



Lake Superior

(1)

Chart Datum, Lake Superior

- (2) Depths and vertical clearances under overhead cables and bridges given in this chapter are referred to Low Water Datum, which for Lake Superior is an elevation 601.1 feet (183.2 meters) above mean water level at Rimouski, QC, on International Great Lake Datum 1985 (IGLD 1985). (See **Chart Datum, Great Lakes System**, indexed as such, chapter 3.)

(3)

Lake Superior Dimensions	
Description	Length/Area
Duluth Ship Canal to Point Iroquois (steamer track)	383 miles
Duluth Ship Canal to Michipicoten Harbor	350 miles
Breadth at longitude 86°45'N	160 miles
Maximum recorded depth	1,333 feet
Water surface (including St. Marys River above Brush Point)	20,600 sq mi (U.S.) 11,100 sq mi (Canada)
Drainage basin (including St. Marys River above Brush Point)	37,500 sq mi (U.S.) 43,500 sq mi (Canada)

(4)

General description

- (5) **Lake Superior**, the largest freshwater lake in the world, is the northernmost, westernmost, highest and deepest of the five Great Lakes. The lake is fed by the waters of many short swift-flowing streams and drains through the St. Marys River into Lake Huron. The shores of the lake are generally high, rocky and forested. The lake is sparsely populated, especially along the north shore.
- (6) The waters of Lake Superior are colder and form more shore ice than do the other lakes. The navigation season, shorter than the other lakes, is generally about 8 months long. The actual length of the season depends primarily on whether tonnage demands justify the expense of ice breaking for earlier or later vessel movements. Commercial fishing operations from harbors around the lake continue throughout the year except where prevented by ice conditions.

(12)

Fluctuations of water level

- (13) The normal elevation of the lake surface varies irregularly from year to year. During the course of each year, the surface is subject to a consistent seasonal rise

and fall; the lowest stage is usually reached at about the close of winter and the highest during the late summer.

(14)

In addition to the normal seasonal fluctuation, oscillations of irregular amount and duration are also produced by storms. Winds and barometric pressure changes that accompany squalls can produce fluctuations that last at the most a few hours. A storm of this type in 1939 produced fluctuations at Marquette with a maximum range of 7.4 feet. At other times, strong winds of sustained speed and direction can produce fluctuations that last a few hours or a day. These winds drive forward a greater volume of surface water than can be carried off by the lower return currents, thus raising the water level on the lee shore and lowering it on the windward shore. Fluctuations caused by such winds seldom exceed 1 foot above or below the normal level, but may cause changes up to 2 feet. An unusually severe storm in 1905 temporarily raised the water level in Duluth by 2.3 feet.

(15)

Through an agreement between the United States and Canada, the water level of Lake Superior is controlled by means of compensating works in St. Marys River. The dikes and sluice gates in the river are operated so as to maintain the monthly mean level of Lake Superior as nearly as possible between elevations 599.61 feet (182.76 meters) and 603.22 feet (183.86 meters) above the mean water level at Rimouski, QC, on International Great Lakes Datum 1985 (IGLD 1985).

(16)

Weather, Lake Superior

(17)

Strong winds are a threat from fall through spring over the open waters. Late autumn is the worst, when gales blow up to 6 percent of the time. The west part of the lake is least susceptible since it is somewhat sheltered from the strong winds, many of which have a westerly or northerly component. Fall windspeeds of 28 knots or more occur 11 percent of the time in this region compared to 16 to 18 percent elsewhere.

(18)

Spring winds are variable, with north through southeast winds common in the morning; southwesterlies also appear in the west. Afternoon directions are similar, with the addition of northwesterlies in the east. Gale frequencies drop to 2 percent or less by May; however, some of the highest winds of the year are encountered during this season. Along the shore, it is a volatile time. At many locations, April registers the highest mean windspeed of the year, while speeds of 28 knots or more also reach a peak. At Duluth, they blow up to 3 percent of the time in April, a month in which its highest windspeed of 65 knots (northeast) was recorded. Marquette recorded

(7)

Recommended Courses on Lake Superior

Downbound/Outbound

The **Lake Carriers' Association** and the **Canadian Shipowners Association** have recommended the following courses for downbound/outbound and upbound/inbound traffic in Lake Erie. These courses are recommended and recognized for the Great Lakes by both Associations, with navigation safety and application of the Collision Regulations always taking priority. While strict observance of these courses is recommended for all Masters, Navigating Officers of the Watch, and Pilots for their respective vessels in the interest of navigation safety, these are *recommended* and *voluntary* lake courses. They are delineated on general and other charts of the Great Lakes both in paper and electronic formats.

The distances given for these courses are given in **statute miles** with the **nautical mile** equivalents shown in parentheses.

To Upper St. Marys River from:

Duluth

- From a departure position bearing 063° at 3.0 (2.6) miles from the outer end of the Duluth Piers, steer 063° for 69.0 (60.0) miles to a point 12.0 (10.4) miles due north of Devils Island Light.
- From this point, steer 077° for 123.1 (106.9) miles to a point 12.0 (10.4) miles due north of Eagle Harbor Light, then steer 085° for 14.0 (12.2) miles to a point 12.0 (10.4) miles due north of Copper Harbor Light.
- From here, steer 105° for 18.3 (15.9) miles until Manitou Light bears 204° at 12.0 (10.4) miles, then steer 114° for 131.4 (113.8) miles until Whitefish Point Light bears 210° at 2.5 (2.2) miles.
- From here, steer 147° for 14.8 (12.9) miles until Ile Parisienne Light bears 050° at 2.5 (2.2) miles, then steer 138° for 9.8 (8.5) miles until Gros Cap Reefs Light bears 113° at 0.6 (0.5) mile.

Thunder Bay

- From a departure position south of Welcome Island, steer 118° for 8.9 (7.7) miles until Thunder Cape Light bears 047° at 2.5 (2.2) miles *or* from a departure position 0.5 (0.4) mile northeast of Welcome Island Light, steer 137° for 9.1 (7.9) miles until Thunder Cape Light bears 047° at 2.5 (2.2) miles.
- From this point, steer 097° for 26.1 (22.7) miles until Blake Point Light bears 188° at 2.5 (2.2) miles, then steer 121° for 2.1 (1.8) miles until Passage Island Light bears 030° at 1.0 (0.9) mile.
- From here, steer 148° for 15.0 (13.0) miles until Passage Island Light bears 330° at 15.5 (13.5) miles, then steer 118° until Whitefish Point Light bears 210° at 2.5 (2.2) miles.
- From this point, steer 147° for 14.8 (12.9) miles until Ile Parisienne Light bears 050° at 2.5 (2.2) miles, then steer 138° for 9.8 (8.5) miles until Gros Cap Reefs Light bears 113° at 0.6 (0.5) mile.

Marquette

- From a departure position 2.0 (1.7) miles east of Presque Isle Harbor Breakwater Light, steer 076° for 58.3 (50.7) miles to a point 7.0 (6.1) miles due north of Au Sable Light, then steer 082° for 48.5 (42.1) miles until Whitefish Point Light bears 128° at 10.0 (8.7) miles.
- From here, steer 114° for 10.0 (8.7) miles until Whitefish Point Light bears 210° at 2.5 (2.2) miles, then steer 147° for 14.8 (12.9) miles until Ile Parisienne Light bears 050° at 2.5 (2.2) miles, and then steer 138° for 9.8 (8.5) miles until Gros Cap Reefs Light bears 113° at 0.6 (0.5) mile.

