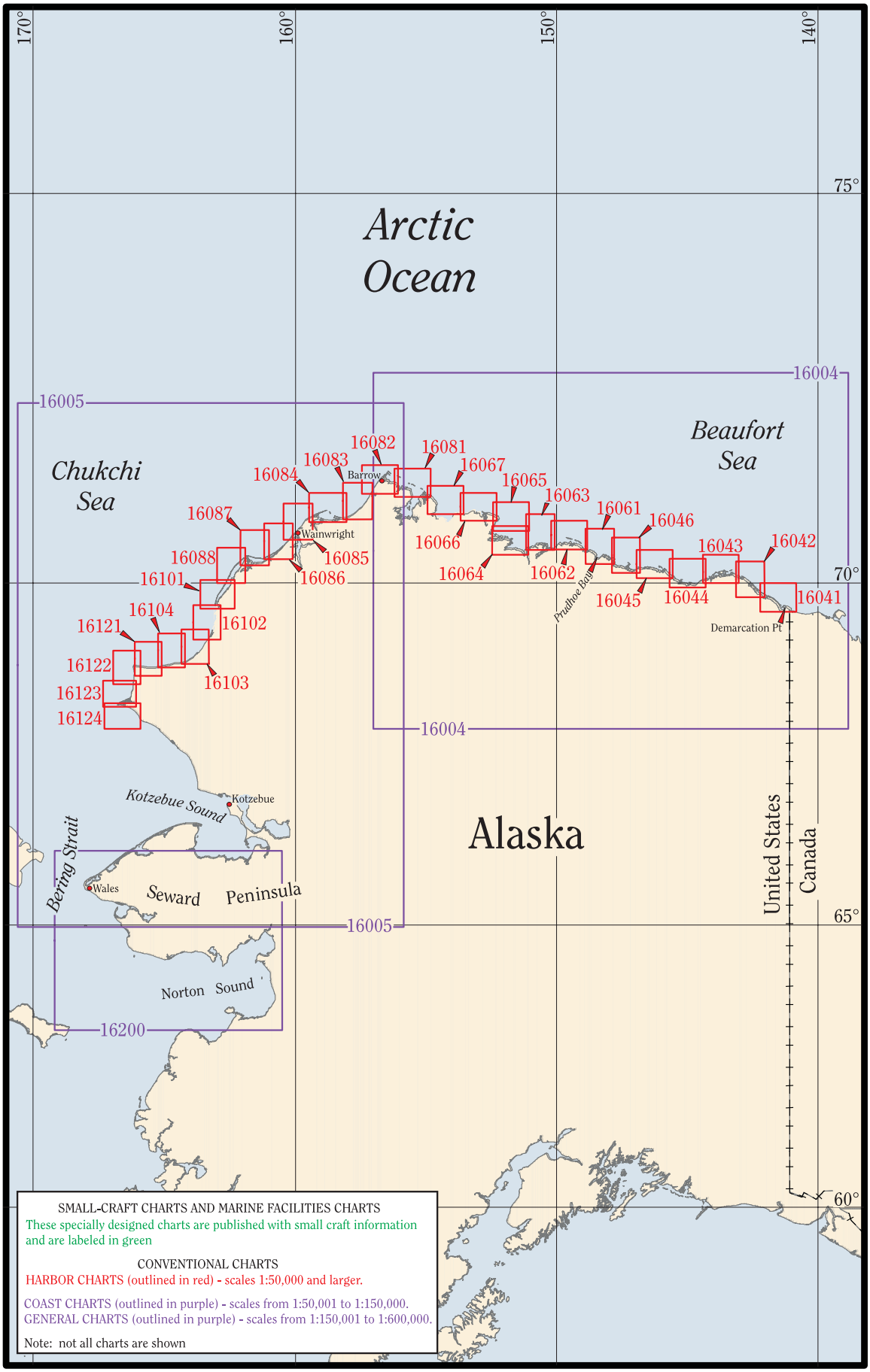
170°
160°
150°
140°
75°
70°
65°
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Arctic Ocean
Chukchi Sea
Beaufort Sea
Alaska
United States
Canada
Barrow
Wainwright
Kotzebue
Kotzebue Sound
Bering Strait
Wales
Seward Peninsula
Norton Sound
Prudhoe Bay
Demarcation Pt
16004
16005
16200
16041
16042
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16044
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SMALL-CRAFT CHARTS AND MARINE FACILITIES CHARTS
These specially designed charts are published with small craft information and are labeled in green
CONVENTIONAL CHARTS
HARBOR CHARTS (outlined in red) - scales 1:50,000 and larger.
COAST CHARTS (outlined in purple) - scales from 1:50,001 to 1:150,000.
GENERAL CHARTS (outlined in purple) - scales from 1:150,001 to 1:600,000.
Note: not all charts are shown

