12.3	11.2	10.2	12.6	13.4	13.6	11.9	12.4	12.6	22
North Northwest	13.5	12.5	14.4	13.4	12.4	11.5	11.0	12.8	14.2	14.5	14.0	14.9	13.6	22
VISIBILITY														
Mean Number of Days with Fog	8	6	9	9	13	18	26	24	16	11	8	8	154	22
Days with Visibility less than 1/2 mile	3.3	2.0	2.9	0.8	0.3	1.7	3.3	2.9	0.4	0.2	1.0	3.5	22.3	12

SHEMYA, ALASKA (52°43'N., 174°06'W.) Elevation 122 ft. (37.2m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	999.1	998.9	1004.8	1010.6	1010.0	1011.3	1011.2	1011.0	1011.1	1007.9	1002.8	1000.2	1006.6	25
TEMPERATURE (DEGREES F)														
Mean	31.6	30.8	32.0	34.6	37.7	41.6	46.0	49.1	46.9	41.1	35.5	32.5	38.3	29
Mean Daily Maximum	34.4	33.4	34.8	37.8	40.9	44.7	48.7	51.6	50.3	45.0	38.8	35.6	41.3	25
Mean Daily Minimum	28.9	27.9	29.2	32.2	35.4	39.4	43.6	46.5	44.6	38.4	32.5	29.7	35.7	25
Extreme Highest	44	41	42	44	48	57	63	60	58	54	48	46	63	26
Extreme Lowest	13	7	11	21	25	27	37	38	33	26	15	15	7	26
RELATIVE HUMIDITY														
Average Percentage	83.1	82.1	82.5	84.6	87.7	91.8	95.2	93.6	88.2	83.2	83.1	81.9	86.4	26
CLOUD COVER														
Average Amount (Tenths)	8.3	8.4	8.4	8.4	9.2	9.6	9.6	9.3	8.2	8.0	8.0	8.1	8.7	21
PRECIPITATION														
Mean Amount (Inches)	2.13	1.91	2.11	1.57	2.12	1.49	2.51	2.97	2.73	3.31	2.94	2.38	28.17	29
Greatest Amount (Inches)	4.63	5.03	4.66	4.46	5.44	3.60	8.71	7.24	5.06	8.59	7.96	6.00	0	26
Least Amount (Inches)	1.26	0.72	0.42	0.34	0.14	0.28	0.60	0.39	0.57	0.46	0.95	0.78	0	26
Maximum in 24 hrs. (Inches)	1.32	2.12	1.44	1.55	1.39	1.56	1.81	2.24	1.99	5.20	1.74	1.15	5.20	26
Mean Amount of Snow (Inches)	11.8	14.1	11.5	4.0	1.1	t	0.0	0.0	t	0.8	8.4	12.4	64.1	26
Mean Number of Days with Precipitation	29	26	28	25	26	25	26	26	23	29	28	29	318	22
Snow (Mean Number of Days)	25	25	25	20	9	1	0	0	1	8	21	24	159	22
WIND														
Percent of Observations with Gales	5.9	5.9	5.3	2.5	1.1	0.3	0.1	0.5	1.1	4.5	6.5	5.5	3.3	24
Mean Wind Speed (Knots)	18.0	18.2	18.0	16.3	14.9	12.2	11.6	12.1	14.0	17.5	18.9	18.0	15.8	23
Direction (Percentage of Obs.)														
North	4.7	7.3	6.0	4.8	6.9	6.4	3.0	4.2	6.3	4.9	5.6	5.3	5.4	23
North Northeast	6.6	9.4	7.2	5.2	6.2	5.3	3.0	3.2	4.7	3.0	4.4	5.9	5.3	23
Northeast	6.7	7.5	4.8	4.0	3.8	4.3	2.6	2.8	3.6	2.2	3.1	4.7	4.1	23
East Northeast	8.4	9.9	8.9	5.0	4.1	4.9	3.4	2.4	3.8	3.2	4.5	7.6	5.3	23
East	6.1	7.5	6.2	4.2	3.0	4.3	4.0	2.6	4.0	2.3	3.0	7.0	4.5	23
East Southeast	7.5	7.8	7.1	5.2	5.3	4.7	4.7	3.2	4.8	2.7	4.4	7.8	5.4	23
Southeast	7.7	4.6	6.1	5.2	5.8	6.4	6.4	4.4	5.5	3.6	4.4	5.5	5.5	23
South Southeast	6.5	4.1	5.2	5.6	4.7	5.5	6.7	5.0	3.9	3.8	5.2	4.9	5.1	23
South	4.7	4.3	5.0	6.8	6.4	6.2	9.4	8.3	6.7	5.3	5.3	4.8	6.1	23
South Southwest	4.6	4.4	6.6	7.1	6.4	5.7	8.2	8.7	5.5	6.7	5.9	4.5	6.2	23
Southwest	4.6	3.8	5.1	6.3	5.0	5.2	9.6	9.8	6.2	6.2	6.0	4.2	6.0	23
West Southwest	7.3	5.4	7.4	9.5	9.8	8.7	12.4	12.3	9.4	13.4	10.2	9.1	9.6	23
West	5.7	4.3	5.5	6.8	5.8	6.8	10.1	10.0	7.5	11.3	8.9	7.6	7.6	23
West Northwest	7.1	5.7	6.7	7.0	6.9	5.2	5.3	7.5	7.8	10.9	11.9	8.0	7.6	23
Northwest	4.5	5.6	5.7	8.8	9.4	9.4	5.4	8.2	9.5	10.2	8.6	5.3	7.6	23
North Northwest	5.3	6.4	6.6	6.9	8.7	8.4	3.8	5.7	8.5	9.1	7.6	4.7	6.8	23
Calm	2.1	2.3	2.1	1.6	1.7	2.7	2.1	1.8	2.3	1.2	1.2	3.1	2.0	23
Direction (Mean Speed, knots)														
North	15.8	17.7	17.6	13.6	13.4	12.2	10.6	11.8	13.4	15.3	16.7	16.7	14.8	23
North Northeast	18.4	19.1	19.6	15.8	14.3	11.8	11.2	11.6	14.1	13.9	17.9	16.9	16.0	23
Northeast	16.7	18.2	18.7	15.0	13.9	11.8	12.4	10.8	14.3	14.0	16.5	18.0	15.6	23
East Northeast	18.4	20.0	19.1	17.2	13.3	12.6	12.8	11.9	14.7	15.9	17.6	17.7	16.8	23
East	17.0	19.9	19.1	16.3	12.5	12.4	11.9	11.9	13.3	16.8	16.1	18.3	16.1	23
East Southeast	18.5	20.8	20.7	17.5	15.0	12.2	12.9	11.7	14.7	16.7	20.3	18.7	17.2	23
Southeast	21.7	18.6	20.6	17.3	15.5	13.0	12.0	11.0	14.2	19.9	21.4	20.1	17.1	23
South Southeast	22.2	18.8	21.4	19.7	17.0	14.2	12.2	12.6	14.9	20.7	23.0	21.8	18.1	23
South	20.4	18.5	18.2	18.4	16.5	12.2	12.1	13.2	15.2	21.2	22.2	21.0	16.8	23
South Southwest	19.8	20.0	18.4	18.4	16.5	11.8	11.9	12.9	14.1	18.7	21.0	21.7	16.7	23
Southwest	17.9	17.5	17.4	17.8	16.0	11.5	11.4	12.9	15.1	18.2	21.0	20.0	15.9	23
West Southwest	20.8	19.0	18.5	18.0	16.9	14.1	12.6	12.5	15.8	19.3	21.4	21.8	17.3	23
West	17.7	16.8	16.8	16.2	15.1	11.9	10.9	11.1	13.4	17.2	18.2	18.4	15.1	23
West Northwest	15.1	15.5	15.3	14.5	14.9	12.2	11.6	12.7	13.2	17.2	17.5	16.1	15.0	23
Northwest	16.6	17.0	15.0	14.4	14.7	12.8	11.9	12.7	13.7	17.0	17.5	15.7	14.9	23
North Northwest	16.5	17.8	16.9	14.7	14.3	12.7	11.5	12.5	14.4	17.3	17.7	15.1	15.3	23
VISIBILITY														
Mean Number of Days with Fog	12	9	13	16	19	23	30	27	17	14	12	10	203	22

ST PAUL ISLAND, ALASKA (57°09'N., 170°13'W.) Elevation 22 ft. (6.7m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1004.6	1001.4	1008.9	1008.9	1010.8	1012.2	1013.4	1009.8	1006.4	1003.7	1002.7	1003.8	1007.2	19
TEMPERATURE (DEGREES F)														
Mean	26.1	23.0	23.8	28.5	34.9	40.9	45.7	47.5	44.4	37.6	33.2	27.8	34.5	29
Mean Daily Maximum	30.1	27.4	28.6	32.5	38.8	45.0	49.4	50.8	48.2	41.7	36.9	31.7	38.4	29
Mean Daily Minimum	22.0	18.6	19.0	24.4	31.0	36.7	42.0	44.1	40.6	33.8	29.5	23.8	30.5	29
Extreme Highest	48	44	44	44	56	62	63	64	59	54	50	52	64	56
Extreme Lowest	-26	-15	-19	-2	8	24	28	30	25	13	9	-5	-26	56
RELATIVE HUMIDITY														
Average Percentage	85.6	86.3	85.1	88.1	90.2	91.7	94.8	93.6	89.0	82.8	84.4	82.7	87.9	25
CLOUD COVER														
Average Amount (Tenths)	8.0	8.0	8.0	8.5	9.0	9.1	9.5	9.5	8.8	8.3	8.2	8.1	8.6	23
PRECIPITATION														
Mean Amount (Inches)	1.84	1.37	1.26	1.09	1.28	1.25	2.23	3.44	3.02	3.15	2.58	2.03	24.54	29
Greatest Amount (Inches)	4.99	5.69	3.28	3.10	3.11	3.59	5.85	9.32	6.02	5.18	5.31	4.18	0	51
Least Amount (Inches)	0.25	0.33	0.08	0.16	0.21	0.18	0.32	1.32	1.05	1.03	0.67	0.08	0	51
Maximum in 24 hrs. (Inches)	1.38	1.51	1.26	1.00	1.27	1.48	1.92	1.91	1.58	1.93	1.76	1.15	1.93	51
Mean Amount of Snow (Inches)	12.8	10.3	9.4	5.8	2.3	0.1	0.0	0.0	0.1	2.7	5.9	9.7	59.1	50
Mean Number of Days with Precipitation	25	24	26	24	26	23	27	27	26	29	28	27	310	21
Snow (Mean Number of Days)	21	22	24	21	13	2	0	0	1	14	20	23	267	21
WIND														
Percent of Observations with Gales	3.9	4.7	3.2	1.5	0.3	*	0	0.2	0.9	3.1	2.8	3.5	2.1	24
Mean Wind Speed (Knots)	17.0	17.8	16.3	15.1	13.4	11.4	10.7	12.4	13.5	16.5	16.6	17.4	14.9	25
Direction (Percentage of Obs.)														
North	9.9	12.2	9.4	8.6	9.5	7.1	5.1	4.4	7.7	9.5	9.4	10.4	8.6	25
North Northeast	10.1	14.8	9.5	7.5	7.5	6.5	3.6	3.1	5.6	6.0	10.2	12.6	8.2	25
Northeast	7.1	8.8	7.4	8.1	5.8	7.4	3.4	2.6	4.8	3.5	5.7	8.3	6.1	25
East Northeast	9.0	8.2	9.7	6.3	6.2	7.7	4.2	2.7	3.0	3.3	6.6	7.7	6.3	25
East	10.5	7.0	8.1	5.1	6.1	5.9	6.2	3.5	4.1	3.9	6.3	6.8	6.1	25
East Southeast	7.5	6.5	6.3	6.6	6.0	7.5	5.4	3.4	3.7	3.5	5.3	6.2	5.7	25
Southeast	6.5	5.6	4.5	4.3	5.2	6.1	6.2	4.9	4.2	3.1	3.7	5.0	4.9	25
South Southeast	5.0	4.6	4.5	4.6	5.2	4.5	5.4	5.5	5.2	3.4	4.5	4.5	4.7	25
South	6.1	5.3	5.4	6.7	7.4	8.1	9.4	10.1	7.2	5.8	5.5	5.1	6.8	25
South Southwest	4.1	4.6	4.7	4.5	6.5	4.3	8.9	10.5	6.5	4.7	4.5	4.0	5.6	25
Southwest	3.2	3.5	3.3	4.5	4.4	3.8	6.8	10.5	5.2	5.3	5.3	3.6	4.9	25
West Southwest	2.7	3.6	3.3	5.0	5.1	5.5	8.1	9.4	5.1	5.6	5.2	2.5	5.0	25
West	3.1	3.4	3.7	4.0	4.3	5.7	8.8	9.1	7.5	9.2	6.3	3.8	5.7	25
West Northwest	3.0	2.6	3.7	5.3	4.0	4.5	4.7	5.5	6.9	8.4	5.1	3.7	4.8	25
Northwest	4.1	2.7	6.6	8.8	6.8	7.1	6.8	8.0	12.1	13.7	8.6	7.2	7.7	25
North Northwest	5.5	5.1	8.1	8.7	8.6	7.5	5.2	5.2	9.4	9.4	6.3	6.8	7.2	25
Calm	2.5	1.6	1.8	1.4	1.4	1.0	1.7	1.6	1.8	1.5	1.4	1.7	1.6	25
Direction (Mean Speed, knots)														
North	18.5	19.2	16.9	16.6	14.4	12.1	10.7	12.9	13.5	15.9	16.8	17.0	16.0	21
North Northeast	17.4	18.3	14.5	14.0	15.5	13.1	11.7	11.9	13.4	16.6	15.6	17.9	15.8	25
Northeast	19.1	19.8	18.2	14.4	15.4	12.6	11.6	14.0	14.4	16.5	16.6	20.2	16.7	25
East Northeast	18.9	19.8	19.5	15.4	14.6	11.3	10.8	13.4	13.7	18.7	17.9	19.5	16.9	25
East	18.3	19.4	18.8	16.0	12.7	11.5	10.1	12.5	13.9	19.6	18.4	19.9	16.4	25
East Southeast	17.1	17.7	16.4	15.0	12.8	10.3	9.7	11.9	13.6	18.1	19.4	19.1	15.3	25
Southeast	16.8	16.0	14.6	14.4	12.7	11.5	10.4	12.0	13.1	18.9	17.9	19.2	14.6	25
South Southeast	16.0	16.9	14.5	14.7	12.7	10.1	10.4	11.6	15.8	17.7	17.7	17.8	14.6	25
South	16.5	18.3	15.5	16.1	12.4	10.3	10.4	12.5	14.5	18.1	18.3	16.9	14.5	25
South Southwest	17.2	18.8	15.7	15.4	13.1	11.3	10.9	13.5	15.0	16.7	17.7	17.9	14.8	25
Southwest	16.3	16.9	16.1	15.1	13.9	11.5	10.9	13.9	14.6	16.0	16.5	16.4	14.6	25
West Southwest	15.8	16.5	16.6	14.0	11.8	10.5	11.4	12.4	13.0	16.7	16.7	15.9	13.9	25
West	14.7	15.8	14.5	14.0	11.2	11.2	11.5	11.2	11.5	15.0	14.2	15.5	13.0	25
West Northwest	14.7	16.1	14.8	13.9	13.1	10.7	11.3	11.9	11.5	14.7	15.1	13.9	13.4	25
Northwest	16.4	14.8	16.2	16.1	13.9	12.6	12.2	12.9	13.7	16.7	16.3	15.3	14.9	25
North Northwest	17.7	17.4	16.7	17.1	14.5	12.7	11.2	13.0	14.4	17.5	17.0	16.9	15.7	25
VISIBILITY														
Mean Number of Days with Fog	12	10	12	15	20	24	26	26	15	9	10	9	190	21