Superior

- From a departure position with Superior Entry South Breakwater Light bearing 235° at 2.0 (1.7) miles, steer 044° for 17.7 (15.4) miles to a point 3.8 (3.3) miles southeast of Knife River Harbor Entrance Light, then steer 063° for 52.1 (45.3) miles to a point 12.0 (10.4) miles due north of Devils Island Light.
- From this point, steer 077° for 123.1 (106.9) miles to a point 12.0 (10.4) miles due north of Eagle Harbor Light, then steer 085° for 14.0 (12.2) miles to a point 12.0 (10.4) miles due north of Copper Harbor Light.
- From this point, steer 105° for 18.3 (15.9) miles until Manitou Light bears 204° at 12.0 (10.4) miles, then steer 114° for 131.4 (113.8) miles until Whitefish Point Light bears 210° at 2.5 (2.2) miles.
- From here, steer 147° for 14.8 (12.9) miles until Ile Parisienne Light bears 050° at 2.5 (2.2) miles, then steer 138° for 9.8 (8.5) miles until Gros Cap Reefs Light bears 113° at 0.6 (0.5) mile.

Two Harbors

- From a departure position 2.0 (1.7) south of Two Harbors East Breakwater Light, steer 067° for 48.0 (41.7) miles to a point 12.0 (10.4) miles due north of Devils Island Light.
- From this point, steer 077° for 123.1 (106.9) miles to a point 12.0 (10.4) miles due north of Eagle Harbor Light, then steer 085° for 14.0 (12.2) miles to a point 12.0 (10.4) miles due north of Copper Harbor Light.
- From this point, steer 105° for 18.3 (15.9) miles until Manitou Light bears 204° at 12.0 (10.4) miles, then steer 114° for 131.4 (113.8) miles until Whitefish Point Light bears 210° at 2.5 (2.2) miles.
- From here, steer 147° for 14.8 (12.9) miles until Ile Parisienne Light bears 050° at 2.5 (2.2) miles, then steer 138° for 9.8 (8.5) miles until Gros Cap Reefs Light bears 113° at 0.6 (0.5) mile.

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Recommended Courses on Lake Superior

Downbound/Outbound

Silver Bay

- From a departure position with Beaver Island Light bearing 285° at 1.5 (1.3) miles, steer 080° for 145.7 (126.6) miles to a point 12.0 (10.4) miles due north of Eagle Harbor Light.
- From this point, steer 085° for 14.0 (12.2) miles to a point 12.0 (10.4) miles due north of Copper Harbor Light, then steer 105° for 18.3 (15.9) miles until Manitou Light bears 204° at 12.0 (10.4) miles.
- From here, steer 114° for 131.4 (113.8) miles until Whitefish Point Light bears 210° at 2.5 (2.2) miles. From here, steer 147° for 14.8 (12.9) miles until Ile Parisienne Light bears 050° at 2.5 (2.2) miles, then steer 138° for 9.8 (8.5) miles until Gros Cap Reefs Light bears 113° at 0.6 (0.5) mile.

Taconite Harbor

- From a departure position with Taconite Harbor of Refuge South Breakwater Light bearing 300° at 2.5 (2.2) miles, steer 085° for 127.0 (110.5) miles to a point 12.0 (10.4) miles due north of Eagle Harbor Light.
- From this point, steer 085° for 14.0 (12.2) miles to a point 12.0 (10.4) miles due north of Copper Harbor Light, then steer 105° for 18.3 (15.9) miles until Manitou Light bears 204° at 12.0 (10.4) miles.
- From here, steer 114° for 131.4 (113.8) miles until Whitefish Point Light bears 210° at 2.5 (2.2) miles, then steer 147° for 14.8 (12.9) miles until Ile Parisienne Light bears 050° at 2.5 (2.2) miles, and then steer 138° for 9.8 (8.5) miles until Gros Cap Reefs Light bears 113° at 0.6 (0.5) mile.

Ashland

- From a departure position 0.9 (0.8) mile northwest of Ashland Harbor Breakwater Light, steer 027° for 8.3 (7.2) miles to a point 0.8 (0.7) mile due north of Chequamegon Point Light.
- From this point, then steer 090° for 6.1 (5.3) miles until La Pointe Light bears 261° at 5.0 (4.3) miles, then steer 062° for 133.7 (116.2) miles to a point 12.0 (10.4) miles due north of Eagle Harbor Light.
- From this point, steer 085° for 14.0 (12.2) miles to a point 12.0 (10.4) miles due north of Copper Harbor Light, then steer 105° for 18.3 (15.9) miles until Manitou Light bears 204° at 12.0 (10.4) miles.
- From here, steer 114° for 131.4 (113.8) miles until Whitefish Point Light bears 210° at 2.5 (2.2) miles, then steer 147° for 14.8 (12.9) miles until Ile Parisienne Light bears 050° at 2.5 (2.2) miles, and then steer 138° for 9.8 (8.5) miles until Gros Cap Reefs Light bears 113° at 0.6 (0.5) mile.

The following two-way courses and may be run either downbound or upbound

Thunder Bay to Whitefish Point (mid-lake route)

- From a position with Trowbridge Island Light bearing 007° at 1.7 (1.5) miles, steer 081° for 35.8 (31.1) miles with Bateau Rock bearing 180° at 5.0 (4.3) miles.
- From here, steer 106° for 126.2 (109.7) miles until Michipicoten Island Light bears 228° at 6.0 (5.3) miles, then steer 156° for 75.9 (66.0) miles until Whitefish Point Light bears 245° at 6.0 (5.2) miles.

Lamb Island to Heron Bay (south of the Slate Islands)

- From a position with Lamb Island Light bearing 305° at 2.5 (2.2) miles, steer 090° for 50.4 (43.8) miles to a point 2.5 (2.2) miles due south of Slate Islands Light. Continue to steer 090° for another 26.7 (23.2) miles until Oglivy Point bears 060° at 3.8 (3.3) miles.

Heron Bay to Whitefish Point (east of Michipicoten Island)

- From a position 2.5 (2.2) miles southwest of Heron Bay Front Range Light, steer 217° for 4.4 (3.8) miles to a point with Oglivy Point bearing 060° at 3.8 (3.3) miles.
- From this point, steer 163° for 37.7 (32.8) miles until Otter Island Light bears 055° at 6.5 (5.6) miles, then steer 118° for 36.0 (31.3) miles until Michipicoten Island Light bears 228° at 6.0 (5.3) miles, and then steer 156° for 75.9 (66.0) miles until Whitefish Point Light bears 245° at 6.0 (5.2) miles.

Heron Bay to Whitefish Point (west of Michipicoten Island)

- From a position 2.5 (2.2) miles southwest of Heron Bay Front Range Light, steer 217° for 4.4 (3.8) miles to a point with Oglivy Point bearing 060° at 3.8 (3.3) miles.
- From this point, steer 163° for 64.8 (56.3) miles until Michipicoten Island West End Light bears 047° at 3.7 (3.2) miles, then steer 137° for 81.9 (71.2) miles until Whitefish Point Light bears 245° at 6.0 (5.2) miles.

(9)

Recommended Courses on Lake Superior

Downbound/Outbound

The following weather routes may be picked up anywhere by vessels departing from any port or maneuvering to avoid weather.

Optional Lake Superior North Shore Weather Route (passing north of Slate Islands)

- From a position 3.8 (3.3) miles southeast of Knife Island, steer 047° for 34.7 (30.2) miles to a point 4.5 (3.9) miles east-southeast of Silver Bay.
- From this point, steer 038° for 22.0 (19.1) miles to until Taconite Harbor of Refuge South Breakwater Light bears 300° at 2.5 (2.2) miles, then steer 065° for 27.8 (24.2) miles to 5.5 (4.8) miles south of Grand Marais Harbor, then continue on this bearing for 38.4 (33.4) miles to a point 5.0 (4.3) miles southeast of Grand Portage Bay.
- From this point, steer 059° for 53.0 (46.1) miles until Point Porphyry Light bears 325° at 3.8 (3.3) miles, then steer 049° for 30.4 (26.4) miles until Lamb Island Light bears 305° at 2.5 (2.2) miles.
- From here, steer 068° for 26.6 (23.1) miles to a point 2.0 (1.7) miles south of Battle Island, then steer 090° for 26.3 (22.9) miles to a point 4.5 (3.9) miles due south of St. Patrick Island in Jackfish Bay.
- From this point, steer 110° for 27.6 (24.0) miles to a point with Oglivry Point bearing 060° at 3.8 (3.3) miles, then steer 163° for 37.7 (32.8) miles until Otter Island Light bears 055° at 6.5 (5.6) miles.
- From here, steer 118° for 36.0 (31.3) miles until Michipicoten Island Light bears 228° at 6.0 (5.3) miles, then steer 130° for 22.8 (19.8) miles until 4.0 (3.5) miles due west of Hursley Island Light, and then steer 166° for 56.1 (48.7) miles until Whitefish Point Light bears 245° at 6.0 (5.2) miles.