# 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 off-lying coastal islands, and the more important towns and communities in this area including Wales, Kotzebue, Wainwright, and Barrow.

## Chart 16003

(2) **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.

### Loran

(8) 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.

### Omega

(9) In September 1980, strong Omega signals were experienced in the Beaufort Sea by the U.S. Coast Guard Cutter POLAR SEA.

### Currents

(10) 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.

(11) 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.

(12) 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.

**Weather, Arctic Ocean**

(13) 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 one percent of the time, although winds reach 28 knots or more up to five percent of the time. This same flow is present over the open waters of the Chukchi Sea, where average wind speeds range from 14 to 18 knots, and gales occur about two 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 two percent of the time in November, December, January, and February, while winds at Kotzebue and Cape Lisburne reach 28 knots or more about three to seven percent of the time in winter.

(14) 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 one percent of the time in July and August, but one to two 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 and unlikely in March through August. 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 two to four percent of the time. Winds have reached 75 knots at Barter Island. Strong winter winds often blow parallel to the coast from Barrow to Barter Island.

(15) 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 two 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 five to 20 percent of the time and are worse 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.

(16) Winters are cold and summers are cool along this coast. In November, average daily maximums drop to the low teens (°F, -11 to -9°C) or below, while average minimums are around 0°F (-17.8°C). February is generally the coldest month. Average maximums range from just above 0°F (>-18°C) at Kotzebue to -14°F (-25.6°C), at Barter Island. Low temperatures in the -20°F (-28.9°C) range are common. Extremes of -59°F (-50.5°C) or below have been recorded. The big increase in temperature starts in March. By April, daytime highs in the 10 to 20°F (-12 to -7°C) range, and nighttime lows in the -5 to 5°F (-21 to -15°C) range are common. By June, temperatures are often in the forties (5 to 10°C) during the day and thirties (-1 to 4°C) at night. Warmest weather usually occurs in July. At Kotzebue, the average maximum is 59°F (15°C), while the average minimum is 48°F (8.9°C). Along the North Slope, these readings are 8 to 10°F (4 to 6°C) cooler. Extremes can reach the mid-seventies to mid-eighties (23 to 30°C).

(17) Since the air in this region holds relatively little moisture, particularly in winter, annual precipitation amounts are light, ranging from 5 to 15 inches (127 to 381 mm). 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 (762 to 1270 mm) fall each year. Heaviest amounts of precipitation are most likely in July, August, and September, when 2 to 4 inches (51 to 102 mm) per month are common.

### Ice

(18) 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.

(19) 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.

(20) 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.

(21) 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.

(22) 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.

(23) 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.

(24) Freezeup normally begins at Kotzebue in late October, and a southbound vessel should try to clear Bering Strait by early November.

### Small-boat operation in ice

(25) 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.

(26) Aids to navigation are maintained only during the navigation season. (See Light List.)

## Chart 16200

(27) **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.

(28) **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.

(29) **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.