BETHEL, ALASKA (60°47'N., 161°48'W.) Elevation 125 ft. (38.1m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1010.1	1009.0	1010.2	1010.6	1009.6	1012.0	1013.1	1010.4	1007.0	1002.0	1003.5	1008.0	1008.6	20
TEMPERATURE (DEGREES F)														
Mean	5.1	8.2	11.4	24.5	40.1	51.6	54.7	52.3	45.0	30.2	17.2	4.4	28.7	29
Mean Daily Maximum	12.3	15.8	20.3	32.7	48.5	60.2	61.9	58.5	51.8	36.1	23.6	11.3	36.1	29
Mean Daily Minimum	-2.2	0.5	2.5	16.3	31.7	43.0	47.4	46.0	38.2	24.3	10.8	-2.5	21.3	29
Extreme Highest	46	47	48	58	76	86	86	81	70	57	48	42	86	20
Extreme Lowest	-52	-45	-42	-31	-5	28	31	33	18	-5	-27	-44	-52	20
RELATIVE HUMIDITY														
Average Percentage	77.6	76.6	78.3	81.8	78.6	76.7	81.7	87.2	86.2	86.3	83.1	76.7	80.9	20
CLOUD COVER														
Average Amount (Tenths)	6.0	5.9	6.0	6.6	7.8	8.0	8.4	8.9	7.9	7.2	6.8	6.2	7.1	20
PRECIPITATION														
Mean Amount (Inches)	0.54	0.74	0.79	0.43	0.83	1.24	1.98	3.97	2.42	1.32	0.96	0.62	15.84	29
Greatest Amount (Inches)	6.48	3.61	3.09	1.30	2.25	3.32	5.69	12.37	5.21	3.24	1.88	6.17	0	20
Least Amount (Inches)	0.08	0.09	0.02	0.13	0.02	0.30	0.49	1.71	1.23	0.29	0.10	0.05	0	20
Maximum in 24 hrs. (Inches)	1.76	0.95	1.21	0.37	0.73	0.95	3.10	2.30	1.50	1.88	0.88	0.81	3.10	20
Mean Amount of Snow (Inches)	9.5	8.8	10.9	5.3	1.5	0.1	0.0	0.0	0.4	4.6	7.2	9.6	56.5	20
Mean Number of Days with Precipitation	20	18	20	19	20	20	22	26	23	21	21	22	251	20
Snow (Mean Number of Days)	19	17	19	17	7	1	0	0	2	15	19	21	137	20
WIND														
Percent of Observations with Gales	0.4	0.4	0.3	*	*	*	0	*	0.1	*	0.2	0.1	0.1	20
Mean Wind Speed (Knots)	10.6	11.4	10.7	10.0	9.1	8.9	8.7	9.1	9.2	9.6	9.9	10.3	9.8	20
Direction (Percentage of Obs.)														
North	12.4	14.7	12.3	10.4	9.4	5.0	4.7	3.9	7.6	9.4	10.4	11.9	9.3	20
North Northeast	19.1	19.0	12.3	8.2	5.2	2.6	3.1	3.3	7.7	11.9	17.8	19.9	10.8	20
Northeast	17.2	17.0	9.8	5.6	5.0	3.3	2.6	4.3	7.8	11.4	12.6	14.3	9.2	20
East Northeast	6.9	4.4	4.2	3.3	4.8	2.5	2.3	3.9	4.9	6.1	7.0	4.6	4.6	20
East	4.3	3.6	4.2	4.4	6.3	4.6	3.1	4.4	5.3	4.0	5.4	3.2	4.4	20
East Southeast	3.8	3.4	3.4	4.8	7.1	4.1	2.7	3.7	4.5	4.1	4.1	2.3	4.0	20
Southeast	4.2	3.0	3.8	3.5	5.7	4.7	3.8	4.4	4.9	4.1	4.7	2.7	4.1	20
South Southeast	4.2	4.1	4.4	4.0	5.3	5.0	5.0	6.6	6.5	5.2	4.8	4.0	4.9	20
South	4.6	5.6	7.2	8.4	9.4	9.9	11.9	11.3	8.5	7.0	7.7	6.4	8.2	20
South Southwest	2.4	3.6	4.2	4.3	6.7	8.5	14.6	14.4	6.7	3.5	2.8	3.2	6.3	20
Southwest	1.8	2.5	3.7	4.7	4.9	8.4	10.8	10.0	4.8	2.8	2.5	2.4	5.0	20
West Southwest	1.1	1.2	2.7	3.2	2.9	5.6	5.5	5.5	3.6	2.8	1.6	1.4	3.1	20
West	1.1	1.4	3.2	3.7	3.6	5.5	5.0	5.2	3.2	3.0	2.0	1.5	3.2	20
West Northwest	1.8	2.7	4.0	5.1	4.6	7.3	6.5	5.1	4.5	4.8	2.2	2.7	4.3	20
Northwest	4.3	5.7	10.1	12.1	9.7	12.8	9.0	5.9	8.3	8.0	5.1	6.1	8.1	20
North Northwest	5.5	5.9	7.6	11.2	7.4	8.0	6.9	4.7	8.1	8.6	5.3	8.6	7.3	20
Calm	5.4	2.1	3.0	3.1	2.2	2.2	2.5	3.2	3.1	3.4	4.1	4.7	3.3	20
Direction (Mean Speed, knots)														
North	9.7	10.6	9.8	9.3	8.4	7.9	7.4	7.5	8.6	8.9	9.0	9.3	9.2	20
North Northeast	13.3	13.6	13.5	11.7	9.0	8.0	8.0	8.4	9.6	11.9	12.7	13.8	12.4	20
Northeast	12.0	11.9	10.8	10.4	7.4	7.1	5.8	7.4	8.9	10.7	11.5	11.4	10.6	20
East Northeast	9.5	9.6	9.7	9.4	8.9	7.1	6.8	7.8	8.7	9.1	10.2	8.6	9.0	20
East	8.6	8.7	8.9	8.2	8.6	7.5	6.4	6.7	7.0	7.1	8.3	8.7	7.9	20
East Southeast	10.0	10.8	9.6	9.0	8.8	8.0	6.7	7.2	7.7	8.3	9.1	9.3	8.7	20
Southeast	10.4	10.4	10.9	8.7	8.5	7.5	7.1	7.5	8.0	7.8	8.7	9.5	8.7	20
South Southeast	14.0	14.9	14.6	12.2	11.0	10.5	10.0	11.7	10.9	11.5	11.4	11.8	11.9	20
South	12.6	13.7	12.9	12.3	11.3	10.3	10.8	12.0	11.9	10.9	10.4	10.9	11.6	20
South Southwest	12.1	13.6	12.2	11.3	11.1	10.4	11.1	12.1	11.7	11.0	10.5	10.7	11.4	20
Southwest	8.9	12.1	9.1	10.3	9.2	9.1	9.0	9.4	9.5	10.9	8.2	8.8	9.4	20
West Southwest	11.4	9.8	9.2	10.0	8.4	8.9	8.5	9.1	9.2	9.6	8.4	10.0	9.1	20
West	8.3	9.3	9.8	9.1	8.3	8.5	7.7	8.3	8.3	8.6	8.4	8.7	8.5	20
West Northwest	10.3	10.5	11.0	10.6	9.6	9.3	8.5	8.8	9.8	9.8	9.2	9.6	9.6	20
Northwest	10.3	9.2	10.5	10.5	9.1	10.1	8.8	8.1	9.6	9.4	9.1	8.8	9.6	20
North Northwest	9.6	10.1	9.5	10.1	8.9	9.4	8.6	8.2	9.4	9.5	9.4	10.5	9.5	20
VISIBILITY														
Mean Number of Days with Fog	11	8	10	10	9	9	14	19	13	10	10	10	135	20
Days with Visibility less than 1/2 mile	4.7	3.0	3.0	2.2	2.2	1.8	2.7	3.5	2.6	3.1	3.8	4.7	37.3	12

NOME, ALASKA (64°30'N., 162°26'W.) Elevation 13 ft. (4.0m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1012.5	1011.1	1012.4	1012.2	1012.2	1012.1	1011.8	1008.9	1007.5	1003.5	1006.5	1009.3	1010.0	25
TEMPERATURE (DEGREES F)														
Mean	6.0	5.2	7.4	18.9	34.8	45.5	50.1	49.2	42.1	26.5	15.6	4.4	25.6	29
Mean Daily Maximum	13.5	13.7	16.6	27.0	41.4	52.2	55.8	54.6	48.2	34.4	22.1	11.7	32.6	29
Mean Daily Minimum	-1.6	-3.3	-1.9	10.8	28.1	38.8	44.4	43.7	35.9	22.6	9.1	-3.0	18.6	29
Extreme Highest	43	47	42	51	75	81	86	83	65	59	44	43	86	25
Extreme Lowest	-39	-42	-42	-30	-11	25	32	27	16	-10	-39	-41	-42	25
RELATIVE HUMIDITY														
Average Percentage	75.3	73.6	74.4	78.8	78.8	80.2	84.5	84.8	80.7	78.3	77.6	73.9	78.4	25
CLOUD COVER														
Average Amount (Tenths)	5.8	5.2	5.8	6.2	6.9	7.1	7.9	8.3	7.4	6.7	6.5	5.5	6.6	25
PRECIPITATION														
Mean Amount (Inches)	0.90	0.84	0.79	0.73	0.70	0.95	2.42	3.57	2.40	1.42	0.98	0.74	16.44	29
Greatest Amount (Inches)	2.10	1.46	1.95	2.15	1.28	3.04	4.23	7.82	5.72	3.84	2.53	2.16	0	27
Least Amount (Inches)	t	t	t	0.02	0.12	0.04	0.25	0.40	0.39	0.02	0.03	0.03	0	27
Maximum in 24 hrs. (Inches)	1.23	0.52	0.65	0.56	0.70	2.03	1.77	2.38	1.28	2.28	0.79	1.09	2.38	27
Mean Amount of Snow (Inches)	9.6	5.7	7.4	6.5	1.9	0.1	0.0	t	0.4	5.1	10.1	7.7	54.5	27
Mean Number of Days with Precipitation	19	15	19	18	17	17	20	23	19	18	20	18	223	25
Snow (Mean Number of Days)	18	15	19	17	10	1	0	**	3	14	20	18	134	25
WIND														
Percent of Observations with Gales	0.9	0.9	0.4	0.1	0.1	0	*	0.1	0.1	0.4	0.4	0.5	0.4	24
Mean Wind Speed (Knots)	10.6	9.9	9.0	9.7	9.1	8.8	8.7	9.7	10.2	10.3	10.5	9.1	9.6	25
Direction (Percentage of Obs.)														
North	10.0	9.7	10.4	9.9	9.5	5.0	4.4	7.5	13.9	16.0	14.0	13.6	10.3	25
North Northeast	7.7	7.9	7.3	6.2	7.4	2.8	1.7	3.4	7.3	8.9	8.6	8.2	6.4	25
Northeast	12.0	13.2	11.6	9.1	7.9	3.3	2.5	4.4	9.5	12.3	12.5	10.5	9.0	25
East Northeast	12.4	11.1	10.5	9.7	6.7	3.0	2.7	4.6	6.7	9.4	13.9	11.2	8.5	25
East	20.6	13.7	13.7	12.7	9.5	4.6	4.6	5.4	7.0	7.3	13.3	14.6	10.6	25
East Southeast	5.0	5.1	4.6	5.3	7.2	5.3	4.8	4.9	4.7	3.6	4.8	4.2	5.0	25
Southeast	2.7	3.1	3.4	3.6	6.6	6.7	6.9	6.4	4.9	3.8	3.2	2.3	4.5	25
South Southeast	1.5	1.7	1.5	3.2	4.1	4.7	6.7	5.5	4.9	3.3	1.6	1.4	3.4	25
South	1.5	2.3	1.6	4.1	4.4	6.0	9.4	8.6	4.8	3.5	1.7	1.5	4.1	25
South Southwest	0.7	1.2	0.9	2.2	2.7	4.4	7.9	7.5	3.7	1.7	0.8	0.8	2.9	25
Southwest	1.6	1.3	1.9	4.9	6.4	9.6	10.7	10.4	5.3	2.4	1.6	0.9	4.8	25
West Southwest	1.2	1.1	1.7	2.8	6.1	15.0	12.1	6.9	3.7	1.4	1.0	0.9	4.5	25
West	1.9	3.0	3.4	4.0	5.5	12.8	9.5	5.7	2.9	1.7	1.1	1.9	4.5	25
West Northwest	2.2	2.8	3.3	3.9	3.3	5.1	4.7	5.1	4.3	3.4	2.6	3.0	3.6	25
Northwest	3.8	4.5	5.2	5.6	3.7	4.4	4.9	5.8	6.2	8.2	6.3	6.1	5.4	25
North Northwest	3.8	5.0	4.8	4.8	4.1	3.5	2.9	4.8	6.1	8.9	6.3	6.5	5.1	25
Calm	11.4	13.6	14.3	8.1	5.0	3.8	3.4	3.1	4.1	4.4	6.9	12.3	7.5	25
Direction (Mean Speed, knots)														
North	8.0	7.9	7.9	8.7	9.3	8.2	7.0	7.8	9.1	8.2	7.7	8.0	8.2	25
North Northeast	11.5	12.4	12.6	11.8	12.4	9.5	6.8	8.7	10.7	10.6	9.8	9.3	10.9	25
Northeast	13.3	13.1	11.9	12.5	12.0	9.4	7.1	9.0	10.6	10.1	11.6	10.7	11.5	25
East Northeast	14.6	14.8	14.0	13.5	11.9	10.0	8.5	9.9	11.0	11.8	13.6	13.7	13.0	25
East	14.7	14.7	12.2	12.7	11.1	10.0	9.0	10.1	11.2	11.8	14.7	14.2	13.0	25
East Southeast	12.6	11.4	11.6	10.6	11.0	10.3	10.2	11.9	12.8	15.3	14.1	11.8	11.8	26
Southeast	9.0	9.1	8.4	9.7	9.3	8.9	9.5	11.2	11.9	15.1	13.2	8.9	10.3	25
South Southeast	12.1	10.2	9.0	10.9	8.3	7.8	9.7	10.8	13.4	16.8	14.4	11.2	11.0	25
South	11.0	10.1	8.3	10.3	7.2	6.8	8.8	10.0	11.2	15.3	14.8	10.1	9.8	25
South Southwest	12.1	12.5	11.6	10.1	7.8	7.2	9.9	11.9	11.8	14.3	14.8	10.3	10.5	25
Southwest	10.0	9.0	9.3	11.4	8.1	7.9	8.3	11.0	11.3	14.4	15.1	8.0	9.8	25
West Southwest	10.4	9.0	8.3	8.2	8.4	10.7	10.3	10.2	11.6	12.2	13.0	8.5	10.2	25
West	8.8	8.8	8.2	7.7	8.1	10.6	10.2	10.1	10.1	9.4	9.6	8.2	9.5	25
West Northwest	8.7	9.2	8.3	8.2	7.6	9.1	8.6	9.2	9.7	8.9	9.2	8.0	8.7	25
Northwest	6.7	6.3	6.8	7.3	6.8	7.2	7.5	8.6	8.8	8.7	7.8	6.7	7.6	25
North Northwest	7.9	6.6	7.0	6.4	7.3	7.9	6.4	8.0	8.5	7.9	6.7	6.8	7.3	25
VISIBILITY														
Mean Number of Days with Fog	9	6	9	9	10	12	17	15	9	5	7	8	116	25
Days with Visibility less than 1/2 mile	5.4	4.1	3.4	2.2	2.6	4.6	3.0	2.1	0.5	1.1	3.1	3.2	35.3	12