Optional Lake Superior South Shore Weather Route

- From a position 2.5 (2.2) miles north of Devils Island Light, steer 086° for 18.7 (16.2) miles until Outer Island Light bears 045° at 5.6 (4.9) miles, then steer 163° for 27.6 (24.0) miles until Black River Harbor Light bears 135° at 7.8 (6.8) miles. • From here, steer 068° for 46.7 (40.6) miles until 6.0 (5.2) miles west of Fourteen Mile Point, then steer 053° for 29.2 (25.4) miles until Keweenaw Upper Entrance Light bears 100° at 5.8 (5.0) miles.
- From this point, steer 048° for 15.7 (13.6) miles until 4.0 (3.5) miles off Sevenmile Point, then steer 066° for 17.4 (15.1) miles until 2.8 (2.4) miles north of Eagle Harbor Light.
- From here, steer 090° for 19.1 (16.6) miles until Gull Rock Light bears 144° at 7.0 (6.1) miles, then steer 144° for 4.5 (3.9) miles until Gull Rock Light bears 144° at 2.5 (2.2) miles.
- From here, steer 177° for 30.9 (26.9) miles until 11.0 (9.6) miles north of Big Bay Point Light, then steer 152° for 25.9 (22.5) miles until 4.3 (3.7) miles north of Partridge Island.
- From this point, steer 106° for 20.6 (17.9) miles until 3.5 (3.0) miles off Laughing Fish Point, then steer 083° for 24.0 (20.9) miles until 5.2 (4.5) miles off Grand Portal Point.
- From here, steer 071° for 18.0 (15.6) miles to 2.5 (2.2) miles north of Au Sable Light, then steer 082° for 42.7 (37.1) miles until 2.7 (2.3) miles north of Crisp Point, and then steer 087° for 15.1 (13.1) miles until Whitefish Point Light bears 210° at 2.5 (2.2) miles.

(10)

Recommended Courses on Lake Superior

Upbound/Inbound

Upper St. Marys River to:

Duluth

- From the dredged channel at the upper end of the St. Marys River off Point Iroquois, steer 300° for 4.9 (4.3) miles until Gros Cap Reefs Light bears 110° at 3.9 (3.4) miles.
- From here, steer 319° for 7.0 (6.1) miles until Ile Parisienne Light bears 050° at 4.0 (3.5) miles, then steer 328° for 14.3 (12.4) miles until Whitefish Point Light bears 210° at 1.0 (0.9) mile.
- From this point, steer 279° for 14.2 (12.3) miles until the abandoned lighthouse on Crisp Point bears 190° at 4.5 (3.9) miles, then steer 292° for 118.0 (102.5) miles until Manitou Light bears 204° at 4.0 (3.5) miles.
- From here, steer 289° for 15.3 (13.3) miles until 5.0 (4.3) miles due north of Copper Harbor Light, then steer 265° for 14.0 (12.2) miles to a point 5.0 (4.3) miles due north of Eagle Harbor Light
- From here, steer 257° for 123.3 (107.1) miles until 5.0 (4.3) miles north of Devil's Island Light, then steer 248° for 66.2 (57.5) miles for Duluth Entry, 063° at 3.0 (2.6) miles from the outer ends of the Duluth Piers.

Thunder Bay

- From a departure position 113° at 0.6 (0.5) mile off Gros Cap Reefs Light, steer 000° for 1.5 (1.3) miles until Gros Cap Reefs Light bears 160° at 1.9 (1.7) miles, then steer 318° for 8.6 (7.5) miles until Ile Parisienne Light bears 050° at 1.5 (1.3) miles.
- From here, steer 339° for 13.0 (11.3) miles until Whitefish Point Light bears 245° at 6.0 (5.2) miles, then steer 300° for 191.7 (166.6) miles until Passage Island Light bears 030° at 0.5 (0.4) mile.
- From this point, steer 310° for 2.9 (2.5) miles to 3.8 (3.3) miles north of Blake Point Light, then steer 276° for 26.1 (22.7) miles until Hare Island Light Buoy A2 bears 340° at 0.5 (0.4) mile.
- From here, steer 319° for 8.2 (7.1) miles to 1.3 (1.1) miles northeast of Welcome Island Light *or* steer 292° for 8.2 (7.1) miles to a position south of Welcome Island.

Marquette

- From the dredged channel at the upper end of the St. Marys River off Point Iroquois, steer 300° for 4.9 (4.3) miles until Gros Cap Reefs Light bears 110° at 3.9 (3.4) miles, then steer 319° for 7.0 (6.1) miles until Ile Parisienne Light bears 050° at 4.0 (3.5) miles.
- From here, steer 328° for 14.3 (12.4) miles until Whitefish Point Light bears 210° at 1.0 (0.9) mile, then steer 279° for 14.2 (12.3) miles until the abandoned lighthouse on Crisp Point bears 190° at 4.5 (3.9) miles.
- From this point, steer 262° for 43.0 (37.4) miles to 4.5 (3.9) miles due north of Au Sable Light, then steer 256° for 57.3 (49.8) miles to a position 3.0 (2.6) miles east of Marquette Light.

Whitefish Point to Thunder Bay (mid-lake route)

- From a position with Whitefish Point Light bearing 245° at 6.0 (5.2) miles, steer 336° for 75.9 (66.0) miles until Michipicoten Island Light bears 228° at 6.0 (5.3) miles.
- From here, steer 286° for 126.2 (109.7) miles until Bateau Rock bears 180° at 5.0 (4.3) miles, then steer 261° for 35.8 (31.1) miles until Point Porphyry Light bears 325° at 3.8 (3.3) miles.
- From this position, steer 265° for 12.7 (11.0) miles until due south of Trowbridge Island Light, then steer 276° for 5.2 (4.5) miles until Hare Island Light Buoy A2 bears 340° at 0.5 (0.4) mile.
- From here, steer 319° for 8.2 (7.1) miles to 1.3 (1.1) miles northeast of Welcome Island Light *or* steer 292° for 8.2 (7.1) miles to a position south of Welcome Island.

Note—most of this route is two way until the waypoint off Point Porphyry Light.

Taconite Harbor

- From the dredged channel at the upper end of the St. Marys River off Point Iroquois, steer 300° for 4.9 (4.3) miles until Gros Cap Reefs Light bears 110° at 3.9 (3.4) miles, then steer 319° for 7.0 (6.1) miles until Ile Parisienne Light bears 050° at 4.0 (3.5) miles.
- From here, steer 328° for 14.3 (12.4) miles until Whitefish Point Light bears 210° at 1.0 (0.9) mile, then steer 279° for 14.2 (12.3) miles until the abandoned lighthouse on Crisp Point bears 190° at 4.5 (3.9) miles.
- From this point, steer 292° for 118.0 (102.5) miles until Manitou Light bears 204° at 4.0 (3.5) miles, then steer 289° for 15.3 (13.3) miles until 5.0 (4.3) miles due north of Copper Harbor Light.
- From here, steer 268° for 141 (122.5) miles until Taconite Harbor of Refuge South Breakwater Light bears 300° at 2.5 (2.2) miles.