(30) **Cape Prince of Wales Light** (65°38'00"N., 168°07'12"W.), 20 feet (6.1 m) 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.

(31) 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.

### Ice

(32) Average breakup in Bering Strait at Wales is in early June and average freezeup is about the first of December. Navigation is difficult from early December to early June and is usually suspended from late December through April.

(33) **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.

(34) **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.

(35) 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.

(36) **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.

(37) **Big Diomede Island** (Russia), 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.

## Chart 16005

(38) **Cape Dezhneva**, 19 miles NW of Big Diomede Island, is the E extremity of the mountainous peninsula at the NE end of the Russian 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. A light is shown from the SE side of the cape. A radiobeacon is at the light. A submerged rock is a mile off the NE face of the cape. Anchorage, with good protection 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.

(39) 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.

(40) **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°15'22"N., 166°04'11"W.), 20 feet (6.1 m) 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.

(41) **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.

(42) 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.

(43) 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.

### Ice

(44) Average breakup at Shishmaref is in the latter part of June and average freezeup is about the second week of November. Navigation is difficult from the first of December until late June and usually is suspended from late December until early June.

(45) 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.

(46) **Northwest Corner Light** (66°34'50"N., 164°24'24"W.), 75 feet (22.9 m) 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°33'27"N., 163°36'31"W.), 28 feet (8.5 m) above the water, is shown seasonally from a skeleton tower with a red and white diamond-shaped daymark on the cape.

(47) **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.

(48) 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.

(49) 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°05'58"N., 162°45'10"W.), 200 feet (61.0 m) 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.

(50) **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.

(51) **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.

(52) **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.

(53) **Spafarief Bay**, also in the SE corner of Kotzebue Sound but N of Kiwalik Lagoon, has depths of 3 to 5 fathoms.

(54) 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.

(55) 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.

(56) **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.

(57) **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.

(58) 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.

(59) **Cape Blossom** is a distinctive point in the Baldwin Peninsula bluffs, which are highest at the point and slope to either side.

(60) **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.

(61) **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.

(62) 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.

(63) 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.

(64) 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.

(65) 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.

(66) 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.

**Currents**

(67) 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.

**Weather, Kotzebue Vicinity**

(68) Kotzebue is 26 miles (48 km) 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.

(69) 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.

(70) 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.

(71) 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. Average winter maximums at Kotzebue are in the positive single digits 1°F to 10°F (-17°C to -12°C) while overnight lows average around -10°F (-23.3°C). During the summer months daily maximums average in the Farenheit middle fifties (12°C to 14°C) with overnight lows in the low to middle Farenheit forties (6°C to 8°C). Extremes for Kotzebue include a maximum of 85°F

(29.4°C) in July 1958 and a minimum of -52°F (-46.77°C) in February of 1964 and 1968.

(72) Annual precipitation is very light. The total for a normal year is about nine inches (229 mm), and over half of that usually occurs in three months; July, August, and September. The wettest year on record, 1990, had only 14.76 inches (374.9 mm) of precipitation. Snow falls on an average of 124 days during a given year and has fallen during every month. The snowiest month is November. The annual average snowfall is 49 inches (1245 mm) with extremes of 88 inches (2235 mm) and 21 inches (533 mm).

(73) (See page T-12 for **Kotzebue Climatological Table**.)

### Ice

(74) Average breakup in Kotzebue Sound at Kotzebue is about the last of May and average freezeup is in the latter part of October. 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.

(75) **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.

(76) **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.

(77) **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.

(78) 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.

(79) 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.

(80) 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.

(81) 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.

(82) 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 telephone and radiotelephone communications year round; telephone (907) 645-2184. 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.

(83) 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.

### Ice

(84) Average breakup at Kivalina is in the latter part of May and average freezeup is in the latter part of October.

### Pilotage, Kivalina/Cape Krusenstern

(85) Pilotage, except for certain exempted vessels, is compulsory for all vessels navigating the waters of the State of Alaska.