KOTZEBUE, ALASKA (66°52'N., 162°38'W.) Elevation 10 ft. (3.0m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1016.4	1014.7	1015.2	1014.1	1013.6	1012.1	1011.5	1009.2	1009.2	1006.5	1009.5	1012.2	1012.0	25
TEMPERATURE (DEGREES F)														
Mean	-3.7	-4.3	-0.5	13.0	30.8	43.5	52.9	50.7	41.1	23.6	7.7	-3.9	20.9	29
Mean Daily Maximum	3.2	3.3	8.1	22.3	37.8	49.6	58.7	55.9	46.5	28.7	13.4	2.6	27.5	29
Mean Daily Minimum	-10.6	-11.8	-9.1	3.7	23.7	37.3	47.1	45.4	35.7	18.5	2.0	-10.3	14.3	29
Extreme Highest	39	35	39	46	74	83	85	80	68	51	38	36	85	31
Extreme Lowest	-47	-52	-48	-44	-18	20	34	31	15	-13	-36	-47	-52	31
RELATIVE HUMIDITY														
Average Percentage	72.4	72.0	72.7	78.4	82.6	84.3	83.1	84.7	82.9	81.5	77.2	73.6	78.8	25
CLOUD COVER														
Average Amount (Tenths)	5.3	5.0	5.4	5.9	6.5	6.8	7.7	8.3	7.2	6.6	6.4	5.4	6.4	25
PRECIPITATION														
Mean Amount (Inches)	0.29	0.30	0.33	0.33	0.40	0.52	1.55	2.26	1.43	0.61	0.41	0.33	8.76	29
Greatest Amount (Inches)	1.77	1.13	1.23	1.34	0.94	1.32	2.98	5.18	2.85	1.53	1.31	0.79	0	31
Least Amount (Inches)	t	0.01	t	t	0.03	0.01	0.45	0.38	0.03	0.04	0.09	0.02	0	31
Maximum in 24 hrs. (Inches)	0.81	0.68	0.47	0.36	0.56	0.80	1.78	1.48	0.94	0.54	0.36	0.40	1.78	31
Mean Amount of Snow (Inches)	6.2	5.2	5.9	5.2	1.8	0.2	t	t	1.1	7.0	8.3	7.0	47.9	30
Mean Number of Days with Precipitation	17	14	17	16	15	14	17	22	18	18	19	17	203	25
Snow (Mean Number of Days)	16	14	17	15	9	1	**	**	4	16	19	17	129	25
WIND														
Percent of Observations with Gales	2.1	2.3	1.1	0.8	*	*	*	0.1	0.1	0.3	1.3	1.8	0.8	25
Mean Wind Speed (Knots)	12.5	11.5	10.7	10.9	9.3	10.4	11.1	11.5	11.3	11.4	12.1	10.9	11.1	25
Direction (Percentage of Obs.)														
North	4.1	5.3	4.5	4.6	4.9	3.0	2.7	4.3	8.4	10.7	6.3	5.9	5.4	25
North Northeast	5.2	5.3	5.2	5.1	4.8	1.7	1.6	2.8	5.6	9.1	7.4	6.8	5.0	25
Northeast	9.6	10.3	8.8	6.8	6.3	2.2	1.6	3.2	5.7	10.4	10.5	12.5	7.3	25
East Northeast	8.6	10.5	8.7	6.2	6.3	2.3	2.1	3.7	7.4	12.5	14.4	12.9	8.0	25
East	18.9	15.8	15.8	9.5	8.3	3.0	3.2	7.0	13.0	14.4	19.6	18.1	12.2	25
East Southeast	22.0	14.1	14.3	12.8	8.9	3.4	5.2	9.4	15.8	17.0	19.2	14.4	13.0	25
Southeast	4.3	3.3	3.9	5.2	5.3	4.1	7.5	9.0	6.3	4.6	3.6	3.7	5.1	25
South Southeast	1.7	2.1	2.0	4.0	3.9	3.5	5.4	6.3	3.1	1.6	1.3	1.2	3.0	25
South	1.5	2.0	2.2	3.1	3.4	3.8	6.1	5.6	2.4	1.2	1.2	1.1	2.8	25
South Southwest	1.1	1.6	2.0	3.0	2.8	3.9	4.7	3.5	1.6	0.7	0.7	0.9	2.2	25
Southwest	2.4	2.8	3.3	4.4	5.5	7.2	7.1	4.8	2.9	1.5	1.2	1.4	3.7	25
West Southwest	2.3	3.7	5.1	6.1	7.7	10.3	8.5	5.8	2.8	1.8	0.9	1.6	4.7	25
West	3.9	6.2	7.8	10.3	12.1	24.6	16.8	11.6	4.8	1.9	1.9	3.8	8.8	25
West Northwest	4.7	6.1	7.0	9.4	10.5	18.9	18.8	13.7	7.1	2.1	2.1	3.7	8.7	25
Northwest	3.1	2.6	2.4	2.8	3.2	4.1	4.7	4.7	6.1	3.6	3.2	3.4	3.7	25
North Northwest	3.0	3.0	2.4	2.6	2.6	2.5	2.5	3.0	5.5	5.6	4.0	3.7	3.4	25
Calm	3.6	5.3	4.7	4.2	3.5	1.6	1.6	1.6	1.6	1.4	2.5	5.0	3.0	25
Direction (Mean Speed, knots)														
North	8.3	9.0	8.7	8.2	7.7	8.9	8.6	9.8	11.0	11.1	8.3	9.1	9.4	25
North Northeast	6.4	7.2	7.0	7.0	6.5	6.2	6.9	7.3	7.7	7.8	7.3	6.3	7.1	25
Northeast	6.5	7.6	7.3	7.6	6.7	6.6	6.6	6.9	7.8	7.2	7.0	6.1	7.0	25
East Northeast	8.7	8.9	9.1	9.7	9.6	8.2	7.5	8.5	9.5	8.9	9.3	7.9	8.9	25
East	15.3	16.5	14.0	14.4	12.3	11.4	9.4	11.0	12.3	13.4	14.9	14.6	14.0	25
East Southeast	18.4	18.0	16.1	16.0	12.2	10.5	10.5	12.3	13.0	15.4	17.6	17.2	15.7	25
Southeast	13.5	12.7	12.0	13.2	11.4	10.9	12.3	12.9	12.4	13.8	14.2	13.3	12.7	25
South Southeast	12.7	12.1	10.2	14.4	11.3	11.0	12.0	13.2	12.1	15.0	14.6	12.7	12.5	25
South	10.2	8.8	7.2	10.2	9.6	9.6	10.5	11.5	12.1	11.6	13.2	11.0	10.4	25
South Southwest	9.9	7.8	6.7	7.7	7.1	7.8	10.1	11.7	10.8	12.6	11.8	8.0	9.1	25
Southwest	11.0	9.2	6.3	7.7	7.0	7.7	9.6	11.3	12.0	12.2	13.8	9.8	9.1	25
West Southwest	11.4	9.9	9.0	10.1	8.3	9.3	10.7	11.6	11.7	13.3	13.3	10.0	10.1	25
West	12.4	13.1	11.8	11.3	10.1	12.4	12.8	12.7	11.1	12.7	15.7	12.6	12.1	25
West Northwest	15.4	13.9	14.0	12.4	11.6	12.6	13.4	13.3	12.9	12.4	14.0	13.5	13.1	25
Northwest	11.3	9.1	9.8	9.8	7.7	9.2	10.4	11.5	12.3	12.3	13.8	14.2	11.1	25
North Northwest	11.1	9.4	9.3	8.6	8.6	8.5	9.0	10.7	12.4	12.4	11.2	11.8	10.7	25
VISIBILITY														
Mean Number of Days with Fog	7	7	8	9	10	11	9	9	6	6	6	8	93	25

BARROW, ALASKA (71°18'N., 156°47'W.) Elevation 31 ft. (9.5m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1020.5	1021.6	1020.8	1018.9	1018.6	1015.0	1012.8	1011.8	1012.8	1010.1	1014.5	1017.6	1016.2	22
TEMPERATURE (DEGREES F)														
Mean	-14.7	-18.6	-15.2	-0.9	19.1	33.0	38.7	37.6	30.3	15.3	-0.5	-12.3	9.3	29
Mean Daily Maximum	-8.0	-12.6	-8.6	6.5	24.2	37.1	44.3	42.0	33.4	20.2	5.4	-6.4	14.8	29
Mean Daily Minimum	-21.3	-24.6	-21.8	-8.2	14.0	28.9	33.0	33.1	27.2	10.4	-6.4	-18.1	3.8	29
Extreme Highest	35	32	33	42	45	70	78	76	62	43	39	34	78	53
Extreme Lowest	-53	-56	-52	-42	-18	4	22	20	1	-32	-40	-55	-56	53
RELATIVE HUMIDITY														
Average Percentage	65.0	63.2	63.5	71.2	85.8	91.8	91.2	92.6	90.4	84.2	74.9	65.8	79.0	23
CLOUD COVER														
Average Amount (Tenths)	4.8	4.7	4.6	5.6	8.3	8.3	8.2	9.1	9.2	8.6	6.9	5.2	7.0	23
PRECIPITATION														
Mean Amount (inches)	0.23	0.20	0.19	0.21	0.17	0.35	0.88	1.04	0.58	0.55	0.30	0.19	4.89	29
Greatest Amount (inches)	1.04	0.81	1.49	1.36	0.81	1.15	2.44	2.81	1.56	1.65	1.15	0.76	0	53
Least Amount (inches)	0.00	0.00	0.00	0.00	t	t	t	t	0.01	0.12	t	0.00	0	53
Maximum in 24 hrs. (inches)	0.70	0.36	0.71	0.42	0.30	0.82	0.86	0.83	0.56	1.00	0.41	0.26	1.00	52
Mean Amount of Snow (inches)	2.3	2.2	1.9	2.3	2.0	0.5	0.7	0.7	3.1	7.1	3.8	2.7	29.3	53
Mean Number of Days with Precipitation	21	19	21	19	26	22	21	25	26	27	23	22	270	23
Snow (Mean Number of Days)	18	16	18	16	21	11	5	7	18	24	20	19	193	23
WIND														
Percent of Observations with Gales	0.3	0.3	0.3	*	0	*	*	*	*	0.2	0.4	0.2	0.1	23
Mean Wind Speed (Knots)	10.3	9.9	9.9	10.0	10.5	10.1	10.2	11.0	11.2	11.8	11.8	9.9	10.6	23
Direction (Percentage of Obs.)														
North	3.9	4.6	5.0	4.6	3.5	4.5	5.0	5.4	4.3	2.4	2.4	3.0	4.0	23
North Northeast	4.0	3.1	4.3	5.2	4.0	4.3	5.0	5.3	4.2	4.0	2.6	4.2	4.2	23
Northeast	8.7	10.2	14.4	12.2	11.6	7.4	6.4	7.3	8.5	11.5	12.2	12.0	10.2	23
East Northeast	13.9	14.4	15.7	13.3	19.4	14.0	12.9	10.9	14.3	15.9	19.1	18.2	15.2	23
East	11.9	15.4	13.0	12.3	18.0	19.4	15.1	15.5	15.6	15.3	14.6	12.9	14.9	23
East Southeast	9.9	6.9	6.6	8.7	10.9	12.0	7.0	9.9	11.8	9.4	8.2	6.0	8.9	23
Southeast	5.1	3.8	4.5	5.5	5.6	4.6	4.0	5.2	6.2	7.2	6.3	4.7	5.2	23
South Southeast	2.6	2.0	1.8	3.2	2.2	2.0	2.8	3.4	4.4	5.4	4.1	2.4	3.0	23
South	5.3	3.9	4.0	5.6	3.5	2.2	2.8	3.7	5.1	7.7	6.7	4.4	4.6	23
South Southwest	4.7	3.4	4.5	4.5	2.8	2.0	2.8	3.2	2.7	4.1	4.0	3.6	3.5	23
Southwest	5.1	4.4	4.6	4.2	3.2	3.9	6.6	4.6	2.9	2.9	2.7	4.3	4.1	23
West Southwest	5.2	4.1	4.0	3.7	2.8	6.5	9.1	6.5	2.9	2.0	3.2	4.4	4.5	23
West	6.2	7.8	6.2	4.7	3.2	6.6	8.6	6.5	4.1	3.1	4.3	6.8	5.6	23
West Northwest	4.7	6.8	4.3	4.3	2.3	3.9	4.6	5.1	4.8	3.3	4.0	4.7	4.4	23
Northwest	3.8	4.5	3.3	3.9	3.2	3.2	3.9	3.6	3.9	2.5	2.9	3.6	3.5	23
North Northwest	3.2	3.2	2.2	2.5	2.6	2.7	2.6	3.1	2.9	2.1	1.9	2.1	2.6	23
Calm	1.8	1.7	1.5	1.4	1.1	0.8	0.9	0.7	1.2	1.1	0.9	2.7	1.3	23
Direction (Mean Speed, knots)														
North	8.2	6.6	7.7	7.6	7.7	6.7	6.2	6.9	8.6	9.9	8.9	7.8	7.6	23
North Northeast	9.4	7.4	9.5	8.7	9.0	7.9	7.6	9.1	9.8	11.5	9.4	8.1	9.0	23
Northeast	9.6	8.9	10.2	10.1	10.2	8.8	9.9	10.8	10.9	12.6	12.0	10.4	10.4	23
East Northeast	11.2	11.8	12.0	11.5	12.2	11.3	12.2	13.1	13.4	13.7	13.8	12.0	12.4	23
East	11.9	11.8	11.1	11.2	12.1	12.5	11.8	13.3	12.7	12.9	12.8	10.5	12.1	23
East Southeast	13.4	11.6	11.2	12.0	11.8	11.9	11.3	12.3	12.0	11.1	11.0	10.4	11.7	23
Southeast	10.0	8.2	9.1	9.5	9.8	9.4	10.3	9.6	9.3	9.6	9.3	9.6	9.5	23
South Southeast	8.4	7.1	7.8	9.0	7.9	8.7	10.0	9.1	9.4	9.2	9.2	8.1	8.8	23
South	9.1	8.3	7.9	8.8	8.4	8.2	9.8	9.8	9.3	10.0	9.7	7.1	9.0	23
South Southwest	9.7	9.2	9.0	10.2	9.1	9.3	10.9	11.8	11.2	11.2	12.3	8.5	10.2	23
Southwest	9.8	9.7	8.6	9.3	9.8	9.7	10.8	11.3	11.2	12.3	13.3	8.9	10.2	23
West Southwest	12.0	11.0	11.2	10.5	10.4	10.5	11.4	12.1	12.3	13.9	13.6	10.4	11.5	23
West	11.2	10.9	10.1	10.9	9.5	9.0	9.7	10.4	11.8	14.0	13.4	11.4	10.6	23
West Northwest	9.4	10.3	9.9	10.4	8.9	8.3	8.4	10.6	12.4	12.8	12.9	12.0	10.5	23
Northwest	8.1	8.1	7.4	8.3	7.0	7.2	7.2	8.5	10.2	11.8	10.5	9.1	8.5	23
North Northwest	8.1	7.2	6.8	7.4	8.0	7.2	6.7	8.5	9.9	11.1	9.7	8.2	8.2	23
VISIBILITY														
Mean Number of Days with Fog	12	11	10	10	17	21	23	22	17	16	13	12	185	23

BARTER ISLAND, ALASKA (70°08'N., 143°38'W.) Elevation 11.9m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JUIG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE													
Mean (Millibars)	1021.3	1020.3	1020.8	1018.4	1018.1	1014.4	1012.7	1012.3	1009.9	1013.7	1016.1	1015.9	23
TEMPERATURE (DEGREES F)													
Mean	-15.2	-19.5	-14.7	0.1	21.1	34.1	43.9	31.6	16.4	0.2	-12.4	10.1	29
Mean Daily Maximum	-8.5	-13.1	-7.5	8.2	26.5	38.2	48.5	35.0	21.5	6.3	-6.4	15.8	29
Mean Daily Minimum	-21.9	-25.8	-21.9	-8.1	15.7	29.9	34.3	28.1	11.2	-5.9	-18.3	4.3	29
Extreme Highest	39	34	36	43	52	67	72	64	46	37	37	75	24
Extreme Lowest	-51	-59	-51	-38	-16	15	24	4	-23	-51	-51	-59	26
RELATIVE HUMIDITY													
Average Percentage	68.8	68.1	68.8	74.6	85.5	90.0	89.5	90.2	84.6	74.9	69.3	79.7	23
CLOUD COVER													
Average Amount (Tenths)	5.4	5.2	5.2	6.0	8.2	7.9	7.6	8.4	8.2	6.9	5.8	7.0	23
PRECIPITATION													
Mean Amount (Inches)	0.55	0.33	0.26	0.23	0.31	0.53	1.28	0.89	0.81	0.45	0.29	7.05	29
Greatest Amount (Inches)	4.08	2.53	1.44	1.22	1.51	2.09	3.40	4.91	3.62	1.50	1.17	0	25
Least Amount (Inches)	0.01	t	t	t	t	0.06	0.16	0.07	0.12	0.04	t	0	25
Maximum in 24 hrs. (Inches)	2.25	1.22	0.55	0.44	0.76	1.15	1.41	2.23	1.98	0.43	0.55	2.25	25
Mean Amount of Snow (Inches)	5.8	3.0	2.8	2.6	3.2	1.5	0.5	6.2	9.4	5.4	3.5	45.3	25
Mean Number of Days with Precipitation	17	14	17	17	23	19	21	23	24	20	19	233	23
Snow (Mean Number of Days)	17	14	17	17	21	10	5	14	22	20	19	180	23
WIND													
Percent of Observations with Gales	3.9	3.7	2.1	1.0	.4	*	.4	1.0	2.5	2.9	2.6	1.8	22
Mean Wind Speed (Knots)	12.3	12.4	11.6	10.5	10.5	9.5	9.0	10.9	12.9	12.7	12.0	11.2	23
Direction (Percentage of Obs.)													
North	0.4	0.4	0.6	0.8	1.9	2.5	2.7	1.9	1.0	0.6	0.9	1.4	23
North Northeast	0.4	0.4	0.7	0.8	1.5	2.3	2.8	2.1	1.2	1.0	0.5	1.4	23
Northeast	2.3	2.2	3.8	2.7	6.4	8.1	6.7	6.0	6.1	4.1	3.5	5.2	23
East Northeast	10.8	10.3	14.0	13.7	16.2	22.2	20.7	13.9	12.2	15.3	12.8	15.2	23
East	20.8	19.2	18.3	20.3	28.5	26.7	19.8	23.0	19.6	20.3	15.4	21.2	23
East Southeast	5.9	5.2	5.1	5.4	5.5	3.0	4.9	7.0	7.5	6.8	4.6	5.5	23
Southeast	3.5	1.0	1.6	1.9	1.2	0.8	1.8	2.8	3.9	3.3	1.5	2.0	23
South Southeast	0.9	0.6	0.5	0.8	0.9	0.4	0.9	1.0	1.4	1.0	0.7	0.8	23
South	2.1	1.7	1.7	2.1	1.3	0.6	1.4	1.9	4.4	3.2	1.9	2.0	23
South Southwest	2.1	2.3	2.1	2.1	1.3	0.6	0.2	1.7	5.7	4.1	3.8	2.3	23
Southwest	9.3	8.5	7.8	6.6	4.3	1.2	1.7	3.0	7.0	7.5	11.2	5.8	23
West Southwest	11.8	13.5	12.5	11.0	4.1	3.4	3.4	6.1	7.9	9.2	11.3	8.1	23
West	20.1	25.3	22.8	20.1	12.5	10.2	11.5	13.9	12.1	14.5	23.0	16.4	23
West Northwest	3.8	4.5	3.6	4.2	5.4	7.9	8.8	6.4	3.9	3.3	3.0	5.2	23
Northwest	1.1	0.8	0.9	1.5	2.7	4.1	9.5	3.7	1.9	1.1	1.5	2.4	23
North Northwest	0.2	0.2	0.4	0.5	1.3	1.9	2.1	1.6	0.8	0.4	0.3	1.0	23
Calm	4.5	3.9	3.7	5.6	3.1	4.1	4.3	4.1	3.4	4.3	4.1	4.1	23
Direction (Mean Speed, knots)													
North	5.0	5.1	4.4	4.7	4.9	4.5	4.1	6.0	7.2	5.1	5.0	5.1	23
North Northeast	5.6	4.6	5.4	5.5	5.0	5.2	5.6	6.1	8.0	6.2	5.5	5.7	23
Northeast	7.2	7.4	7.5	7.9	7.8	6.6	7.9	9.4	14.0	10.9	7.9	8.6	23
East Northeast	12.1	11.4	13.4	11.7	11.1	10.8	12.1	12.6	16.7	14.6	12.5	12.3	23
East	13.8	12.9	13.2	12.3	13.4	12.2	18.4	13.8	18.3	16.8	14.4	13.7	23
East Southeast	8.9	10.1	9.5	9.3	9.8	10.1	9.2	10.9	11.2	13.6	9.6	10.3	23
Southeast	8.1	5.9	6.4	7.0	6.1	7.2	6.7	8.2	8.0	7.0	6.4	7.2	23
South Southeast	9.0	5.8	5.6	6.7	5.5	5.6	5.9	6.0	5.9	5.4	6.0	6.2	23
South	6.9	6.2	5.8	6.5	6.3	5.2	6.1	6.3	6.8	6.3	6.6	6.4	23
South Southwest	6.3	6.3	5.6	5.9	5.7	5.3	6.3	6.5	7.1	7.0	6.7	6.5	23
Southwest	7.4	7.6	7.3	7.2	7.4	6.4	7.1	7.8	8.1	7.8	8.6	7.7	23
West Southwest	14.7	11.4	10.1	9.3	8.9	9.9	10.3	12.0	12.8	13.1	11.9	11.6	23
West	18.3	18.2	16.4	15.0	13.0	10.9	10.4	13.7	16.2	16.5	17.4	15.5	23
West Northwest	14.7	17.4	13.6	12.9	11.0	9.0	9.7	10.6	13.8	13.5	14.2	11.7	23
Northwest	7.5	8.2	5.9	7.0	6.4	6.1	6.5	7.6	10.0	9.2	9.4	7.1	23
North Northwest	6.6	4.5	5.3	4.7	5.6	5.1	5.5	6.2	7.7	5.6	5.9	5.6	23
VISIBILITY													
Mean Number of Days with Fog	9	8	10	12	21	20	24	19	14	11	8	176	23
Days with Visibilty less than 1/2 mile	7.8	7.8	5.7	5.4	8.5	10.5	13.5	11.7	6.2	7.3	5.0	105.1	12