(11)

Recommended Courses on Lake Superior

Upbound/Inbound

Ashland

- From the dredged channel at the upper end of the St. Marys River off Point Iroquois, steer 300° for 4.9 (4.3) miles until Gros Cap Reefs Light bears 110° at 3.9 (3.4) miles, then steer 319° for 7.0 (6.1) miles until Ile Parisienne Light bears 050° at 4.0 (3.5) miles.
- From here, steer 328° for 14.3 (12.4) miles until Whitefish Point Light bears 210° at 1.0 (0.9) mile, then steer 279° for 14.2 (12.3) miles until the abandoned lighthouse on Crisp Point bears 190° at 4.5 (3.9) miles.
- From this point, steer 292° for 118.0 (102.5) miles until Manitou Light bears 204° at 4.0 (3.5) miles, then steer 289° for 15.3 (13.3) miles until 5.0 (4.3) miles due north of Copper Harbor Light.
- From here, steer 265° for 14.0 (12.2) miles to 5.0 (4.3) miles due north of Eagle Harbor Light, then steer 244° for 119 (103.4) miles until 6.5 (5.6) miles southeast of Michigan Island Light.
- From this point, steer 254° for 12.0 (10.4) miles until La Pointe Light bears 261° at 5.0 (4.3) miles, then steer 270° for 6.1 (5.3) miles to 0.8 (0.7) mile due north of Chequamegon Point Light, and then steer 207° for 8.3 (7.2) miles to a position 0.9 (0.8) mile northwest of Ashland Harbor Breakwater Light.

Silver Bay

- From the dredged channel at the upper end of the St. Marys River off Point Iroquois, steer 300° for 4.9 (4.3) miles until Gros Cap Reefs Light bears 110° at 3.9 (3.4) miles, then steer 319° for 7.0 (6.1) miles until Ile Parisienne Light bears 050° at 4.0 (3.5) miles.
- From here, steer 328° for 14.3 (12.4) miles until Whitefish Point Light bears 210° at 1.0 (0.9) mile, then steer 279° for 14.2 (12.3) miles until the abandoned lighthouse on Crisp Point bears 190° at 4.5 (3.9) miles.
- From this point, steer 292° for 118.0 (102.5) miles until Manitou Light bears 204° at 4.0 (3.5) miles, then steer 289° for 15.3 (13.3) miles until 5.0 (4.3) miles due north of Copper Harbor Light.
- From here, steer 265° for 14.0 (12.2) miles to 5.0 (4.3) miles due north of Eagle Harbor Light, then steer 257° for 110.7 (96.1) miles to 8.4 (7.3) miles due north of Outer Island Light, and then steer 277° for 38.4 (33.4) miles until Beaver Island Light bears 285° at 1.5 (1.3) miles.

Superior

- From the dredged channel at the upper end of the St. Marys River off Point Iroquois, steer 300° for 4.9 (4.3) miles until Gros Cap Reefs Light bears 110° at 3.9 (3.4) miles, then steer 319° for 7.0 (6.1) miles until Ile Parisienne Light bears 050° at 4.0 (3.5) miles.
- From here, steer 328° for 14.3 (12.4) miles until Whitefish Point Light bears 210° at 1.0 (0.9) mile, then steer 279° for 14.2 (12.3) miles until the abandoned lighthouse on Crisp Point bears 190° at 4.5 (3.9) miles.
- From this point, steer 292° for 118.0 (102.5) miles until Manitou Light bears 204° at 4.0 (3.5) miles, then steer 289° for 15.3 (13.3) miles until 5.0 (4.3) miles due north of Copper Harbor Light.
- From here, steer 265° for 14.0 (12.2) miles to 5.0 (4.3) miles due north of Eagle Harbor Light, then steer 257° for 123.3 (107.1) miles until 5.0 (4.3) miles north of Devil's Island Light, and then steer 243° for 65.7 (57.1) miles until Superior Entry South Breakwater Light bears 235° at 2.0 (1.7) miles.

Two Harbors

- From the dredged channel at the upper end of the St. Marys River off Point Iroquois, steer 300° for 4.9 (4.3) miles until Gros Cap Reefs Light bears 110° at 3.9 (3.4) miles, then steer 319° for 7.0 (6.1) miles until Ile Parisienne Light bears 050° at 4.0 (3.5) miles.
- From here, steer 328° for 14.3 (12.4) miles until Whitefish Point Light bears 210° at 1.0 (0.9) mile, then steer 279° for 14.2 (12.3) miles until the abandoned lighthouse on Crisp Point bears 190° at 4.5 (3.9) miles.
- From this point, steer 292° for 118.0 (102.5) miles until Manitou Light bears 204° at 4.0 (3.5) miles, then steer 289° for 15.3 (13.3) miles until 5.0 (4.3) miles due north of Copper Harbor Light.
- From here, steer 265° for 14.0 (12.2) miles to 5.0 (4.3) miles due north of Eagle Harbor Light, then steer 257° for 123.3 (107.1) miles until 5.0 (4.3) miles north of Devil's Island Light, and then steer 255° for 45.8 (39.8) miles to a position 2.0 (1.7) south of Two Harbors East Breakwater Light.

Anchorage

Limits of anchorage in Whitefish Bay are recommended as follows: From a point on the Birch Point Range 0.5 miles above Gros Cap Light, steer 340° for 2.5 miles; then 314° to a point 2 miles off Ile Parisienne Light.

From a point on the Birch Point Range 0.5 miles above Gros Cap, steer 229° for 0.5 miles; thence 300° for 2.7 miles; thence to a point 3.5 miles off Ile Parisienne Light.

No downbound vessels shall proceed from this anchorage area unless authorized to do so by the U.S. Coast Guard.

(30)

METEOROLOGICAL TABLE – COASTAL AREA LAKE SUPERIOR

Between 46.5°N to 49.0°N and 84.0°W to 92.0°W

WEATHER ELEMENTS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Wind > 33 knots ¹	5.2	0.7	1.6	2.0	1.0	0.4	0.2	0.4	1.7	3.7	5.0	5.5	2.0
Wave Height > 9 feet ¹	6.7	2.7	2.9	1.7	0.9	0.3	0.2	0.3	1.7	3.0	4.5	4.9	1.9
Visibility < 2 nautical miles ¹	13.0	4.5	6.5	5.9	9.1	14.9	16.6	8.7	4.0	3.0	4.3	11.4	8.8
Precipitation ¹	38.5	29.1	16.9	9.7	8.0	5.4	4.1	5.5	8.2	11.7	21.0	34.6	11.3
Temperature > 69° F	0.0	0.1	0.0	0.0	0.3	1.2	4.2	5.8	1.5	0.1	0.0	0.0	1.6
Mean Temperature (°F)	15.0	14.0	27.3	37.3	43.2	48.6	55.5	60.1	55.0	45.2	34.5	24.8	45.3
Temperature < 33° F ¹	93.6	90.3	65.4	18.2	2.4	0.2	0.1	0.0	0.1	3.6	39.0	73.2	14.6
Mean RH (%)	75	77	83	82	81	85	88	88	85	81	82	88	84
Overcast or Obscured ¹	55.8	39.3	36.0	28.5	26.1	25.5	22.7	22.1	26.3	34.0	49.0	57.1	31.4
Mean Cloud Cover (8 ^{ths})	6.5	5.2	5.0	4.5	4.4	4.5	4.4	4.2	4.7	5.3	6.2	6.7	4.9
Mean SLP (mbs)	1016	1018	1019	1015	1015	1014	1014	1015	1016	1013	1015	1017	1015
Ext. Max. SLP (mbs)	1042	1040	1044	1057	1058	1054	1048	1049	1056	1056	1056	1060	1060
Ext. Min. SLP (mbs)	990	987	980	968	971	976	981	982	975	966	961	976	961
Prevailing Wind Direction	W	W	W	NE	NE	W	SW	SW	SW	NW	NW	NW	NW
Thunder and Lightning ¹	0.3	0.1	0.6	0.7	0.9	1.6	2.0	2.2	1.8	0.6	0.3	0.4	1.2

¹ Percentage Frequency

a 79-knot wind during a May thunderstorm. Winds with easterly components are common in the morning; this is most noticeable at Duluth and Sault Ste. Marie. At Marquette northerlies prevail. Afternoon winds often have a westerly component, but northerlies and southerlies are frequent too.