(86) The Chukchi Sea area is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association. (See **Pilotage, General** (indexed), chapter 3, for the pilot pickup stations and other details.)

(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.

## Charts 16124, 16005

(90) 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.

### Ice

(93) Average breakup at Point Hope is in the latter part of June and average freezeup is about the second week of November. 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.

## Charts 16123, 16005

(94) **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.

## Charts 16122, 16005

(96) **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.

## Charts 16121, 16104, 16005

(97) 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.

## Charts 16103, 16005

(98) 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.

## Charts 16102, 16101, 16088, 16087, 16005

(99) 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.

## Charts 16102, 16005

(100) **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.

## Charts 16101, 16005

(101) **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.

### Ice

(102) Average breakup at Point Lay is in late June and average freezeup is in early November. Navigation is difficult from early November to late June and usually is suspended from mid-December to late June.

## Charts 16088, 16087, 16005

(103) **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.

(104) **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.

(105) **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.

(106) 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.

(107) 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.

(108) 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.

(109) 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.

(110) **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.

## Charts 16086, 16005

(111) **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.

## Charts 16085, 16005

(112) **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.

(113) **Wainwright**, on the beach 2.5 miles NE of the inlet, has stores, a school, a church, and an airstrip.

(114) An aerolight (70°38.2'N., 160°01.6'W.) is close S of Wainwright. An aerolight and aero radiobeacon are at Wainwright airstrip (70°36.6'N., 159°51.9'W.).

### Ice

(115) Average breakup at Wainwright is about the last of June and average freezeup is about the first of October. Navigation is difficult from early November to mid-July and usually is suspended from early December to early July.

(116) **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.

## Charts 16084, 16005

(117) **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.

(118) 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.

(119) 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.

(120) Protection from S to W weather is available NE of Point Franklin and the Seahorse Islands. This shelter does not afford protection from ice.

(121) 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.

(122) 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.

(123) **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.

(124) 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.

## Charts 16083, 16082, 16005

(125) 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.

(126) 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.

(127) 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.

(128) **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.

(129) Barrow is a **customs station.**

## Charts 16082, 16004

(130) **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.

### Tides and currents

(131) 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.

(132) **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.

(133) 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.

### Weather, Barrow Vicinity

(134) Barrow is the location of the most northern Weather Service Office (WSO) 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 (370 km) 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.

(135) Temperatures at the Barrow WSO remain below the freezing point through most of the year, with the daily maximum reaching higher than 32°F (0°C) on an average of only 109 days a year. The mean daily maximum for the station is only 15°F (-9.4°C) while the mean daily minimum is 4°F (-15.6°C). The mean annual temperature is 10°F (-12.2°C). Daily minimums drop below the freezing point (0°C) 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 -17°F (-27.2°C), and the lowest temperature at the station on record -56°F (-48.8°C) 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 40°F (4.4°C). The record high for the station is 79°F (26.1°C) recorded in July 1993. 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 (-17.8°C) or below.

(136) Precipitation at Barrow is extremely light with a mean annual value of 4.57 inches (116 mm). The wettest months are July and August when nearly a half of the annual precipitation total may fall. Despite such limited amounts of precipitation, precipitation is recorded an average 252 days per year. Snowfall averages about 29 inches (737 mm) each year, occurs an average of 211 days each year and has been recorded during every month.

### Ice

(137) Average breakup at Barrow is in late July and average freezeup is in early October. Navigation is difficult from mid-October to late July and usually is suspended from early December to early July.

(138) 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.

(139) 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.

(140) 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.

(141) 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.

(142) Mariners should be aware that Alaskan Natives engage in subsistence whaling in the Beaufort Sea near Point Barrow from August 15 to October 31. Vessel operators are requested to contact the Alaska Eskimo Whaling Commission at 907-852-2392, or aewcdir@barrow.com prior to entering this area for information about the location and avoidance of traditional Native hunting parties.