METEOROLOGICAL TABLE FOR COASTAL AREA OFF CORDOVA
Boundaries: Between 57°N. and the coast, from 140°W. to 146°W.

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Wind ≥ 34 knots (1)	9.5	10.2	5.3	3.9	2.0	1.1	0.4	0.8	4.9	12.4	11.6	10.5	5.9
Wave height ≥ 10 feet (1)	23.2	28.0	19.7	14.5	9.4	8.1	7.7	4.5	11.7	21.9	14.8	29.8	15.7
Visibility < 2 naut. mi. (1)	6.4	8.2	5.3	4.7	4.8	3.4	5.7	3.1	4.2	6.2	4.9	5.5	5.1
Precipitation (1)	17.9	16.6	16.5	13.6	15.3	10.8	13.5	11.6	15.4	18.4	24.4	21.8	16.2
Temperature ≥ 85°F (1)	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean Temperature (°F)	36.6	38.2	37.7	40.6	45.2	50.4	54.4	56.8	53.8	47.0	41.8	38.2	45.5
Temperature ≤ 32°F (1)	23.1	8.4	8.1	0.2	0	0	0	0	0	0	4.0	15.6	4.5
Mean relative humidity (%)	85	86	85	83	86	86	88	85	87	83	84	86	85
Sky overcast or obscured (1)	40.5	48.8	37.4	36.6	49.0	53.8	62.3	48.9	43.9	37.6	47.0	42.9	45.9
Mean cloud cover (eighths)	5.8	6.1	5.7	5.2	6.1	6.6	6.8	6.1	6.1	5.9	6.2	5.9	6.1
Mean sea-level pressure (2)	1,007	1,006	1,008	1,011	1,014	1,014	1,016	1,014	1,009	999	1,004	1,002	1,009
Extreme max. sea-level pressure (2)	1,045	1,038	1,039	1,034	1,032	1,033	1,031	1,028	1,032	1,033	1,034	1,034	1,045
Extreme min. sea-level pressure (2)	976	974	975	982	986	994	997	990	979	963	963	968	963
Prevailing wind direction	E	E	E	W	E	W	W	W	E	E	E	E	E
Thunder and lightning (1)	0	0	0	*	0	0	0	0	*	*	0	0	*

METEOROLOGICAL TABLE FOR COASTAL AREA OFF SEWARD
Boundaries: Between 57°N. and the coast, from 146°W. to 151°W.

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Wind ≥ 34 knots (1)	11.7	12.0	9.7	5.4	3.0	1.1	0.5	1.6	5.8	8.8	14.6	16.7	6.8
Wave height ≥ 10 feet (1)	27.5	28.9	26.3	18.9	7.8	6.2	7.2	8.9	20.8	29.9	32.5	29.7	18.7
Visibility < 2 naut. mi. (1)	8.1	5.3	4.5	4.3	4.1	8.0	9.4	11.8	5.4	1.6	1.3	7.9	6.2
Precipitation (1)	19.4	21.9	14.3	16.1	13.4	12.7	14.2	11.4	18.0	14.9	17.0	16.1	15.4
Temperature ≥ 85°F (1)	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean Temperature (°F)	37.4	36.8	37.2	39.6	44.2	49.0	53.7	55.7	52.5	45.5	41.0	37.2	45.0
Temperature ≤ 32°F (1)	11.1	13.3	11.1	3.5	0.3	0	0	0	0	0.6	3.7	19.5	4.4
Mean relative humidity (%)	83	83	82	83	85	87	88	87	86	81	82	84	84
Sky overcast or obscured (1)	42.9	50.5	37.8	35.2	41.9	56.7	55.0	47.0	44.5	35.7	39.6	41.0	44.6
Mean cloud cover (eighths)	5.6	6.1	5.6	5.1	5.6	6.4	6.3	5.9	5.9	5.6	5.6	5.5	5.8
Mean sea-level pressure (2)	1,007	1,005	1,007	1,010	1,013	1,013	1,015	1,013	1,006	999	1,000	1,001	1,008
Extreme max. sea-level pressure (2)	1,044	1,038	1,037	1,038	1,033	1,031	1,030	1,030	1,031	1,029	1,028	1,033	1,044
Extreme min. sea-level pressure (2)	972	968	969	979	983	993	991	991	976	966	965	966	965
Prevailing wind direction	W	E	NW	W	W	E	SW	SW	E	W	E	E	W
Thunder and lightning (1)	0	0	0	0	0	0	0	0	0	0	0	0	0

METEOROLOGICAL TABLE FOR COASTAL AREA OFF KODIAK
Boundaries: Between 56°N. and the coast, from 151°W. to 157°W.

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Wind ≥ 34 knots (1)	4.4	9.8	9.0	6.2	1.8	1.4	*	2.7	2.9	4.9	12.1	12.2	4.8
Wave height ≥ 10 feet (1)	13.6	17.1	22.6	11.0	9.6	1.5	3.3	5.4	5.4	10.3	23.3	18.4	9.0
Visibility < 2 naut. mi. (1)	4.3	5.6	5.5	7.9	4.9	8.0	9.2	12.5	5.3	4.4	2.8	6.9	6.6
Precipitation (1)	34.4	35.2	22.9	16.8	20.4	20.1	24.7	19.1	20.2	30.6	29.3	20.3	23.6
Temperature ≥ 85°F (1)	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean Temperature (°F)	35.5	33.5	36.2	39.1	44.7	48.8	53.9	55.0	52.6	45.1	38.5	32.4	44.6
Temperature ≤ 32°F (1)	20.5	25.8	14.1	6.6	0.6	0	0	0	0	*	7.3	26.0	4.9
Mean relative humidity (%)	83	80	85	84	75	84	87	88	87	84	84	87	83
Sky overcast or obscured (1)	36.9	35.7	40.4	43.9	37.3	56.6	49.7	50.7	46.1	32.1	43.4	46.3	43.8
Mean cloud cover (eighths)	5.4	5.0	5.3	5.7	5.1	6.6	6.1	5.9	6.0	5.1	5.5	5.9	5.7
Mean sea-level pressure (2)	1,004	1,008	1,004	1,010	1,014	1,012	1,015	1,011	1,007	999	1,000	1,003	1,008
Extreme max. sea-level pressure (2)	1,039	1,041	1,036	1,033	1,033	1,031	1,031	1,029	1,029	1,025	1,032	1,032	1,041
Extreme min. sea-level pressure (2)	966	969	969	980	987	989	993	988	977	968	957	969	966
Prevailing wind direction	E	NW	NW	NW	SW	NE	SW	SW	W	W	NW	W	SW
Thunder and lightning (1)	0	0	0	0	0	0	0	0	0	0	0	0	0

(1) Percentage frequency.
(2) Millibars.
* 0.0-0.5%
These data are based upon observations made by ships in passage. Such ships tend to avoid bad weather when possible, thus biasing the data toward good weather samples.

METEOROLOGICAL TABLE FOR COASTAL AREA OFF UNIMAK
Boundaries: Between 53°N. and the coast, from 157°W. to 165°W.

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Wind ≥ 34 knots (1)	11.2	10.9	7.5	5.6	3.3	2.4	0.8	2.1	3.2	9.1	14.4	13.3	5.8
Wave height ≥ 10 feet (1)	18.8	32.8	14.3	16.0	14.2	6.5	7.7	12.6	13.4	18.9	26.2	27.1	16.1
Visibility < 2 naut. mi. (1)	8.3	8.7	10.2	7.6	7.1	10.7	13.2	13.1	9.1	2.4	3.3	7.6	8.9
Precipitation (1)	18.2	21.5	17.5	14.9	14.6	13.4	13.8	15.6	17.2	17.2	20.5	21.3	16.5
Temperature ≥ 85°F (1)	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean Temperature (°F)	35.6	36.1	35.9	37.9	42.0	46.5	51.3	52.9	50.7	45.3	40.4	36.1	44.1
Temperature ≤ 32°F (1)	19.1	17.1	20.5	8.1	1.6	0	0	0	0	*	5.3	22.7	6.5
Mean relative humidity (%)	85	87	86	86	85	88	89	89	87	83	83	86	86
Sky overcast or obscured (1)	42.0	42.1	41.3	47.4	51.3	62.2	61.3	57.2	45.3	37.0	34.3	42.3	48.8
Mean cloud cover (eighths)	5.8	6.0	5.6	6.1	6.3	6.7	6.6	6.6	6.2	6.0	5.8	6.0	6.2
Mean sea-level pressure (2)	1,004	1,003	1,010	1,011	1,012	1,011	1,017	1,013	1,007	1,004	1,004	1,000	1,009
Extreme max. sea-level pressure (2)	1,047	1,038	1,044	1,040	1,039	1,034	1,036	1,037	1,036	1,038	1,051	1,043	1,051
Extreme min. sea-level pressure (2)	958	960	974	966	975	982	992	981	973	969	966	960	958
Prevailing wind direction	W	W	W	W	W	W	W	W	W	W	W	NW	W
Thunder and lightning (1)	0	0	0	0	0	0	0	0	*	0	0	0	*

METEOROLOGICAL TABLE FOR COASTAL AREA OFF DUTCH HARBOR
Boundaries: Between 51°N. and 55°N. from 165°W. to 172°W.

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Wind ≥ 34 knots (1)	9.1	9.9	7.4	5.5	3.3	0.8	0.9	1.5	4.3	9.4	12.6	8.5	5.4
Wave height ≥ 10 feet (1)	35.3	33.0	19.8	21.9	13.9	4.6	5.8	13.0	15.3	27.3	31.0	27.5	20.3
Visibility < 2 naut. mi. (1)	9.4	9.8	8.8	9.5	9.8	18.3	25.6	25.3	11.2	5.3	6.2	8.9	13.4
Precipitation (1)	25.3	24.9	18.4	21.9	19.5	16.9	16.1	14.4	16.5	21.0	21.7	24.1	19.5
Temperature ≥ 85°F (1)	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean Temperature (°F)	35.5	35.9	36.1	37.8	41.5	45.2	48.9	51.3	49.6	44.9	40.8	37.3	42.7
Temperature ≤ 32°F (1)	33.2	20.4	17.6	8.5	*	0	0	0	0	*	1.5	10.4	6.1
Mean relative humidity (%)	84	85	85	85	85	88	90	90	86	83	83	84	86
Sky overcast or obscured (1)	42.3	45.2	53.1	52.4	60.3	74.2	83.9	74.1	58.3	42.4	41.4	44.8	58.5
Mean cloud cover (eighths)	6.1	6.2	6.5	6.6	6.8	7.4	7.6	7.3	6.8	6.2	6.1	6.1	6.7
Mean sea-level pressure (2)	1,001	1,001	1,011	1,012	1,011	1,012	1,016	1,013	1,009	1,006	1,003	1,002	1,009
Extreme max. sea-level pressure (2)	1,040	1,044	1,039	1,044	1,044	1,039	1,038	1,038	1,036	1,038	1,045	1,048	1,048
Extreme min. sea-level pressure (2)	958	959	960	969	971	972	986	980	966	965	959	956	956
Prevailing wind direction	W	S	W	W	W	W	SW	W	W	W	W	W	W
Thunder and lightning (1)	0	*	*	0	0	0	*	0	0	0	*	0	*

METEOROLOGICAL TABLE FOR COASTAL AREA OFF ADAK
Boundaries: Between 51°N. and 55°N., from 172°W. to 180°.

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Wind ≥ 34 knots (1)	8.5	13.0	9.9	7.4	4.3	0.6	0.7	0.8	3.9	8.4	11.6	10.6	5.0
Wave height ≥ 10 feet (1)	31.7	31.0	24.6	21.6	10.2	6.0	4.0	9.3	21.5	24.7	40.8	27.2	17.1
Visibility < 2 naut. mi. (1)	5.0	8.5	6.9	8.6	11.0	16.6	28.8	26.9	10.4	4.5	6.5	7.2	15.3
Precipitation (1)	30.4	29.6	31.6	28.4	22.0	16.4	16.5	16.8	22.0	23.6	30.6	34.3	23.0
Temperature ≥ 85°F (1)	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean Temperature (°F)	35.9	35.2	36.1	37.7	41.0	44.0	48.2	50.1	49.1	45.0	40.1	37.7	43.2
Temperature ≤ 32°F (1)	18.0	23.1	16.9	5.9	0	0	0	0	0	0	2.4	7.2	4.0
Mean relative humidity (%)	86	87	87	86	87	88	91	92	88	84	85	85	88
Sky overcast or obscured (1)	45.9	46.9	53.1	49.7	64.9	75.0	82.8	76.3	63.2	41.6	41.0	42.9	63.9
Mean cloud cover (eighths)	6.2	6.3	6.6	6.5	7.1	7.4	7.6	7.4	6.9	6.1	6.0	5.9	7.0
Mean sea-level pressure (2)	997	998	1,007	1,008	1,011	1,013	1,016	1,013	1,010	1,008	1,002	1,002	1,009
Extreme max. sea-level pressure (2)	1,039	1,040	1,041	1,038	1,040	1,037	1,036	1,038	1,042	1,042	1,043	1,047	1,047
Extreme min. sea-level pressure (2)	953	958	955	968	972	976	984	982	975	965	959	957	953
Prevailing wind direction	SE	SW	SW	W	SW	SW	SW	SW	W	W	W	W	SW
Thunder and lightning (1)	0	*	*	0	*	0	*	*	*	*	*	*	*

(1) Percentage frequency.
(2) Millibars.
* 0.0-0.5%
These data are based upon observations made by ships in passage. Such ships tend to avoid bad weather when possible, thus biasing the data toward good weather samples.

METEOROLOGICAL TABLE FOR COASTAL AREA OFF ATTU
Boundaries: Between 51°N. and 55°N., from 172°E. to 180°.