(19) Summer winds are often out of the south through west; this pattern is intruded upon by afternoon northwesterlies in the east. Windspeeds are most often in the 10- to 20-knot range with gales and near gales uncommon. Strong winds are usually associated with occasional thunderstorms. In fact, the highest recorded wind on the lake was 81 knots (northwesterly) in a June thunderstorm. Along the shore the lake-land breeze results in offshore components in the morning reversing themselves during the day. Morning easterlies give way to west through northwest winds at Sault Ste. Marie. Marquette's light and variable breezes yield to a north-through-northeast flow.

(20) As autumn progresses, winds blow more and more out of the west and north, and windspeeds are on the increase. By October, gales are blowing up to 5 percent of the time in the east and 2 to 4 percent of the time in the west. Onshore, similar changes are occurring. Early autumn onshore-offshore flow gives way to a variety of south through northwest winds associated with migratory highs and lows. Speeds of 28 knots or more, while not frequent, are more so than in summer. Sault Ste. Marie recorded a 62-knot northwesterly during November. Winter winds are stronger still and remain mostly out of the south through northwest with an increase in northerlies.

(21) Thunderstorms can occur at any time, but they are most likely from April through October, particularly during June, July and August. Over the open waters, thunderstorms are encountered 1 to 3 percent of the time during the summer months. These thunderstorms are by far most likely in the early morning hours between

midnight and 0300 l.s.t.; they occur up to 8 percent of the time during these hours. Minimum activity occurs around midday. The west half of the lake is more vulnerable to thunderstorms than the east half.

(22) Along the shore, thunderstorms occur on 20 to 30 days annually, including 4 to 7 days per month in the summer. Activity is slightly more frequent at Duluth than at other locations. These thunderstorms can occur as isolated single cells or in violent squall lines. They can generate strong gusty winds and hail. On occasion, tornadoes or waterspouts have been associated with these squalls. Winds in thunderstorms have been recorded at around 80 knots; strong winds are most likely in spring and early summer.

(23) The lake is large enough for strong winds from any direction to have sufficient fetch to build up a sea. However, the Keweenaw Peninsula tends to diminish seas generated by easterlies and westerlies in the south part of the lake. Elsewhere, seas of 25 to 30 feet (8 to 9 m) have been encountered.

(24) In spring, seas can be rough but become less so as summer approaches. Waves of 5 feet (1.5 m) or more encountered 30 to 40 percent in April drop off 10 to 15 percent by May. Seas of 10 feet (3 m) or more also crop up less frequently. An even more dramatic calming occurs in June.

(25) Summer seas rarely build to 10 feet (3 m) or more, 1 percent of the time, and reach 5 to 10 feet (1.5 to 3 m) about 10 to 15 percent of the time. Thunderstorms can quickly build rough, choppy seas, but the large waves generated when strong winds blow over a long fetch of water are unusual. Wave heights are 2 feet (0.6 m) or less about 60 to 70 percent of the time. Rough conditions return in force during autumn.

(26) Seas of 5 feet (1.5 m) or more can be expected 20 to 30 percent of the time in September; by November these figures increase by 20 percent. By late fall, seas are

running 10 feet (3 m) or more about 5 to 10 percent of the time, more than double earlier chances. West waters are the least vulnerable, while central and east waters are more susceptible to the strong winds with northerly and westerly components.

- (27) Poor visibilities can be encountered during any season. Radiation fog in autumn, ice fog in winter, and advection fog from spring through fall all contribute to restricted visibilities, as do rain and snow.

- (28) Over the open waters, April through August and December are the fog-prone months during the navigation season; June and July are the worst. During this 2-month stretch, visibilities of 2 statute miles (1.7 nm) or less may be encountered about 10 to 20 percent of the time, while they fall to 0.5 statute mile (0.4 nm) or less about 8 to 17 percent of the time. The most vulnerable waters lie between Keweenaw Point and Au Sable Point. While there is a greater tendency towards fog in the early morning hours, it is not as pronounced as it is onshore.

- (29) Along the shore, fog is mainly a morning phenomenon, particularly dense fog. While there are seasonal variations, poor visibilities are common throughout the year. They drop to 0.5 statute mile (0.4 nm) or less on about 40 to 60 days annually. At a peak these conditions can be expected on about 6 to 7 days per month. This peak occurs during the summer at some locations with advection fog drifting onshore. Marquette experiences this type of fog. When cold air moves across warm water, fog can set in; this happens at Sault Ste. Marie in late summer and autumn. Radiation fog is also a fall problem but usually lifts by early afternoon. At Duluth, industrial smoke adds to the visibility hazard.

(31)

Ice

- (32) The large heat-storage capacity of Lake Superior plus the strong winds, waves and currents that create a continuing overturning of relatively warm, deep water inhibit an early ice cover.

- (33) Whitefish Bay, at the lower end of Lake Superior, is a bottleneck area. The shallow bay forms ice rapidly, and the prevailing west winds jam and pack the lake ice into the area. The ice reaches an average thickness of 14 inches and an average maximum thickness of 22 inches. Windrows are at least 4 feet thick in most winters, and thicknesses of 8 to 9 feet may be reached.

- (34) In the north part of Lake Superior, ice begins to form along the shore in late January and early December, but because of the nature of the shoreline, significant fast ice develops only in Nipigon Bay and Black Bay. Through January and early February the lake remains open, with drifting patches of slush and new ice. By late February these patches may extend 40 to 50 miles into the lake from the lee shores and may reach a 70 to 90 percent coverage of medium-thickness ice. Some open water is always present in midlake. The drifting ice decays through March and reaches open water by the end of the

month. After reaching a thickness of 30 to 35 inches, the fast ice along the shore breaks up by mid-April.

- (35) In the west end of Lake Superior, fast ice about 4 to 6 inches thick builds northeast from Duluth as far as the Apostle Islands. In navigation areas, ridging and rafting of the ice occurs, and the refrozen brash ice may reach a thickness of 4 feet. The lake may briefly become covered 80 to 90 percent, but strong winds and the associated waves generally compact the thinner ice and stir up warm water, thus reducing the ice coverage to 40 to 50 percent, even in a severe winter.

- (36) Fast ice forms in practically all harbors, entrance channels, and bays. In Thunder Bay, the ice reaches an average thickness of 20 to 30 inches through January, February and March. At Duluth-Superior, ice up to 1 foot thick can form in December depending on the severity of the winter; the average range is 3 to 6 inches. Ice in the harbor reaches an average maximum of 27 inches and, depending on the weather, is in a state of deterioration by mid-April. (See Winter Navigation, chapter 3.)

(37)

Local magnetic disturbances

- (38) Local magnetic disturbances are more prevalent on Lake Superior than on the other Great Lakes. Reports from vessel masters show that the strongest disturbances are along the north shore of the lake, that they decrease in intensity as the distance from this shore increases and that the tendency is for upbound vessels to be drawn toward the north shore. The disturbances are described in this chapter with the discussion of their locale.

- (39) The directive force of the earth's magnetism is rather weak in this region as compared with other navigable waters of the world, and this tends to make the compass needle rather sluggish. Vessel masters should give proper attention to the correction of the compass and the determination of the ship's deviation.