## Charts 16082, 16081, 16004

(143) **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.

(144) **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.

(145) **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.

(146) **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.

(147) **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.

(148) 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.

## Charts 16081, 16067, 16004

(149) **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.

(150) 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.

(151) **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.

(152) 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.

(153) **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.

(154) **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.

(155) 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.

(156) 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.

## Charts 16066, 16004

(157) **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. 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.

## Charts 16065, 16004

(158) **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.

## Charts 16064, 16063, 16004

(159) **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.)

(160) **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.

(161) **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.

(162) **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.

(163) **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.

## Charts 16062, 16004

(164) **Oliktok Point**, the first prominent mainland point E of Colville River, is a triangular sandflat with elevations of as much as 5 feet. 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.

(165) **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.

(166) **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.

(167) 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.

(168) **Simpson Lagoon**, between the Jones Islands and the mainland, has depths of 6 feet and affords protected passage from Oliktok Point to Beechey Point. In January 2000, a 2-foot shoal was reported 3.8 miles ENE of Oliktok Point in about 70°32'12.8"N., 149°41'46.4"W.

## Charts 16062, 16061, 16004

(169) 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.

(170) **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.

(171) 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.

(172) 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.

(173) **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.

(174) **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.

(175) 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.

(176) 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.

(177) **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 artificial 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.

(178) 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.

## Charts 16046, 16004

(179) **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.

(180) **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.

(181) **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.

(182) 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.

(183) **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.

(184) **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.

(185) **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.

## Charts 16045, 16004

(186) **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.

(187) **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.

(188) **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.

(189) **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.

(190) **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.

(191) **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.

(192) 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.

(193) 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.

(194) **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.)

(195) 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.

## Charts 16044, 16004

(196) **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.

(197) 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.

(198) **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.

(199) **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.

## Charts 16043, 16004

(200) 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.

(201) **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.

(202) Kaktovik is a **customs station**.

(203) 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.

(204) 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.

### Weather, Barter Island Vicinity

(205) The climate is determined by the surrounding open Arctic water surface. The island terrain and the terrain of the mainland south 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 (120 km) to the south. Consequently, there are no topographic features to affect temperature and precipitation.

(206) 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. Extreme maximums have exceeded 70°F (21.1°C) only in July and August with the all-time maximum of 78°F (25.6°C) recorded in July 1974. The annual mean daily maximum temperature is just under 16°F (-8.9°C) and the mean daily minimum is slightly above 4°F (-15.6°C). 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 (8.3°C) in April and diminishing to their minimums of slightly less than 8 F (13.3°C) in June during the period of continuous daylight. February is the coldest month with a mean temperature of -19°F (-28.3°C). The all-time minimum for the station is -59°F (-50.5°C) in February 1950. Only the months of June through September have not seen below 0°F (-17.8°C) temperatures.

(207) Snow covers the ground about eight months of the year, and snow usually falls every month of the year. Barter Island has seen a three inch (76 mm) snowfall in July. Overall precipitation is very light averaging only six inches (152 mm) in a year. The wettest month is August when about an inch of precipitation can be expected. Snowfall averages about 42 inches (1067 mm) each year and the snowiest month is October. 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.

(208) 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 lagoons adjacent to Barter Island 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 freeze up in the early winter and, particularly, during the breakup of late spring or early summer.

(209) **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**)

(210) **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.

(211) **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.

(212) 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.

## Charts 16042, 16004

(213) **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**.

(214) 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.

(215) **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.

(216) 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.

(217) **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.

(218) **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.

(219) **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.

## Charts 16041, 16004

(220) **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.

(221) 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.

(222) 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.

(223) 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.

(224) **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.

(225) 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.

(226) 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.

(227) **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.

(228) There is an aero radiobeacon (69°35'N., 140°11'W.) about 17 miles E by S of the boundary monument.

(229) **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.