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Wind ≥ 34 knots (1)	10.9	9.3	7.9	5.1	3.1	1.2	0.9	0.9	2.8	6.8	13.4	6.0	3.8
Wave height ≥ 10 feet (1)	27.4	48.4	22.6	27.4	8.0	7.5	8.6	3.7	8.5	14.1	23.5	22.4	14.2
Visibility < 2 naut. mi. (1)	11.0	12.4	15.2	9.4	12.4	21.5	40.2	33.5	14.0	5.8	6.3	7.1	19.9
Precipitation (1)	29.6	36.5	32.8	21.7	17.9	19.2	18.3	18.0	17.3	21.4	28.9	34.5	21.4
Temperature ≥ 85°F (1)	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean Temperature (°F)	34.1	34.1	34.4	36.7	40.1	42.9	47.4	50.1	48.5	44.5	38.3	35.2	42.5
Temperature ≤ 32°F (1)	36.1	37.7	30.5	16.7	1.0	0	0	0	0	0	8.9	25.2	6.3
Mean relative humidity (%)	86	87	88	85	87	90	92	92	87	84	87	85	89
Sky overcast or obscured (1)	49.5	52.1	48.1	57.3	65.6	79.3	85.2	78.4	58.6	50.4	51.6	60.9	68.8
Mean cloud cover (eighths)	6.3	6.6	6.5	6.7	7.0	7.5	7.6	7.3	6.6	6.3	6.4	6.8	7.1
Mean sea-level pressure (2)	996	997	1,006	1,010	1,013	1,011	1,013	1,012	1,010	1,010	1,004	1,003	1,010
Extreme max. sea-level pressure (2)	1,034	1,032	1,036	1,042	1,052	1,055	1,052	1,046	1,036	1,044	1,044	1,047	1,055
Extreme min. sea-level pressure (2)	958	960	961	966	971	972	983	978	974	967	964	962	958
Prevailing wind direction	E	N	N	W	W	W	SW	SW	W	W	W	W	W
Thunder and lightning (1)	0	*	0	*	0	0	0	0	0	0	0	0	*

METEOROLOGICAL TABLE FOR COASTAL AREA BRISTOL BAY
Boundaries: Between 55°N. and 59°N., from coast to 165°W.

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Wind ≥ 34 knots (1)				3.1	1.9	*	*	1.8	3.7				
Wave height ≥ 10 feet (1)				4.9	6.8	1.8	5.6	4.9	10.0				
Visibility < 2 naut. mi. (1)				14.6	18.8	24.9	25.2	26.0	17.1				
Precipitation (1)				18.2	16.3	10.0	15.6	18.3	16.8				
Temperature ≥ 85°F (1)				0	0	0	0	0	0				
Mean Temperature (°F)				34.2	38.7	44.3	49.4	50.8	48.2				
Temperature ≤ 32°F (1)				31.7	7.4	*	0	0	0				
Mean relative humidity (%)				90	87	90	92	91	88				
Sky overcast or obscured (1)				55.0	57.6	60.3	70.6	77.9	49.8				
Mean cloud cover (eighths)				6.5	6.6	6.7	6.9	7.4	6.4				
Mean sea-level pressure (2)				1,013	1,011	1,012	1,015	1,011	1,007				
Extreme max. sea-level pressure (2)				1,040	1,039	1,037	1,034	1,035	1,033				
Extreme min. sea-level pressure (2)				969	979	978	988	983	968				
Prevailing wind direction				NW	NW	W	W	SW	NW				
Thunder and lightning (1)				0	0	0	0	0	0				

METEOROLOGICAL TABLE FOR COASTAL AREA AROUND ST. PAUL
Boundaries: Between 55°N. and 59°N., from 165°W. to 172°W.

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Wind ≥ 34 knots (1)				5.9	2.0	0.7	0.5	1.7	4.4	7.1			
Wave height ≥ 10 feet (1)				23.3	7.7	3.7	3.5	8.1	16.3	38.9			
Visibility < 2 naut. mi. (1)				15.5	26.9	30.0	35.4	26.9	18.8	9.2			
Precipitation (1)				25.7	13.7	11.9	19.6	18.3	16.8	17.1			
Temperature ≥ 85°F (1)				0	0	0	0	0	0	0			
Mean Temperature (°F)				32.0	36.5	42.1	47.2	48.7	46.5	41.1			
Temperature ≤ 32°F (1)				50.3	15.0	1.3	0	0	0	1.4			
Mean relative humidity (%)				88	90	91	92	91	88	83			
Sky overcast or obscured (1)				56.1	70.4	77.0	77.9	76.1	58.5	46.8			
Mean cloud cover (eighths)				6.7	7.0	7.3	7.3	7.4	6.8	6.6			
Mean sea-level pressure (2)													
Extreme max. sea-level pressure (2)													
Extreme min. sea-level pressure (2)													
Prevailing wind direction				NW	N	NW	SW	W	NW	NW			
Thunder and lightning (1)				0	0	0	0	0	0	0			

(1) Percentage frequency.
(2) Millibars.
* 0.0-0.5%
These data are based upon observations made by ships in passage. Such ships tend to avoid bad weather when possible, thus biasing the data toward good weather samples.

METEOROLOGICAL TABLE FOR COASTAL AREA OFF NUNIVAK
Boundaries: Between 59°N. and 62°N., from coast to 171°W.

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Wind ≥ 34 knots (1)							*	1.1	3.6				
Wave height ≥ 10 feet (1)							1.6	2.3	3.0				
Visibility < 2 naut. mi. (1)							25.0	24.3	9.6				
Precipitation (1)							21.9	17.8	34.2				
Temperature ≥ 85°F (1)							0	0	0				
Mean Temperature (°F)							46.9	47.6	46.6				
Temperature ≤ 32°F (1)							0	0	0				
Mean relative humidity (%)							90	92	89				
Sky overcast or obscured (1)							67.8	77.2	64.1				
Mean cloud cover (eighths)							6.9	7.3	7.2				
Mean sea-level pressure (2)							1,014	1,011	1,007				
Extreme max. sea-level pressure (2)							1,031	1,029	1,028				
Extreme min. sea-level pressure (2)							990	985	984				
Prevailing wind direction							S	SW	N				
Thunder and lightning (1)							0	0	0				

METEOROLOGICAL TABLE FOR COASTAL AREA AROUND ST. MATTHEW
Boundaries: Between 59°N. and 62°N. from 171°W. to 178°W.

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Wind ≥ 34 knots (1)							1.3	2.6					
Wave height ≥ 10 feet (1)							0	5.3					
Visibility < 2 naut. mi. (1)							32.7	28.1					
Precipitation (1)							11.0	22.3					
Temperature ≥ 85°F (1)							0	0					
Mean Temperature (°F)							46.9	47.5					
Temperature ≤ 32°F (1)							0	0					
Mean relative humidity (%)							90	92					
Sky overcast or obscured (1)							83.8	83.2					
Mean cloud cover (eighths)							7.5	7.5					
Mean sea-level pressure (2)							1,013	1,007					
Extreme max. sea-level pressure (2)							1,028	1,027					
Extreme min. sea-level pressure (2)							990	981					
Prevailing wind direction							SW	S					
Thunder and lightning (1)							0	0					

METEOROLOGICAL TABLE FOR COASTAL AREA OFF ST. LAWRENCE
Boundaries: Between 62°N. and 66°N., from 172°W. to the coast.

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Wind ≥ 34 knots (1)							0.6	*	1.5				
Wave height ≥ 10 feet (1)							1.7	7.5	8.6				
Visibility < 2 naut. mi. (1)							20.3	13.0	7.8				
Precipitation (1)							14.5	18.6	30.5				
Temperature ≥ 85°F (1)							0	0	0				
Mean Temperature (°F)							47.7	48.3	44.7				
Temperature ≤ 32°F (1)							0	0	*				
Mean relative humidity (%)							89	88	86				
Sky overcast or obscured (1)							60.0	56.6	49.0				
Mean cloud cover (eighths)							6.6	6.7	6.4				
Mean sea-level pressure (2)							1,013	1,009	1,009				
Extreme max. sea-level pressure (2)							1,029	1,026	1,035				
Extreme min. sea-level pressure (2)							981	985	987				
Prevailing wind direction							S	N	N				
Thunder and lightning (1)							0	*	0				

(1) Percentage frequency.
(2) Millibars.
* 0.0-0.5%
These data are based upon observations made by ships in passage. Such ships tend to avoid bad weather when possible, thus biasing the data toward good weather samples.

METEOROLOGICAL TABLE FOR COASTAL AREA OFF CAPE LISBURNE
Boundaries: Between 66°N. and 70°N., from 170°W. to the coast.

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Wind ≥ 34 knots (1)							2.4	2.0	1.1				
Wave height ≥ 10 feet (1)							1.2	2.6	0.9				
Visibility < 2 naut. mi. (1)							13.1	11.6	5.3				
Precipitation (1)							17.0	24.3	30.2				
Temperature ≥ 95°F (1)							0	0	0				
Mean Temperature (°F)							44.1	44.7	40.4				
Temperature ≤ 32°F (1)							*	1.0	5.0				
Mean relative humidity (%)							89	89	88				
Sky overcast or obscured (1)							48.6	53.3	47.1				
Mean cloud cover (eighths)							6.2	6.5	6.3				
Mean sea-level pressure (2)							1,011	1,008	1,009				
Extreme max. sea-level pressure (2)							1,027	1,026	1,033				
Extreme min. sea-level pressure (2)							994	982	988				
Prevailing wind direction							S	S	NE				
Thunder and lightning (1)							0	0	0				

METEOROLOGICAL TABLE FOR COASTAL AREA OFF BARROWY
Boundaries: Between 70°N. and 74°N., from 545°W. to 170°W.

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Wind ≥ 34 knots (1)							0.9	0.7	1.0				
Wave height ≥ 10 feet (1)							2.8	1.3	0				
Visibility < 2 naut. mi. (1)							19.0	11.1	11.9				
Precipitation (1)							17.8	30.8	36.2				
Temperature ≥ 85°F (1)							0	0	0				
Mean Temperature (°F)							38.9	36.0	30.6				
Temperature ≤ 32°F (1)							12.0	24.5	66.8				
Mean relative humidity (%)							89	89	93				
Sky overcast or obscured (1)							36.7	46.3	52.1				
Mean cloud cover (eighths)							5.4	6.2	6.6				
Mean sea-level pressure (2)							1,015	1,012	1,013				
Extreme max. sea-level pressure (2)							1,030	1,033	1,026				
Extreme min. sea-level pressure (2)							988	983	985				
Prevailing wind direction							NE	E	E				
Thunder and lightning (1)							*	0	0				

(1) Percentage frequency.
(2) Millibars.
* 0.0-0.5%
These data are based upon observations made by ships in passage. Such ships tend to avoid bad weather when possible, thus biasing the data toward good weather samples.

MEAN SURFACE WATER TEMPERATURES (T) AND DENSITIES (D)

Stations	Years	Jan		Feb		Mar		Apr		May		June		July		Aug		Sept		Oct		Nov		Dec		Mean	
		(T) °C	(D) $^{\circ}_{15}$	(T) °C	(D) $^{\circ}_{15}$	(T) °C	(D) $^{\circ}_{15}$	(T) °C	(D) $^{\circ}_{15}$	(T) °C	(D) $^{\circ}_{15}$	(T) °C	(D) $^{\circ}_{15}$	(T) °C	(D) $^{\circ}_{15}$	(T) °C	(D) $^{\circ}_{15}$	(T) °C	(D) $^{\circ}_{15}$	(T) °C	(D) $^{\circ}_{15}$	(T) °C	(D) $^{\circ}_{15}$	(T) °C	(D) $^{\circ}_{15}$	(T) °C	(D) $^{\circ}_{15}$
Ketchikan 55°20'N., 131°38'W.	44	5.2	21.0	5.1	21.6	5.4	21.8	6.4	21.7	8.9	20.8	12.2	19.1	13.8	18.5	14.0	18.3	12.0	18.7	9.5	18.5	7.2	18.5	5.8	19.9	8.8	19.8
Sitka 57°03'N., 135°20'W.	24	4.5	22.1	4.2	22.4	4.4	22.2	5.9	21.8	8.8	20.0	11.3	18.8	13.4	18.5	13.9	19.0	12.1	19.1	9.3	19.9	7.1	21.0	5.6	21.6	8.4	20.5
Juneau 58°18'N., 134°25'W.	29	2.2	21.2	2.1	21.8	2.8	21.9	4.5	20.9	7.6	15.2	10.3	10.7	11.0	9.3	10.6	10.0	9.1	11.7	6.6	14.4	4.6	18.0	3.2	20.4	6.2	16.3
Skagway 59°27'N., 135°19'W.	22	2.5	23.2	2.2	23.3	2.3	23.2	3.4	23.0	6.7	17.9	9.9	8.0	10.6	3.5	10.2	3.4	8.8	9.1	6.5	16.2	4.4	20.3	3.3	22.4	5.9	16.1
Yakutat 59°33'N., 139°44'W.	26	3.8	22.3	3.5	22.4	3.8	22.4	5.3	22.0	7.7	21.2	10.8	19.7	12.8	17.6	12.9	17.7	11.4	19.1	9.0	20.6	6.7	21.5	4.9	22.1	7.7	20.7
Cordova 60°33'N., 145°46'W.	14	2.9	23.3	2.7	23.3	2.6	23.4	4.0	23.3	6.0	22.8	8.3	21.7	10.2	20.5	11.2	19.4	10.0	19.8	7.8	21.0	6.2	22.5	4.7	22.8	6.4	22.0
Seward 60°06'N., 149°27'W.	35	3.4	22.2	3.1	22.1	3.2	22.1	4.5	21.3	7.3	16.5	10.5	9.8	12.2	6.5	12.2	9.2	10.7	13.3	8.1	17.5	5.9	19.9	4.5	21.5	7.1	16.8
Womens Bay 57°43'N., 152°31'W.	17	0.7	21.1	0.9	21.6	1.5	22.5	3.6	22.4	6.4	19.0	8.7	16.1	11.3	17.0	11.7	20.2	10.0	19.8	6.9	20.9	4.0	20.7	1.8	21.6	5.6	20.2
Anchorage 61°15'N., 149°53'W.	9	-0.9	14.3	-0.9	16.2	0.4	16.6	0.9	16.3	6.1	15.4	11.4	11.4	14.2	6.2	13.6	4.9	11.2	5.9	5.9	7.8	0.8	9.9	-0.6	12.3	5.1	11.4
Massacre Bay 52°48'N., 173°10'W.	15	2.3	24.3	2.1	24.4	2.2	24.6	3.2	24.3	4.8	23.5	6.5	23.0	8.3	22.8	9.5	23.2	8.8	23.8	6.8	23.9	4.4	23.8	2.7	24.3	5.1	23.9
Unalaska 53°53'N., 166°32'W.	12	2.5	21.5	2.0	21.7	2.4	22.2	3.6	21.5	5.2	20.0	7.3	19.9	8.9	21.1	9.5	22.0	8.3	21.1	6.1	20.8	4.5	21.5	3.1	21.6	5.3	21.2
Sweeper Cove 51°51'N., 176°39'W.	23	2.8	23.2	2.6	22.9	3.1	22.5	3.5	22.1	4.8	22.4	6.2	23.2	7.2	23.5	7.6	23.7	7.4	23.4	5.9	23.4	4.6	23.4	3.4	23.4	4.9	23.1

F (Fahrenheit) = 1.8C (Celsius) + 32

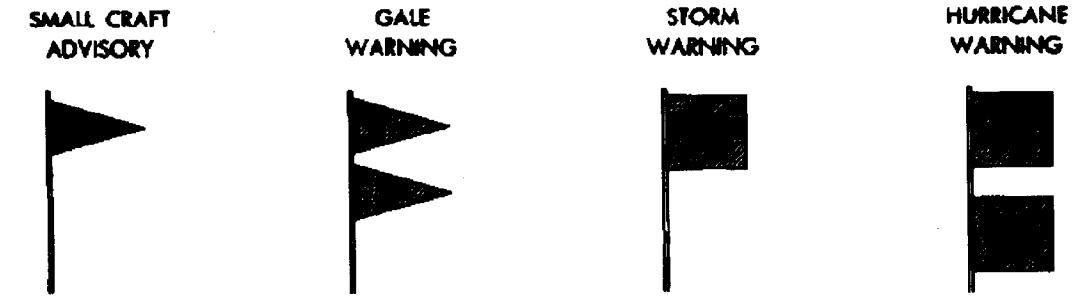
Density as used in this table is the specific gravity of the sea water or the ratio between the weight of a sea-water sample and the weight of an equal volume of distilled water at 15°C (59°F). These figures representing density at 15°C (ρ_{15}) are expressed in terms of sigma-t ($^{\circ}_{t}$) where t = 15°C and $^{\circ}_{15} = (\rho_{15} - 1)\ 1000$. Thus, for $\rho_{15} = 1.0238$, $^{\circ}_{15} = 23.8$.