(40)

Pilotage

- (41) The waters of Lake Superior are Great Lakes undesignated waters; registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot or other officer qualified for Great Lakes undesignated waters. Registered pilots for Lake Superior are supplied by Western Great Lakes Pilots Association. (See Appendix A for addresses.) A pilot exchange point is at the head of St. Mary's River about 3.5 miles southeast of Point Iroquois. The pilot boat in use at the head of the river is the WAISKA PILOT, which runs out of Brimley, MI. During late/early season when light ice is present, the SUPERIOR PILOT may be in operation and runs out of Sault Ste. Marie, MI. (See Pilotage, chapter 3, and **46 CFR 401**, chapter 2.)

(42)

Principal ports

- (43) Compared with the other Great Lakes, Lake Superior is fairly well provided with natural harbors that

provide refuge for vessels. In addition, several harbors have been improved with breakwaters to provide the necessary protection. The most important harbor in U.S. waters in the lake is at Duluth-Superior. This harbor has drydocking facilities for deep-draft vessels.

(44)

Point Iroquois to Salt Point

(45) **Whitefish Bay** is a large deep bay in the southeast corner of Lake Superior in the approach to the head of St. Marys River. **Point Iroquois** (46°29'06"N., 84°37'48"W.), marked by an abandoned lighthouse, is on the southeast side of the bay on the west side of the entrance to St. Marys River. **Nodoway Point** is 2.2 miles west of Point Iroquois. **Mission Hill** is a prominent 400-foot hill between the points. A rocky ledge extends about 2 miles north from Nodoway Point.

(46) There are several submerged buoys located around the outer edges of Whitefish Bay, specifically near Pendills Bay, north of Tahquamenon Bay and near Whitefish Point. These buoys float about 5 feet from the lake bottom and are tethered to hydroacoustic receivers and concrete blocks. A line of floating rope is also attached to the concrete block in order to facilitate the recovery of the buoy and receiver. Mariners are urged to use caution in the vicinity of these buoys.

(47) From Nodoway Point, the south shore of Whitefish Bay extends 7.5 miles southwest to the mouth of **Pendills Creek**, thence northwest for 2.7 miles to **Salt Point**. **Pendills Bay** is the bight formed between the points. Shoals extend about 0.4 mile offshore in the east part of the bay and increase to 1 mile offshore northwest of Pendills Creek.

(48)

Salt Point to Grand Marais, MI

(49) From Salt Point west for 3.8 miles to Naomikong Point, shoals extend 2 miles from shore, and thence the shoal limit extends northwest across the mouth of Tahquamenon Bay. **Naomikong Point**, and **Menekaunee Point** close west, form the south entrance point of **Tahquamenon Bay**, the southwest part of Whitefish Bay. A rocky ledge extends 1 mile north from Naomikong Point and a 6-foot spot is 0.5 mile east of the point. A rocky ledge with a least depth of 4 feet is 2.8 miles north of Naomikong Point.

(50) **Tahquamenon River** flows into the west side of Whitefish Bay just north of the north entrance point to Tahquamenon Bay. A shoal which bares extends from the mouth of the river south for about 3.5 miles into Tahquamenon Bay. The entrance to the river is shoal and should be approached with care. In 1981, the channel across the bar had a controlling depth of 2 feet. The river is navigable by small boats for about 16 miles. In 1963, the least depth in this stretch was 3 feet. A launching ramp is on the south side of the river mouth. Fuel is available nearby.

(51) From the Tahquamenon River north for 15.5 miles to Whitefish Point, the shoal border decreases in width from 2.7 miles to about 0.2 mile. Ruins of two abandoned docks extend offshore at the mouth of **Sheldrake River**, 8.5 miles north of Tahquamenon River.

(52) **Whitefish Point Harbor**, entirely artificial, is on the northwest side of Whitefish Bay about 1 mile southwest of the tip of Whitefish Point. The harbor, protected by breakwaters on the north, south and east sides, serves as a harbor of refuge for shallow-draft vessels.

(53) The harbor is entered from Whitefish Bay through a dredged channel leading north, then west, between the breakwaters to the south end of the basin. The outer ends of the breakwaters are marked by lights.

(54) Transient berths for craft to 60 feet and a launching ramp are available at a facility developed by the Michigan State Waterways Commission at the north end of the basin.

(55) **Whitefish Point**, on the west side of the entrance to Whitefish Bay, has sandhills and some trees. In 1978, it was reported that the point was a poor radar target. **Whitefish Point Light** (46°46'16"N., 84°57'27"W.), 80 feet above the water, is shown from a white cylindrical tower on the point; a radar beacon (Racon) is at the light.

(56) From Whitefish Point west-southwest for 20 miles to Little Lake Harbor, the shore is sandy, wooded inshore and generally bold. Shoals extend about 0.5 mile from shore. None of the rivers that empty into the lake in this stretch are navigable.

(57) A lighthouse at **Crisp Point** and the buildings at the abandoned Coast Guard station at Vermilion Point, 4.5 miles east of Crisp Point, are good landmarks.

(58) **Little Lake Harbor**, 20 miles west of Whitefish Point, is the only harbor of refuge in the 49-mile stretch between that point and Grand Marais. **Little Lake**, oval in shape, about 0.5 mile long and 0.3 mile wide, is separated from Lake Superior for most of its length by a low sand ridge and by higher bluffs along the remainder. The lake has depths of 18 feet and more with good water close to shore.

(59) A dredged channel leads from Lake Superior through a stilling basin between converging breakwaters and thence through the sand ridge into Little Lake. The outer end of the east breakwater is marked by a light. Mariners are cautioned to use care in navigating the entrance and are advised the channel can experience significant shoaling, especially after storms.

(60) A T-shaped dock developed by the Michigan State Waterways Commission is on the northeast side of Little Lake. In 1981, depths at the face of the dock were 6 to 7 feet. Transient berths, water and electricity are available. Other services are very limited because of the isolated location of the harbor.

(61) From Little Lake Harbor west for 29 miles to Grand Marais, the shoreline is bold. Shoals extend about 0.5 mile from shore.

(62)

Grand Marais, MI to Au Sable Point

(63)

Grand Marais, MI, is a village and small-craft harbor in **West Bay**, 29 miles west of Little Lake Harbor. It is an important harbor of refuge, being the only harbor of any kind along the dangerous 65-mile stretch of shore between Little Lake and Grand Island. The bay is separated from Lake Superior at the west end by a low sand ridge and at the east end by a shallow sandspit. The natural entrance to the bay, across the spit, has been closed by a pile dike. The dike is reinforced with riprap, but in 1981 it was in ruins and was not visible above the water. Numerous submerged piles at the dike are a hazard to any craft.

(64)

Prominent features

(65)

Prominent are a red brick school and chimney in the village and a white building on the west side of the harbor entrance.

(66)

Grand Marais Harbor of Refuge Outer Light (46°41'02"N., 85°58'18"W.), 40 feet above the water, is shown from a skeleton tower, upper part enclosed, on the outer end of the west pier. A seasonal sound signal at the light is operated by keying the microphone five times on VHF-FM channel 83A.

(67)

Channels

(68)

A dredged entrance channel leads between parallel piers across the sandspit that separates Lake Superior and West Bay. The outer and inner ends of the west pier and the outer end of the east pier are marked by lights.

(69)

Anchorage

(70)

West Bay has good anchorage in depths of 18 to 40 feet, sand bottom. Sand moving in through breaks in the dike has caused shoaling in the east end of the harbor, so anchorage in the west end is advised.

(71)

Grand Marais Coast Guard Station, operated on weekends during the boating season, is on the west side of the entrance channel.

(72)

Small-craft facilities

(73)

A public dock developed by the Michigan State Waterways Commission at the west end of the harbor provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out facilities and a launching ramp. Arrangements can be made for minor repairs.