DATES OF ICE BREAKUP AND FREEZEUP

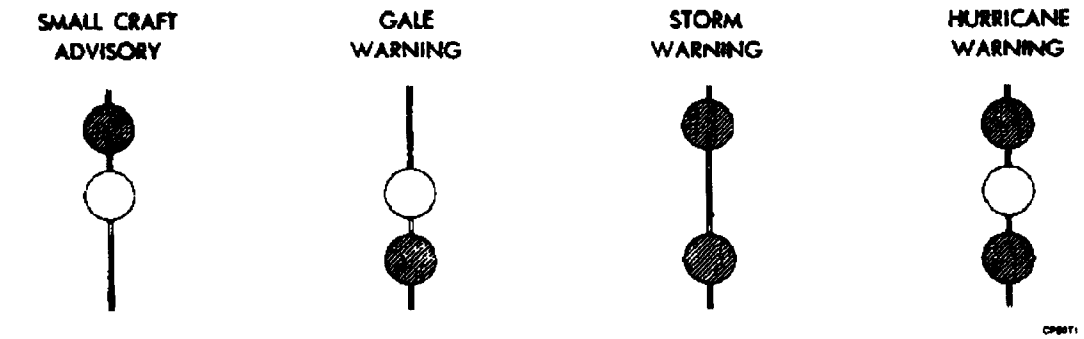
Place	Waters	Ice breakup			Ice freezeup			Ave. years record	Period
		Average	Earliest	Latest	Average	Earliest	Latest		
Gulf of Alaska									
Susitna	Susitna River	May 1	4/12/41	5/10/46	Nov. 1	10/19/33	11/14/36	12	1933 - 1946
Talkeetna	do	May 8	4/12/41	5/25/52	Dec. 2	11/12/39	12/23/47	12	1919 - 1952
Kasilof	Kasilof River	Apr. 13	3/27/41	4/29/46	Dec. 3	11/13/45	12/24/48	10	1937 - 1947
Kenai	Kenai River	Apr. 2	3/18/52	4/14/51	Dec. 10	11/23/51	12/26/37	6	1937 - 1952
Anchorage	Ship Creek	Mar. 29	2/16/44	4/17/42	Nov. 24	11/10/35	12/10/36	21	1915 - 1953
Bering Sea									
Egegik	Egegik River	Apr. 14	3/16/41	5/ 1/39	Dec. 12	11/12/42	1/11/39	10	1937 - 1952
Naknek	Naknek River	Apr. 9	3/19/41	4/25/49	Nov. 17	10/17/39	12/15/17	7	1916 - 1951
Koggiung	Kvichak River	May 4	4/26/38	5/13/40	Dec. 22	11/23/39	1/30/41	3	1937 - 1940
Dillingham	Nushagak Bay	May 9	4/25/26	5/27/52	Nov. 7	10/16/32	12/22/40	19	1919 - 1952
Kanakanak	do	May 2	4/17/40	5/22/39	Nov. 20	10/14/42	12/21/38	4	1937 - 1943
Platinum	Goodnews Bay	May 1	4/ 8/42	5/25/52	Nov. 19	10/23/30	12/12/47	12	1928 - 1952
Kwinhagak	Kuskokwim Bay	May 1	4/10/45	5/17/46	Nov. 15	10/20/29	12/20/38	10	1929 - 1952
Bethel	Kuskokwim River	May 15	4/24/40	5/26/52	Oct. 29	10/ 8/28	11/24/51	27	1923 - 1952
Crooked Creek	do	May 7	4/22/40	5/23/52	Nov. 18	11/ 3/39	12/ 2/52	12	1937 - 1952
McGrath	do	May 10	4/24/40	5/24/52	Nov. 5	10/23/41	11/15/52	12	1939 - 1952
Mekoryuk Nunivak Island	Mekoryuk River	May 12	4/18/50	5/30/46	Nov. 27	11/20/52	12/13/47	5	1943 - 1951
Gambell, St. Lawrence Island		May 26	5/ 1/43	7/ 1/50	Nov. 21	10/15/49	12/14/40	10	1940 - 1952
Savoonga, St. Lawerence Island		May 26	4/25/48	6/17/45	Nov. 19	9/30/30	12/13/40	10	1928 - 1949
Hooper Bay	Hooper Bay	May 26	5/15/42	6/ 4/45	Nov. 12	10/19/26	11/20/41	4	1926 - 1945
St. Michael	Norton Sound	June 9	5/19/12	7/ 3/01	Nov. 10	10/10/84	12/ 7/61	53	1874 - 1952
Unalakleet	Unalakleet River	May 17	4/28/40	5/30/52	Oct. 25	10/ 8/39	11/19/37	14	1937 - 1952
Moses Point	Kwiniuk River	May 24	5/ 2/51	6/11/49	Oct. 20	10/ 1/51	11/ 2/52	6	1943 - 1952
Golovin	Golovnin Bay	May 23	5/13/40	6/14/39	Nov. 2	10/ 8/42	11/19/37	6	1937 - 1943
White Mountain	Fish River	May 21	5/ 5/40	6/ 2/37	Oct. 14	9/27/31	11/ 9/25	24	1923 - 1951
Solomon	Solomon River	May 20	5/ 1/42	5/30/45	Oct. 29	10/10/40	11/29/48	10	1940 - 1952
Council	Niukluk River	May 17	4/27/40	5/31/52	Oct. 30	10/13/20	11/ 9/40	12	1920 - 1952
Nome	Norton Sound	May 29	4/28/42	6/28/48	Nov. 12	10/13/18	12/13/47	50	1900 - 1952
Teller	Grantley Harbor	June 7	5/12/36	6/18/39	Nov. 10	10/13/42	12/26/50	16	1936 - 1952
Yukon River									
Akulurak	Kwikluak Pass	May 27	5/20/42	6/ 4/20	Oct. 24	10/11/39	11/ 7/23	14	1917 - 1948
Hamilton	22	May 22	5/ 6/40	6/ 5/52	Oct. 25	10/15/39	11/ 2/38	14	1938 - 1952
Azacharak	85	May 20	5/ 3/38	6/ 6/52	Nov. 13	11/ 1/39	12/22/49	12	1937 - 1952
Pilot Station	115	May 17	5/ 1/26	5/24/24	Nov. 8	10/27/24	11/13/25	5	1924 - 1943
Russian Mission	195	May 12	4/25/40	5/25/39	Nov. 4	10/21/28	11/15/37	8	1928 - 1944
Holy Cross	257 Nautical	May 17	4/25/40	5/28/52	Oct. 31	10/12/31	11/30/34	32	1917 - 1952
Galena	481 miles	May 17	5/ 8/51	5/26/52	Nov. 6	10/11/47	12/ 8/50	10	1943 - 1952
Ruby	526 above	May 15	4/30/40	5/22/20	Nov. 7	10/28/17	11/18/37	11	1917 - 1946
Tanana	628 Apoon Pass	May 14	4/29/40	5/25/35	Nov. 4	10/13/30	11/22/37	33	1917 - 1952
Rampart	688	May 16	5/ 1/30	5/25/52	Nov. 6	10/13/30	11/23/45	21	1917 - 1952
Fort Yukon	896	May 14	5/ 7/40	5/22/27	Oct. 28	10/14/41	11/15/52	30	1918 - 1952
Coal Creek	1,002	May 12	5/ 7/43	5/18/45	Nov. 9	11/ 1/38	11/20/40	8	1938 - 1950
Eagle	1,089	May 9	4/25/40	5/18/52	Nov. 19	10/18/30	12/11/49	29	1917 - 1952
Dawson, Canada	1,197	May 8	4/28/40	5/16/45	Nov. 17	11/ 3/41	12/18/42	12	1917 - 1947
Arctic Ocean									
Wales	Bering Strait	June 8	5/15/47	6/30/49	Dec. 3	10/ 8/48	1/ 8/51	16	1927 - 1952
Shishmaref	Arctic Ocean	June 22	5/30/36	7/ 8/33	Nov. 10	10/ 6/39	12/18/34	18	1921 - 1952
Candle	Kiwalik River	May 18	5/ 5/43	5/27/27	Oct. 17	10/10/42	10/23/43	8	1922 - 1950
Deering	Inmachuk River	June 4	5/11/43	6/30/41	Oct. 23	10/ 3/46	11/ 4/41	4	1937 - 1948
Kotzebue	Kotzebue Sound	May 31	5/17/40	6/ 8/45	Oct. 23	10/ 2/39	11/ 5/38	14	1929 - 1952
Selawik	Selawik River	May 28	5/13/40	6/ 7/45	Oct. 17	10/ 3/46	10/30/38	12	1927 - 1952
Noorvik	Kobuk River	May 29	5/18/25	6/11/22	Oct. 11	9/26/48	10/25/22	17	1918 - 1952
Kiana	do	May 18	5/ 7/40	5/29/39	Oct. 18	10/10/39	11/ 4/38	6	1938 - 1944
Kobuk	do	May 19	5/11/43	5/29/45	Oct. 21	10/ 9/39	11/ 2/38	12	1937 - 1952
Shungnak	do	May 21	5/12/41	5/29/45	Oct. 16	10/ 7/19	10/25/40	8	1919 - 1950
Kivalina	Kivalina River	May 22	5/15/43	5/27/49	Oct. 25	10/15/48	11/ 1/46	6	1943 - 1952
Point Hope	Arctic Ocean	June 20	5/30/27	7/ 8/46	Nov. 11	10/ 6/42	12/19/47	8	1927 - 1951
Point Lay	do	June 24	6/ 1/43	7/10/53	Nov. 4	10/12/43	11/27/48	4	1943 - 1953
Wainwright	do	June 29	6/ 7/44	7/26/48	Oct. 2	9/26/48	10/ 9/45	7	1939 - 1953
Point Barrow	do	July 22	6/15/44	8/22/31	Oct. 3	8/31/27	12/19/47	31	1920 - 1953

COASTAL WARNING DISPLAYS

DAYTIME SIGNALS



NIGHT (LIGHT) SIGNALS



EXPLANATION OF DISPLAYS

Small Craft Advisory: One RED pennant displayed by day and a RED light ABOVE a WHITE light at night, to alert mariners to sustained (more than two hours) weather or sea conditions, either present or forecast, that might be hazardous to small boats. Mariners learning of a Small Craft Advisory are urged to determine immediately the reason by tuning their radios to the latest marine broadcasts. Decision as to the degree of hazard will be left up to the boatman, based on his experience and size and type of boat. The threshold conditions for the Small Craft Advisory are usually 18 knots of wind (less than 18 knots in some dangerous waters) or hazardous wave conditions.

Gale Warning: Two RED pennants displayed by day and a WHITE light ABOVE a RED light at night to indicate that winds within the range 34 to 47 knots are forecast for the area.

Storm Warning: A single square RED flag with a BLACK center displayed during daytime and two RED lights at night to indicate that winds 48 knots and above, no matter how high the speed, are forecast for the area. However, if the winds are associated with a tropical cyclone (hurricane) the STORM WARNING display indicates that winds within the range 48 to 63 knots are forecast.

Hurricane Warning: Displayed only in connection with a tropical cyclone (hurricane). Two square RED flags with BLACK centers displayed by day and a WHITE light between two RED lights at night to indicate that winds 64 knots and above are forecast for the area.

Note: A "HURRICANE WATCH" is an announcement issued by the National Weather Service via press and radio and television broadcasts whenever a tropical storm or hurricane becomes a threat to a coastal area. The "Hurricane Watch" announcement is not a warning, rather it indicates that the hurricane is near enough that everyone in the area covered by the "Watch" should listen to their radios for subsequent advisories and be ready to take precautionary action in case hurricane warnings are issued.

Note: As of 1 February 1969 the National Weather Service discontinued its operation of the above visual system. Some local organizations, however, continued this program using information from a NOAA Weather Radio or some similar source for activating or ending their display. A SPECIAL MARINE WARNING BULLETIN is issued whenever a severe local storm or strong wind of brief duration is imminent and is not covered by existing warnings or advisories. Boaters will be able to receive these special warnings by keeping tuned to a NOAA VHF-FM radio station or to Coast Guard and commercial radio stations that transmit marine weather information.

PACIFIC OCEAN DISTANCES
(Nautical Miles)

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: San Francisco, Calif., is 2,091 nautical miles from Honolulu, Hawaii.

PANAMA CANAL (Pac. Ent.) 8°53' 0"N., 79°31' 0"W.	San Diego, Calif. 32°43' 0"N., 117°10' 5"W.	Long Beach, Calif. 33°46' 2"N., 118°13' 3"W.	Los Angeles, Calif. 33°45' 0"N., 118°16' 2"W.	San Francisco, Calif. 37°48' 5"N., 122°24' 0"W.	Astoria, Oreg. 46°11' 7"N., 123°50' 0"W.	Portland, Oreg. 45°39' 0"N., 122°41' 7"W.	CAPE FLATTERY, WASH. 48°26' 0"N., 124°47' 0"W.	SWIFTSURE BANK, WASH. 48°31' 0"N., 125°00' 0"W.	Seattle, Wash. 47°36' 2"N., 122°20' 3"W.	Ketchikan, Alaska 55°20' 5"N., 131°38' 1"W.	Sitka, Alaska 57°03' 1"N., 135°20' 5"W.	CAPE SPENCER, ALASKA 58°10' 0"N., 136°38' 3"W.	Port Valdez, Alaska 61°05' 0"N., 146°24' 0"W.	Seward, Alaska 60°06' 0"N., 149°26' 0"W.	Anchorage, Alaska 61°14' 2"N., 149°53' 3"W.	Kodiak, Alaska 57°47' 1"N., 152°25' 1"W.	UNIMAK PASS, ALASKA 54°20' 0"N., 164°45' 0"W.	Kulik Bay, Alaska 51°51' 6"N., 176°37' 6"W.	Hilo, Hawaii 19°44' 1"N., 155°03' 5"W.	Kawaihae, Hawaii 20°02' 3"N., 155°49' 9"W.	Kahului, Hawaii 20°54' 0"N., 156°28' 2"W.	Honolulu, Hawaii 21°18' 5"N., 157°52' 3"W.	Pearl Harbor, Hawaii 21°20' 0"N., 157°58' 3"W.	Nawiliwili, Hawaii 21°57' 4"N., 159°21' 5"W.	Port Allen, Hawaii 21°54' 1"N., 159°35' 6"W.	Midway Island 28°13' 0"N., 177°22' 0"W.
2867																														
2939	94																													
2939	95	3																												
3270	455	374	371																											
3803	989	908	904	567																										
3868	1074	992	989	652	85																									
3920	1104	1024	1020	683	153	238																								
—	—	—	—	—	—	—	10																							
4044	1228	1148	1144	807	278	362	124	134																						
4387	1575	1497	1493	1156	660	745	—	518	659*																					
4538	1723	1643	1639	1302	815	900	—	681	815	224																				
4603	1787	1707	1703	1366	883	968	—	739	976*	307	85																			
4984	2174	2092	2089	1745	1239	1324	—	1100	1234	713	479	400																		
4940	2124	2043	2040	1702	1242	1327	—	1100	1234	682	494	422	144																	
5117	2303	2223	2220	1882	1435	1520	—	1294	1428	892	708	641	385	274																
4924	2115	2034	2031	1693	1261	1346	—	1124	1258	742	564	505	280	175	242															
5228	2412	2331	2328	1990	1626	1711	—	1510	1644	1193	1027	987	761	652	688	505														
5604	2806	2725	2722	2403	2071	2156	—	1973	2107	1656	1490	1450	1224	1115	1151	968	463													
4527	2175	2143	2140	2019	2214	2299	2260	—	2384	2398	2410	2447	2524	2439	2542	2296	2126	2198												
4584	2219	2183	2180	2051	2235	2320	2276	—	2400	2405	2412	2445	2513	2432	2535	2289	2110	2164	83											
4609	2212	2173	2170	2036	2207	2292	2245	—	2369	2361	2365	2398	2463	2377	2479	2233	2044	2099	121	85										
4685	2278	2236	2233	2091	2246	2331	2285	—	2409	2383	2385	2411	2468	2373	2477	2230	2028	2061	196	140	69									
4660	2283	2241	2238	2096	2251	2336	2290	—	2414	2388	2390	2416	2473	2378	2482	2235	2024	2057	201	145	94	9								
4767	2330	2284	2281	2126	2262	2347	2289	—	2413	2368	2361	2388	2429	2332	2440	2184	1963	1989	287	230	181	96	92							
4777	2347	2302	2299	2146	2281	2366	2308	—	2432	2387	2380	2407	2445	2351	2459	2203	1972	1990	297	240	193	106	102	21						
5707	3097	3034	3031	2792	2724	2809	2694	—	2818	2570	2481	2472	2386	2250	2305	2066	1680	1460	1338	1278	1232	1150	1146	1069	1042					

* Via inside passage

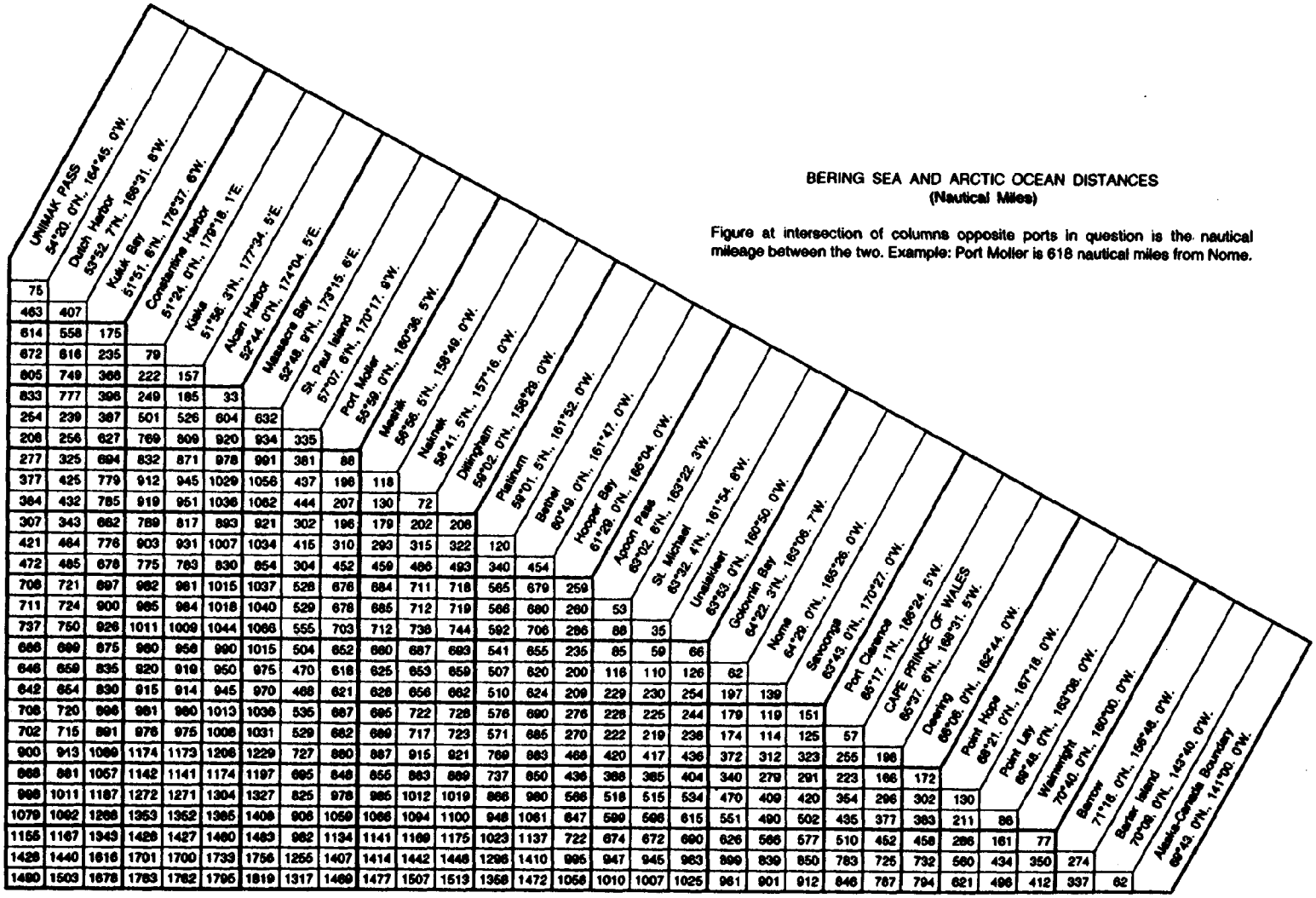
GULF OF ALASKA DISTANCES
(Nautical Miles)

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: Anchorage is 385 nautical miles from Port Valdez.

SWIFTSURE BANK 48°31. 0'N., 125°00. 0'W.	DIXON ENTRANCE 54°26. 0'N., 132°32. 0'W.	CAPE DECISION 55°59. 4'N., 134°08. 1'W.	Sitka 57°03. 1'N., 135°20. 5'W.	CAPE SPENCER 58°10. 0'N., 136°38. 3'W.	Yakutat 59°32. 9'N., 139°43. 8'W.	Cordova 60°33. 4'N., 145°45. 3'W.	Port Valdez 61°06. 0'N., 146°24. 0'W.	Whittier 60°46. 6'N., 148°39. 6'W.	Latouche 60°03. 3'N., 147°54. 1'W.	Seward 60°06. 0'N., 149°26. 0'W.	Seldovia 59°26. 5'N., 151°43. 0'W.	Homer 59°36. 0'N., 151°24. 0'W.	Anchorage 61°14. 2'N., 149°53. 3'W.	Kodiak 57°47. 1'N., 152°25. 1'W.	Uyak 57°38. 6'N., 154°00. 0'W.	Chignik 56°17. 8'N., 158°24. 0'W.	Unga 55°10. 6'N., 160°29. 6'W.	False Pass 54°51. 4'N., 163°24. 0'W.	UNIMAK PASS 54°20. 0'N., 164°45. 0'W.
500																			
586	106																		
681	192	95																	
739	259	162	85																
869	402	295	231	141															
1093	627	522	472	393	278														
1100	634	529	479	400	285	76													
1113	647	542	492	413	298	98	96												
1076	617	527	467	395	286	85	83	64											
1100	642	553	494	422	312	146	144	125	61										
1167	716	636	580	514	411	260	257	239	172	147									
1178	729	647	591	525	422	270	267	249	183	158	16								
1294	845	763	708	641	538	387	385	367	300	274	139	143							
1124	687	613	564	505	414	282	280	261	201	175	115	126	242						
1200	762	689	628	571	480	339	337	317	254	228	138	149	264	80					
1301	874	811	772	717	636	503	501	481	418	392	302	313	428	245	180				
1394	953	892	865	811	730	597	595	574	511	485	395	406	521	338	273	122			
1473	1084	1016	980	926	844	711	709	689	626	600	510	521	636	453	388	236	135		
1510	1120	1084	1027	987	897	763	761	742	678	652	562	573	688	505	440	289	187	86	

BERING SEA AND ARCTIC OCEAN DISTANCES
(Nautical Miles)

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: Port Moller is 618 nautical miles from Nome.



Radio Bearing Conversion Table

Table of corrections, in minutes

[DIFFERENCE OF LONGITUDE IN DEGREES]

Mid. L	½°	1°	1½°	2°	2½°	3°	3½°	4°	4½°	5°	5½°	6°	6½°	7°	7½°	8°	8½°	9°	9½°	10°
15°	4	8	12	16	19	23	27	31	35	40	43	47	50	54	58	62	66	70	74	78
16°	4	8	12	17	21	25	29	33	37	41	45	50	54	58	62	66	70	74	79	83
17°	4	9	13	18	22	26	31	35	39	44	48	53	57	61	66	70	75	79	83	88
18°	5	9	13	19	23	28	32	37	42	46	51	56	60	65	70	74	79	83	88	93
19°	5	10	15	20	24	29	34	39	44	49	54	59	63	68	73	78	83	88	93	98
20°	5	10	15	21	26	31	36	41	46	51	56	62	67	72	77	82	87	92	98	103
21°	5	11	16	21	27	32	38	43	48	54	59	64	70	75	81	86	91	97	102	108
22°	6	11	17	22	28	34	39	45	51	56	62	67	73	79	84	90	96	101	107	112
23°	6	12	18	23	29	35	41	47	53	59	64	70	76	82	88	94	100	105	111	117
24°	6	12	18	24	31	37	43	49	55	61	67	73	79	85	92	98	104	110	116	122
25°	6	13	19	25	32	38	44	51	57	63	70	76	82	89	95	101	108	114	120	127
26°	7	13	20	26	33	39	46	53	59	66	72	79	85	92	99	105	112	118	125	131
27°	7	14	20	27	34	41	48	54	61	68	75	82	89	95	102	109	116	123	129	136
28°	7	14	21	28	35	42	49	56	63	70	77	84	92	99	106	113	120	127	134	141
29°	7	15	21	29	36	44	51	58	65	73	80	87	95	102	109	116	124	131	138	145
30°	7	15	22	30	38	45	53	60	68	75	83	90	98	105	113	120	127	135	143	150
31°	8	15	23	31	39	46	54	62	70	77	85	93	100	108	116	124	131	139	146	155
32°	8	16	24	32	40	48	56	64	72	79	87	95	103	111	119	127	135	143	151	159
33°	8	16	25	33	41	49	57	65	74	82	90	98	106	114	123	131	139	147	155	163
34°	8	17	25	34	42	50	59	67	75	84	92	101	109	117	126	134	143	151	159	168
35°	9	17	26	34	43	52	60	69	77	86	95	103	112	120	129	138	146	155	163	172
36°	9	18	26	35	44	53	62	71	79	88	97	106	115	123	132	141	150	159	168	176
37°	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	144	153	163	172	181
38°	9	18	28	37	46	55	65	74	83	92	102	111	120	129	139	148	157	166	175	185
39°	9	19	28	38	47	57	66	75	85	94	104	113	123	132	142	151	160	170	179	189
40°	10	19	29	39	48	58	68	77	87	96	106	116	125	135	145	154	164	174	183	193
41°	10	20	30	39	49	59	69	79	89	98	108	118	128	138	148	157	167	177	187	197
42°	10	20	30	40	50	60	70	80	90	100	110	120	130	140	151	161	171	181	191	201
43°	10	20	31	41	51	61	72	82	92	102	113	123	133	143	153	164	174	184	194	205
44°	10	21	31	42	52	63	73	83	94	104	115	125	135	146	156	167	177	188	198	208
45°	11	21	32	42	53	64	74	85	95	106	117	127	138	149	159	170	180	191	201	212
46°	11	22	32	43	54	65	76	86	97	108	119	129	140	151	162	173	183	194	205	216
47°	11	22	33	44	55	66	77	88	99	110	121	132	143	154	165	176	186	197	208	219
48°	11	22	33	45	56	67	78	89	100	111	123	134	145	156	167	178	190	201	212	223
49°	11	23	34	45	57	68	79	91	102	113	125	136	147	158	170	181	192	204	215	226
50°	11	23	34	46	57	69	80	92	103	115	126	138	149	161	172	184	195	207	218	230
51°	12	23	35	47	58	70	82	93	105	117	128	140	152	163	175	186	198	210	221	233
52°	12	24	35	47	59	71	83	95	106	118	130	142	154	165	177	189	201	213	225	236
53°	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240
54°	12	24	36	49	61	73	85	97	109	121	133	146	158	170	182	194	206	218	231	243
55°	12	25	37	49	61	74	86	98	111	123	135	147	160	172	184	197	209	221	233	246
56°	12	25	37	50	62	75	87	100	112	124	137	149	162	174	187	199	211	224	236	249
57°	13	25	38	50	63	75	88	101	113	126	138	151	164	176	189	201	214	226	239	252
58°	13	25	38	51	64	76	89	102	115	127	140	153	165	178	191	204	216	229	242	254
59°	13	26	39	51	64	77	90	103	116	129	141	154	167	180	193	206	219	231	244	257
60°	13	26	39	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247	260

Example. A ship in latitude 39°51'N., longitude 67°35' W., by dead reckoning, obtains a radio bearing of 299° true on the radiobeacon located in latitude 40°37'N., longitude 69°37' W.

Radiobeacon station	Latitude	40°37' N.
Dead-reckoning position of ship	Latitude	39°51'
Middle latitude		40°14'
Radiobeacon station	Longitude	69°37' W.
Dead-reckoning position of ship	Longitude	67°35'
Longitude difference		2°02'

Entering the table with difference of longitude equal 2°, which is the nearest tabulated value and opposite 40° middle latitude, the correction of 39' is read.

As the ship is east of the radiobeacon, a minus correction is applied. The Mercator bearing then will be 299° - 000°39' = 298°21'. To facilitate plotting, subtract 180° and plot from the position of the radiobeacon the bearing 298°21' - 180°, or 118°21' (Mercator bearing reckoned clockwise from true north).

Distance of Visibility of Objects at Sea

This table gives the approximate geographic range of visibility for an object which may be seen by an observer at sea level. It is necessary to add to the distance for the height of any object the distance corresponding to the height of the observer's eye above sea level.

Distances of visibility for objects of various elevations above sea level.

Height Feet	Nautical miles	Statute miles	Height *meters*	Height Feet	Nautical miles	Statute miles	Height *meters*
1	1.2	1.3	0.30	120	12.8	14.7	36.58
2	1.7	1.9	0.61	125	13.1	15.1	38.10
3	2.0	2.3	0.91	130	13.3	15.4	39.62
4	2.3	2.7	1.22	135	13.6	15.6	41.15
5	2.6	3.0	1.52	140	13.8	15.9	42.67
6	2.9	3.3	1.83	145	14.1	16.2	44.20
7	3.1	3.6	2.13	150	14.3	16.5	45.72
8	3.3	3.8	2.44	160	14.8	17.0	48.77
9	3.5	4.0	2.74	170	15.3	17.6	51.82
10	3.7	4.3	3.05	180	15.7	18.1	54.86
11	3.9	4.5	3.35	190	16.1	18.6	57.91
12	4.1	4.7	3.66	200	16.5	19.0	60.96
13	4.2	4.9	3.96	210	17.0	19.5	64.01
14	4.4	5.0	4.27	220	17.4	20.0	67.06
15	4.5	5.2	4.57	230	17.7	20.4	70.10
16	4.7	5.4	4.88	240	18.1	20.9	73.15
17	4.8	5.6	5.18	250	18.5	21.3	76.20
18	5.0	5.7	5.49	260	18.9	21.7	79.25
19	5.1	5.9	5.79	270	19.2	22.1	82.30
20	5.2	6.0	6.10	280	19.6	22.5	85.34
21	5.4	6.2	6.40	290	19.9	22.9	88.39
22	5.5	6.3	6.71	300	20.3	23.3	91.44
23	5.6	6.5	7.01	310	20.6	23.7	94.49
24	5.7	6.6	7.32	320	20.9	24.1	97.54
25	5.9	6.7	7.62	330	21.3	24.5	100.58
26	6.0	6.9	7.92	340	21.6	24.8	103.63
27	6.1	7.0	8.23	350	21.9	25.2	106.68
28	6.2	7.1	8.53	360	22.2	25.5	109.73
29	6.3	7.3	8.84	370	22.5	25.9	112.78
30	6.4	7.4	9.14	380	22.8	26.2	115.82
31	6.5	7.5	9.45	390	23.1	26.6	118.87
32	6.6	7.6	9.75	400	23.4	26.9	121.92
33	6.7	7.7	10.06	410	23.7	27.3	124.97
34	6.8	7.9	10.36	420	24.0	27.6	128.02
35	6.9	8.0	10.67	430	24.3	27.9	131.06
36	7.0	8.1	10.97	440	24.5	28.2	134.11
37	7.1	8.2	11.28	450	24.8	28.6	137.16
38	7.2	8.3	11.58	460	25.1	28.9	140.21
39	7.3	8.4	11.89	470	25.4	29.2	143.26
40	7.4	8.5	12.19	480	25.6	29.5	146.30
41	7.5	8.6	12.50	490	25.9	29.8	149.35
42	7.6	8.7	12.80	500	26.2	30.1	152.40
43	7.7	8.8	13.11	510	26.4	30.4	155.45
44	7.8	8.9	13.41	520	26.7	30.7	158.50
45	7.8	9.0	13.72	530	26.9	31.0	161.54
46	7.9	9.1	14.02	540	27.2	31.3	164.59
47	8.0	9.2	14.33	550	27.4	31.6	167.64
48	8.1	9.3	14.63	560	27.7	31.9	170.69
49	8.2	9.4	14.94	570	27.9	32.1	173.74
50	8.3	9.5	15.24	580	28.2	32.4	176.78
55	8.7	10.0	16.76	590	28.4	32.7	179.83
60	9.1	10.4	18.29	600	28.7	33.0	182.88
65	9.4	10.9	19.81	620	29.1	33.5	188.98
70	9.8	11.3	21.34	640	29.5	34.1	195.07
75	10.1	11.7	22.86	660	30.1	34.6	201.17
80	10.5	12.0	24.38	680	30.5	35.1	207.26
85	10.8	12.4	25.91	700	31.0	35.6	213.36
90	11.1	12.8	27.43	720	31.4	36.1	219.46
95	11.4	13.1	28.96	740	31.8	36.6	225.55
100	11.7	13.5	30.48	760	32.3	37.1	231.65
105	12.0	13.8	32.00	780	32.7	37.6	237.74
110	12.3	14.1	33.53	800	33.1	38.1	243.84
115	12.5	14.4	35.05	820	33.5	38.6	249.94

Example: Determine the geographic visibility of an object, with a height above water of 65 feet, for an observer with a height of eye of 35 feet. Enter above table;

Height of object	65 feet	9.4 nautical miles
Height of observer	35 feet	6.9 nautical miles
Computed geographic visibility		16.3 nautical miles

Conversion of Degrees to Points and Vice Versa

°	'	Points	°	'	Points
000	00	N	180	00	S
002	49		182	49	
005	38	N ½ E	185	38	S ½ W
008	26		188	26	
011	15	N x E	191	15	S x W
014	04		194	04	
016	53	N x E ½ E	196	53	S x W ½ W
019	41		199	41	
022	30	NNE	202	30	SSW
025	19		205	19	
028	08	NNE ½ E	208	08	SSW ½ W
030	56		210	56	
033	45	NE x N	213	45	SW x S
036	34		216	34	
039	23	NE ½ N	219	23	SW ½ S
042	11		222	11	
045	00	NE	225	00	SW
047	49		227	49	
050	38	NE ½ E	230	38	SW ½ W
053	26		233	26	
056	15	NE x E	236	15	SW x W
059	04		239	04	
061	53	NE x E ½ E	241	53	SW x W ½ W
064	41		244	41	
067	30	ENE	247	30	WSW
070	19		250	19	
073	08	ENE ½ E	253	08	WSW ½ W
075	56		255	56	
078	45	E x N	258	45	W x S
081	34		261	34	
084	23	E ½ N	264	23	W ½ S
087	11		267	11	
090	00	E	270	00	W
092	49		272	49	
095	38	E ½ S	275	38	W ½ N
098	26		278	26	
101	15	E x S	281	15	W x N
104	04		284	04	
106	53	ESE ½ E	286	53	WNW ½ W
109	41		289	41	
112	30	ESE	292	30	WNW
115	19		295	19	
118	08	SE x E ½ E	298	08	NW x W ½ W
120	56		300	56	
123	45	SE x E	303	45	NW x W
126	34		306	34	
129	23	SE ½ E	309	23	NW ½ W
132	11		312	11	
135	00	SE	315	00	NW
137	49		317	49	
140	38	SE ½ S	320	38	NW ½ N
143	26		323	26	
146	15	SE x S	326	15	NW x N
149	04		329	04	
151	53	SSE ½ E	331	53	NNW ½ W
154	41		334	41	
157	30	SSE	337	30	NNW
160	19		340	19	
163	08	S x E ½ E	343	08	N x W ½ W
165	56		345	56	
168	45	S x E	348	45	N x W
171	34		351	34	
174	23	S ½ E	354	23	N ½ W
177	11		357	11	