(74)

From Grand Marais, the shore extends west-southwest for 7 miles, thence northwest for 1.7 miles to Au Sable Point. **Grand Sable**, a steep bluff with elevations of 400 feet above the lake, extends from 1 mile west of Grand Marais to within 1 mile of Au Sable Point. Shoals extend 0.2 to 0.4 mile offshore in this stretch.

(75)

Au Sable Light (46°40'19"N., 86°08'24"W.), 100 feet above the water, is shown from a white conical tower with red dwelling attached on **Au Sable Point**.

(76)

Local magnetic disturbance

(77)

A large area of magnetic disturbance has been observed about 40 miles northwest of Au Sable Point.

(78)

Pictured Rocks National Lakeshore to Grand Portal Point

(79)

A shoal with a least depth of 6 feet extends 0.9 mile northwest from Au Sable Point.

(80)

Pictured Rocks National Lakeshore occupies the entire shore from 1.5 miles west of Grand Marais west to Au Sable Point, thence southwest for 28 miles to within 2.5 miles of Munising.

(81)

From Au Sable Point, the shore extends southwest for 17.5 miles to **Grand Portal Point**. The shore for most of this reach is bluff with high points up to 100 feet above the lake close to shore. About 4 miles northeast of Grand Portal Point, the shore changes to sheer exposed cliffs over 100 feet high. Except for 23- and 24-foot shoals about 0.5 mile offshore 3 and 4 miles northeast of Grand Portal Point, respectively, no outlying obstructions are along this stretch.

(82)

Grand Portal Point to Au Train Point, including Grand Island

(83)

From Grand Portal Point, the shore trends southwest for 9.7 miles to **Sand Point**. The cliffs of Pictured Rocks extend along the first 8 miles of this stretch. **Sail Rock** and **Miners Castle Point**, 1 and 6 miles southwest of Grand Portal Point, respectively, are prominent. South of Pictured Rocks, a high wooded bluff continues close to shore past Sand Point. Shoals extend about 0.3 mile offshore in this stretch. About 2.2 miles southwest of Miners Castle Point, a shoal with a least depth of ½ foot makes out from shore and extends southwest to a point 0.3 mile northwest of Sand Point. The shoal is marked by a lighted bell buoy.

(84)

Grand Island, about 7.5 miles long and 3.5 miles wide, is a high wooded island west of this reach. The north end is 9 miles west of Grand Portal Point, and the southeast end is 0.7 mile west of Sand Point. **Grand Island Light** (46°33'35"N., 86°40'48"W.), 190 feet above the water, is shown from a white post on the northwest point of the island. Shoals extend about 0.5 mile off the two points at the north end of the island, and a shoal with depths of 2 to 6 feet extends 0.5 mile south and southwest from the south point of the island. A buoy marks the southwest edge and the south edge of the shoal at the south end of the island. Shoals extend no more than 0.3 mile off the east and west shores of the main body of the island.

(85) **The Thumb**, the southeast part of Grand Island, is high and roughly oval in shape, about 3 miles long and 1 mile wide. The Thumb is connected to the southeast side of Grand Island by a low narrow neck of land, with bays formed on either side between the Thumb and the island. **Trout Bay** is north of the neck, and **Murray Bay** is south. An abandoned lighthouse is on the southeast side of the Thumb.

(86) A shoal with depths of 10 to 18 feet extends 0.6 mile north from **Trout Point**, the north point of the Thumb. A shoal, with a depth of 8 feet at the outer edge and marked by a lighted bell buoy, extends 0.5 mile east from shore just southeast of Trout Point. The shoal border for the remainder of the east side of the Thumb is narrow and is marked by a buoy opposite Sand Point.

(87) A narrow deepwater channel leads between the southeast side of the Thumb and the shoal off Sand Point to Grand Island Harbor. The shoal is marked on its west edge by a lighted bell buoy; least depth of the shoal is ½ foot. The channel is marked by a 217° lighted range at Munising.

(88) **Grand Island Harbor**, the area of deep water off the south end of Grand Island, is a refuge during north storms for the largest vessels plying the Great Lakes. Anchorage with good holding ground is in the mouth of Murray Bay, between the south point of Grand Island and **Wick Point**, the south point of the Thumb. Avoid the submerged cables that extend from Powell Point to the south end of Grand Island.

(89) **South Bay**, between Sand Point on the east and **Powell Point** on the west, extends 2.5 miles south from Grand Island Harbor. Shoals extend about 0.2 mile from the shores of the bay.

(90) **Munising Harbor** is at the south end of South Bay at the town of **Munising, MI**. Prominent are the lighted radio masts on the high ground west of the town and the black stack and silver tank at the Neenah Paper Company on the southeast side of the town. A hospital is in the town. A light in the town marks the harbor approach. **Anna River**, which flows into the southeast corner of South Bay, is not navigable by even small craft.

(91) **Towage**

(92) Tugs are available from Sault Ste. Marie and Duluth. (See Towage under those ports.)

(93) **Wharf**

(94) The Neenah Paper Company – Munising Mill, receives coal at a 700-foot wharf 2,000 feet west of the mouth of Anna River. The wharf has reported depths of 14 to 23 feet alongside and a deck height of about 5 feet.

(95) **Small-craft facilities**

(96) The L-shaped city dock is 0.6 mile west of the mouth of Anna River. The dock has depths of 14 to 21 feet along the outer face and depths greater than 6 feet along the remainder of the outer half. Facilities developed

by the Michigan State Waterways Commission are at the dock. Transient berths, gasoline, electricity and sewage pump-out facilities are available. Limited repairs are available from local garages. A launching ramp is 0.6 mile northwest of the dock. The ruins of a large dock are 0.4 mile northwest of the city dock.

(97) From Powell Point, on the west side of the entrance to South Bay, the shore trends southwest for 1.5 miles, thence northwest for 3 miles to **Fivemile Point**, and thence west for 2.5 miles to **Au Train Point**. **Bay Furnace** is the bight formed west of Powell Point. From a width of 0.2 mile in Bay Furnace, the shoal border increases to a width of 1.2 miles northeast of Fivemile Point. **Williams Island** is near the outer edge of the shoals northeast of Fivemile Point. **Wood Island**, surrounded by shoals, is 2 miles north of Fivemile Point. A deep passage, obstructed by several detached 20- to 24-foot spots, leads between Wood and Williams Islands. Shoals extend 0.9 mile north of Au Train Point, and a detached shoal with a least depth of 10 feet is 1.3 miles north of the point.

(98) The west approach to Grand Island Harbor, south through the deep water between Williams Island and Grand Island, is marked by a light on the south shore of Bay Furnace. The shoal that extends from the south end of Grand Island is marked by buoys.

(99) **Au Train Point to Little Presque Isle, including Marquette, MI**

(100) **Au Train Bay** is the bight between Au Train Point and **Au Train Island**, 5 miles west. Au Train Island is 1.1 miles north of the mainland point that forms the west side of the bay. A shoal, with a depth of 10 feet near the outer end, extends 1.3 miles northeast from the point. Around the remainder of Au Train Bay, deep water is within 0.5 mile of shore. Shoals with depths of 18 and 11 feet near the outer edges extend 1.2 miles north and 0.6 mile west from Au Train Island, respectively.

(101) **Shelter Bay** is the bight between Au Train Island and the mainland shore 2.1 miles west. A 17-foot shoal is in the middle of the bay, 0.9 mile west of Au Train Island. The west shore of the bay is bluff and has deep water within 0.2 to 0.6 mile.