DETERMINATION OF WIND SPEED BY SEA CONDITION

Miles per hour	Knots	Descriptive	Sea Conditions	Wind force (Beaufort)	Probable wave height (in ft.)
0-1	0-1	Calm	Sea smooth and mirror-like.	0	-
1-3	1-3	Light air	Scale-like ripples without foam crests.	1	1/4
4-7	4-6	Light breeze	Small, short wavelets; crests have a glassy appearance and do not break.	2	1/2
8-12	7-10	Gentle breeze	Large wavelets; some crests begin to break; foam of glassy appearance. Occasional white foam crests.	3	2
13-18	11-16	Moderate breeze	Small waves, become longer; fairly frequent white foam crests.	4	4
19-24	17-21	Fresh breeze	Moderate waves, taking a more pronounced long form; many white foam crests; there may be some spray.	5	6
25-31	22-27	Strong breeze	Large waves begin to form; white foam crests are more extensive everywhere; there may be some spray.	6	10
32-38	28-33	Near gale	Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of the wind; spindrift begins.	7	14
39-46	34-40	Gale	Moderately high waves of greater length; edges of crests break into spindrift; foam is blown in well-marked streaks along the direction of the wind.	8	18
47-54	41-47	Strong gale	High waves; dense streaks of foam along the direction of the wind; crests of waves begin to topple, tumble, and roll over; spray may reduce visibility.	9	23
55-63	48-55	Storm	Very high waves with long overhanging crests. The resulting foam in great patches is blown in dense white streaks along the direction of the wind. On the whole, the surface of the sea is white in appearance. The tumbling of the sea becomes heavy and shocklike. Visibility is reduced.	10	29
64-72	56-63	Violent storm	Exceptionally high waves that may obscure small and medium-sized ships. The sea is completely covered with long white patches of foam lying along the direction of the wind. Everywhere the edges of the wave crests are blown into froth. Visibility is reduced.	11	37
73 or more	64 or more	Hurricane	The air is filled with foam and spray. Sea completely white with driving spray; visibility very much reduced.	12	45

ATMOSPHERIC PRESSURE CONVERSION TABLE

Inches	Millibars	Inches	Millibars	Inches	Millibars
28.44	963	29.32	993	30.21	1023
28.53	966	29.41	996	30.30	1026
28.62	969	29.50	999	30.39	1029
28.70	972	29.59	1002	30.48	1032
28.79	975	29.68	1005	30.56	1035
28.88	978	29.77	1008	30.65	1038
28.97	981	29.86	1011	30.74	1041
29.06	984	29.94	1014	30.89	1044
29.15	987	30.03	1017	30.92	1047
29.24	990	30.12	1020	31.01	1050

TABLE FOR ESTIMATING TIME OF TRANSIT

Distance	Speed in knots																		
	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	30
Nautical miles	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*
10	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	.....	.....	.....	.....	.....	.....
20	0-3	0-2	0-2	0-2	0-2	0-2	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1
30	0-4	0-3	0-3	0-3	0-3	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-1	0-1	0-1	0-1	0-1	0-1
40	0-5	0-4	0-4	0-4	0-3	0-3	0-3	0-3	0-3	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-1
50	0-6	0-6	0-5	0-5	0-4	0-4	0-4	0-3	0-3	0-3	0-3	0-3	0-3	0-2	0-2	0-2	0-2	0-2	0-2
60	0-8	0-7	0-6	0-5	0-5	0-5	0-4	0-4	0-4	0-4	0-3	0-3	0-3	0-3	0-3	0-3	0-3	0-2	0-2
70	0-9	0-8	0-7	0-6	0-6	0-5	0-5	0-5	0-4	0-4	0-4	0-4	0-4	0-3	0-3	0-3	0-3	0-3	0-2
80	0-10	0-9	0-8	0-7	0-7	0-6	0-6	0-5	0-5	0-5	0-4	0-4	0-4	0-4	0-4	0-3	0-3	0-3	0-3
90	0-11	0-10	0-9	0-8	0-8	0-7	0-6	0-6	0-6	0-5	0-5	0-5	0-5	0-4	0-4	0-4	0-4	0-4	0-3
100	0-13	0-11	0-10	0-9	0-8	0-8	0-7	0-7	0-6	0-6	0-6	0-5	0-5	0-5	0-5	0-4	0-4	0-4	0-3
200	1-1	0-22	0-20	0-18	0-17	0-15	0-14	0-13	0-13	0-12	0-11	0-11	0-10	0-10	0-9	0-9	0-8	0-8	0-7
300	1-14	1-9	1-6	1-3	1-1	0-23	0-21	0-20	0-19	0-18	0-17	0-16	0-15	0-14	0-14	0-13	0-13	0-12	0-10
400	2-2	1-20	1-16	1-12	1-9	1-7	1-5	1-3	1-1	1-0	0-22	0-21	0-20	0-19	0-18	0-17	0-17	0-16	0-13
500	2-15	2-8	2-2	1-21	1-18	1-14	1-12	1-9	1-7	1-5	1-4	1-2	1-1	1-0	0-23	0-22	0-21	0-20	0-17
600	3-3	2-19	2-12	2-7	2-2	1-22	1-19	1-16	1-14	1-11	1-9	1-8	1-6	1-5	1-3	1-2	1-1	1-0	0-20
700	3-16	3-6	2-22	2-16	2-10	2-6	2-2	1-23	1-20	1-17	1-15	1-13	1-11	1-9	1-8	1-6	1-5	1-4	0-23
800	4-4	3-17	3-8	3-1	2-19	2-14	2-9	2-5	2-2	1-23	1-20	1-18	1-16	1-14	1-12	1-11	1-9	1-8	1-3
900	4-17	4-4	3-18	3-10	3-3	2-21	2-16	2-12	2-8	2-5	2-2	1-23	1-21	1-19	1-17	1-15	1-14	1-12	1-6
1,000	5-5	4-15	4-4	3-19	3-11	3-5	2-23	2-19	2-15	2-11	2-8	2-5	2-2	2-0	1-21	1-19	1-18	1-16	1-9
2,000	10-10	9-6	8-8	7-14	6-23	6-10	5-23	5-13	5-5	4-22	4-15	4-9	4-4	3-23	3-19	3-15	3-11	3-8	2-19
3,000	15-15	13-21	12-12	11-9	10-10	9-15	8-22	8-8	7-20	7-8	6-23	6-14	6-6	5-23	5-16	5-10	5-5	5-0	4-4
4,000	20-20	18-12	16-16	15-4	13-21	12-20	11-22	11-8	10-10	9-19	9-6	8-19	8-8	7-22	7-14	7-6	6-23	6-16	5-13
5,000	26-1	23-4	20-20	18-23	17-9	16-1	14-21	13-21	13-1	12-6	11-14	10-23	10-10	9-22	9-11	9-1	8-16	8-8	6-23
6,000	31-6	27-19	25-0	22-17	20-20	19-6	17-21	16-16	15-15	14-17	13-21	13-4	12-12	11-22	11-9	10-21	10-10	10-0	8-8

STANDARD ABBREVIATIONS for BROADCASTS

Characteristic	*Abbrev*
Fixed	F
Occulting	OC
Group-Occulting	OC(2)
Composite Group-Occulting	OC(2+1)
Isophase	ISO
Single-Flashing	FL
Group-Flashing	FL(3)
Composite Group-Flashing	FL(2+1)
Continuous Quick-Flashing	Q
Interrupted Quick-Flashing	IQ
Morse Code	MO(A)
Fixed and Flashing	FFL
Alternating	AL
Characteristic	CHAR
Color[1]	
Black	B
Blue	BU
Green	G
Orange	OR
Red	R
White	W
Yellow	Y
Aids to Navigation	
Aeronautical radiobeacon	AERO RBN
Articulated Daybeacon	ART DBN
Articulated Light	ART LT
Destroyed	DESTR
Discontinued	DISCONTD
Established	ESTAB
Exposed Location Buoy	ELB
Fog signal station	FOG SIG
Large Navigation buoy	LNB
Light	LT
Light List Number	LLNR
Lighted Bell Buoy	LBB
Lighted Buoy	LB
Lighted Gong Buoy	LGB
Lighted Horn Buoy	LHB
Lighted Whistle Buoy	LWB
Ocean Data Acquisition System	ODAS
Privately Maintained	PRIV MAINTD
Radar responder beacon	RACON
Radar Reflector	RA REF
Radiobeacon	RBN
Temporarily Replaced by Unlighted Buoy	TRUB
Temporarily Replaced by Lighted Buoy	TRLB
Whistle	WHIS
Organizations	
Coast Guard	CG
Commander, Coast Guard District (#)	CCCD(#)
Corps of Engineers	COE
Defense Mapping Agency Hydrographic/ Topographic Center	DMAHTC
National Ocean Service	NOS
National Weather Service	NWS
Vessels	
Aircraft	A/C
Fishing Vessel	F/V
Liquified Natural Gas Carrier	LNG
Motor Vessel	M/V[2]
Pleasure Craft	P/C
Research Vessel	R/V
Sailing Vessel	S/V
Compass Directions	
East	E
North	N
Northeast	NE
Northwest	NW
South	S
Southeast	SE
Southwest	SW
West	W

[1] Color refers to light characteristics of aids to navigation only.

[2] M/V includes: Steam Ship, Container Vessel, Cargo Vessel, etc.

STANDARD ABBREVIATIONS for BROADCASTS

Months	
January	JAN
February	FEB
March	MAR
April	APR
May	MAY
June	JUN
July	JUL
August	AUG
September	SEP
October	OCT
November	NOV
December	DEC
Days of the Week	
Monday	MON
Tuesday	TUE
Wednesday	WED
Thursday	THU
Friday	FRI
Saturday	SAT
Sunday	SUN
Various	
Anchorage	ANCH
Anchorage prohibited	ANCH PROHIB
Approximate	APPROX
Atlantic	ATLC
Authorized	AUTH
Average	AVG
Bearing	BRG
Breakwater	BKW
Broadcast Notice to Mariners	BNM
Channel	CHAN
Code of Federal Regulations	CFR
Continue	CONT
Degrees (temp; geo pos)	DEG
Diameter	DIA
Edition	ED
Effect/Effective	EFF
Entrance	ENTR
Explosive Anchorage	EXPLOS ANCH
Fathom(s)	FM(S)
Foot/Feet	FT
Harbor	HBR
Height	HT
Hertz	HZ
Horizontal clearance	HOR CL
Hour	HR
International Regulations for Preventing Collisions at Sea, 1972	COLREGS
Kilohertz	KHZ
Kilometer	KM
Knot(s)	KT(S)
Latitude	LAT
Local Notice to Mariners	LNM
Longitude	LONG
Maintained	MAINTD
Maximum	MAX
Megahertz	MHZ
Millibar	MB
Millimeter	MM
Minute (time; geo pos)	MIN
Moderate	MOD
Mountain, Mount	MT
Nautical Mile(s)	NM
Notice to Mariners	NTM
Obstruction	OBSTR
Occasion/Occasionally	OCCASION
Operating Area	OPAREA
Pacific	PAC
Points(s)	PT(S)
Position	PSN
Position Approximate	PA
Pressure	PRES
Private, Privately	PRIV
Prohibited	PROHIB
Publication	PUB
Range	RGE
Reported	REP
Restricted	RESTR
Rock	RK
Saint	ST
Second (time; geo pos)	SEC
Signal station	SIG STA
Station	STA
Statute Mile(s)	SM
Storm signal station	S SIG STA
Temporary	TEMP
Through	THRU
Thunderstorm	TSTM
True	T
Uncovers; Dries	UNCOV
Universal Coordinate Time	UTC
Urgent Marine Information Broadcast	UMIB

STANDARD ABBREVIATIONS for BROADCASTS

Various (cont.)	
Velocity	VEL
Vertical clearance	VERT CL
Visibility	VSBY
Warning	WARN
Weather	WX
Wreck	WK
Yard(s)	YD

Countries and States	
Alabama	AL
Alaska	AK
American Samoa	AS
Arizona	AZ
Arkansas	AD
California	CA
Canada	CN
Colorado	CO
Connecticut	CT
Delaware	DE
District of Columbia	DC
Federated States of Micronesia	FSM
Florida	FL
Georgia	GA
Guam	GU
Hawaii	HI
Idaho	ID
Illinois	IL
Indiana	IN
Iowa	IA
Kansas	KS
Kentucky	KY
Louisiana	LA
Maine	ME
Maryland	MD
Massachusetts	MA
Mexico	MX
Michigan	MI
Minnesota	MN
Mississippi	MS
Missouri	MO
Montana	MT
Nebraska	NE
New Hampshire	NH
Nevada	NV
New Jersey	NJ
New Mexico	NM
New York	NY
North Carolina	NC
North Dakota	ND
Northern Marianas	CM
Ohio	OH
Oklahoma	OK
Oregon	OR
Pennsylvania	PA
Puerto Rico	PR
Rhode Island	RI
South Carolina	SC
South Dakota	SD
Tennessee	TN
Texas	TX
United States	US
Utah	UT
Vermont	VT
Virgin Islands	VI
Virginia	VA
Washington	WA
West Virginia	WV
Wisconsin	WI
Wyoming	WY

CONVERSION TABLE FOR NAUTICAL AND STATUTE MILES

1 nautical mile = 6076.11549 . . . feet

1 statute mile = 5,280 feet

Nautical miles to statute miles				Statute miles to nautical miles			
Nautical miles	Statute miles	Nautical miles	Statute miles	Statute miles	Nautical miles	Statute miles	Nautical miles
1	1.151	51	58.690	1	0. 869	51	44.318
2	2.302	52	59.840	2	1.738	52	45.187
3	3.452	53	60.991	3	2.607	53	46.056
4	4.603	54	62.142	4	3.476	54	46.925
5	5.754	55	63.293	5	4.345	55	47.794
6	6.905	56	64.444	6	5.214	56	48.663
7	8.055	57	65.594	7	6.083	57	49.532
8	9.206	58	66.745	8	6.952	58	50.401
9	10.357	59	67.896	9	7.821	59	51.270
10	11.508	60	69.047	10	8.690	60	52.139
11	12.659	61	70.197	11	9.559	61	53.008
12	13.809	62	71.348	12	10.428	62	53.877
13	14.960	63	72.469	13	11.297	63	54.746
14	16.111	64	73.659	14	12.166	64	55.615
15	17.262	65	74.801	15	13.035	65	56.484
16	18.412	66	75.951	16	13.904	66	57.353
17	19.563	67	77.102	17	14.773	67	58.222
18	20.714	68	78.253	18	15.642	68	59.091
19	21.865	69	79.404	19	16.511	69	59.959
20	23.016	70	80.554	20	17.380	70	60.828
21	24.166	71	81.705	21	18.249	71	61.697
22	25.317	72	82.856	22	19.118	72	62.566
23	26.468	73	84.007	23	19.986	73	63.435
24	27.619	74	85.158	24	20.855	74	64.304
25	28.769	75	86.308	25	21.724	75	65.173
26	29.920	76	87.459	26	22.593	76	66.042
27	31.071	77	88.610	27	23.462	77	66.911
28	32.222	78	89.761	28	24.331	78	67.780
29	33.373	79	90.911	29	25.200	79	68.649
30	34.523	80	92.062	30	26.069	80	69.518
31	35.674	81	93.213	31	26.938	81	70.387
32	36.825	82	94.364	32	27.807	82	71.256
33	37.976	83	95.515	33	28.676	83	72.125
34	39.126	84	96.665	34	29.545	84	72.994
35	40.277	85	97.816	35	30.414	85	73.863
36	41.428	86	98.967	36	31.283	86	74.732
37	42.579	87	100.118	37	32.152	87	75.601
38	43.730	88	101.268	38	33.021	88	76.470
39	44.880	89	102.419	39	33.890	89	77.339
40	46.031	90	103.570	40	34.759	90	78.208
41	47.182	91	104.721	41	35.628	91	79.077
42	48.333	92	105.871	42	36.497	92	79.946
43	49.483	93	107.022	43	37.366	93	80.815
44	50.634	94	108.173	44	38.235	94	81.684
45	51.785	95	109.324	45	39.104	95	82.553
46	52.936	96	110.475	46	39.973	96	83.422
47	54.087	97	111.625	47	40.842	97	84.291
48	55.237	98	112.776	48	41.711	98	85.160
49	56.388	99	113.927	49	42.580	99	86.029
50	57.539	100	115.078	50	43.449	100	86.898

To convert Nautical miles to Statute miles, multiply Nautical miles by 1.15.
To convert Statute miles to Nautical miles, multiply Statute miles by 0.87.

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