(102) From Shelter Bay, the shore becomes low and rocky for 2 miles northwest to **Laughing Fish Point** (46°32'00"N., 87°01'12"W.), 11.7 miles northwest of Au Train Point. From Laughing Fish Point, the shoreline continues low and rocky and trends southwest for 5 miles to the mouth of **Sand River**, thence west for 12 miles to the mouth of **Chocolay River**, and thence become bluff again for 3 miles northwest to **Lighthouse Point**. **Shot Point**, 3 miles west of Sand River, juts 1 mile north into the lake. Shoals extend 1 mile north in the vicinity of Laughing Fish Point and at Shot Point. Otherwise, deep water is within 0.7 mile of shore in this stretch. A group of rocks awash, marked by a buoy, is near the outer edge of the shoal border 0.8 mile northwest of the mouth of

Chocolay River. **Marquette Bay** is the bight formed between the mouth of Chocolay River and Lighthouse Point.

- (103) **Marquette Harbor**, also known as **Marquette Lower Harbor**, is on the northwest side of Marquette Bay, about 35 miles west of Grand Island Harbor, the nearest safe harbor to the east. The town of **Marquette, MI**, fronts on the harbor and is a base for commercial fishermen. Coal and caustic soda are received in the harbor.

(104)

Prominent features

- (105) Two stacks at the Shiras Generating Plant along the waterfront of the harbor are prominent.
- (106) **Marquette Breakwater Outer Light** (46°32'02"N., 87°22'29"W.), 36 feet above the water, is shown from a white cylindrical tower on the outer end of the breakwater. A mariner-activated sound signal at the light is initiated by keying the microphone five times on VHF-FM channel 83A.

(107)

Channels

- (108) A breakwater extends south and southeast from Lighthouse Point to enclose a dredged harbor basin on its west side. The breakwater is marked by lights at the bend and at the outer end, and buoys mark the west limit of the basin. For detailed channel information and minimum depths as reported by the U.S. Army Corps of Engineers (USACE), use NOAA Electronic Navigational Charts. Surveys and channel condition reports are available through the USACE hydrographic survey website listed in Appendix A.

(109)

Anchorage

- (110) The harbor basin affords good anchorage. It is reported that vessels also sometimes anchor southwest of the outer end of the breakwater.
- (111) A special anchorage is at the north end of the harbor. (See **33 CFR 110.1** and **110.80b**, chapter 2, for limits and regulations.)

(112)

Quarantine, customs, immigration and agricultural quarantine

- (113) (See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)
- (114) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(115)

Coast Guard Station

- (116) **Marquette Coast Guard Station** is on the northeast side of the harbor basin at the inner end of the breakwater.

(117)

Towage

- (118) Tugs are available from Sault Ste. Marie and Duluth. (See Towage under those ports.)

(119)

Wharves

(120)

Shiras Generating Plant receives coal at a wharf 1.2 miles southwest of Marquette Light. The wharf has 675 feet of berthing space with dolphins, a reported depth of 27 feet alongside, a deck height of 10 feet, and open storage for 250,000 tons of coal. The other wharves on the west side of the harbor are either in disrepair or are seldom used.

(121)

Small-craft facilities

(122)

Mooring to the breakwater is prohibited. Limited emergency mooring is available at the inner end of the northernmost dock ruins in the northwest corner of the harbor. Gasoline, diesel fuel, water, electricity, sewage pump-out, launching ramp and ice are available at the municipal marina at the north end of the basin. Repairs are also available at a 50-ton marine railway at the north end of the basin.

(123)

From Lighthouse Point, the shore is low and rocky for 2 miles north to Presque Isle Harbor. **Marquette Light** (46°32'48"N., 87°22'34"W.), 77 feet above the water, is shown from a red square tower on a dwelling. A shoal bank with a few bare rocks near the outer end, extends 0.25 mile east of Lighthouse Point. A rock awash is 150 feet east of the point. The northeast edge of the shoal bank is marked by a buoy. **Picnic Rocks**, a group of small rock islands, is 0.7 mile north of Marquette Light.

(124)

Presque Isle Harbor, also known as **Marquette Upper Harbor** or **North Harbor**, is an indentation in the shore north of Marquette Harbor protected on the north side by Presque Isle Point. The two northernmost stacks of the power plant on the west shore of the harbor are prominent.

(125)

Presque Isle Harbor Breakwater Light (46°34'28"N., 87°22'28"W.), 56 feet above the water, is shown from a white cylindrical tower with a red band on an octagonal building on the outer end of the breakwater that encloses the harbor. A mariner-radio-activated sound signal at the light is initiated by keying the microphone five times on VHF-FM channel 83A.

(126)

Channels

(127)

A breakwater extends southeast from the south end of Presque Isle Park to protect a dredged harbor basin west of the breakwater. A buoy marks the east side of the dredged basin and a lighted buoy marks the outer end of a submerged crib that extends from shore on the west side of the basin. For detailed channel information and minimum depths as reported by the U.S. Army Corps of Engineers (USACE), use NOAA Electronic Navigational Charts. Surveys and channel condition reports are available through a USACE hydrographic survey website listed in Appendix A.

(128)

Wharves

(129) Two docks at the north end of the harbor basin are owned by the Lake Superior and Ishpeming Railroad Co. The slip on the south side of the merchandise dock has a reported depth of 21 feet along the outer 400 feet. Iron ore and pellets are shipped from the northeast side of the ore dock, 500 feet southwest of the merchandise dock. The dock has a 1,200-foot face with a reported depth of 27 feet alongside and a deck height of 7 feet. Storage for 50,000 tons of pellets is available, and loading chutes can load vessels at 3,100 tons per hour.

(130) Presque Isle Station of the Upper Peninsula Generating Company receives coal on the southwest side of the ore dock. The southwest side of the dock has a 1,300-foot face with a reported depth of 27 feet alongside. An overhead conveyor with a 52-foot diameter hopper extends from shore 200 feet south of the dock. Coal received at the hopper is transported to a 900,000-ton storage area.

(131)

Small-craft facilities

(132) Presque Isle Marina, a small-craft basin developed by the Michigan State Waterways Commission is northeast of the merchandise dock. Transient berths, gasoline, diesel fuel, water, ice, electricity, pump-out and launching ramps are available. The harbormaster monitors VHF-FM channel 9.

(133) **Presque Isle Point** (46°35'36"N., 87°22'48"W.) is the north point of the peninsula occupied by Presque Isle Park, which encloses the north side of Presque Isle Harbor. The east side of the point is deep-to, but the shoal border increases in width south to the outer end of Presque Isle Harbor breakwater. **Presque Isle Point Rocks**, a group of small rock islets, are 0.7 mile east of Presque Isle Point. A pinnacle rock covered 10 feet is 0.2 mile east of the rocks. Vessels rounding Presque Isle Point bound to or from Marquette Harbor should keep well outside these rocks. A red sector on the light on the outer end of Marquette Harbor breakwater marks these dangers.

(134) From Presque Isle Point northwest for about 22 miles to Big Bay Point, the shore is generally bold. **Little Presque Isle** (46°38'18"N., 87°27'30"W.) is about 5.9 miles northwest of Presque Isle Point. The southeast half of the bight between these points is somewhat foul with shoals and small islands. **Partridge Island**, largest in the group, is over 200 feet high. **Middle Bay** and **Partridge Bay** are southeast and west of the island, respectively. Caution is advised in navigating these bays. The most dangerous spot, covered 2 feet, is in the center of Partridge Bay 0.5 mile west of Partridge Island. **Larus Island**, 0.8 mile northwest of Partridge Island, is the northwesternmost of the group. From Larus Island northwest to Granite Point, the shores of the bight are fairly deep-to.

(135)

Little Presque Isle to Yellow Dog Point

(136) From Little Presque Isle northwest for about 17 miles to Big Bay Point, Granite Island and Stannard Rocks are the only outlying obstructions. Prominent in this reach are Thoneys (Thoney) Point 4.6 miles northwest of Little Presque Isle, Saux Head Point (Sauk Head), 2.7 miles northwest of Thoneys Point, **Yellow Dog Point** 3 miles southeast of Big Bay Point, and **Granite Point** (46°46'54"N., 87°35'18"W.) 3 miles southeast of Yellow Dog Point. Deep water is generally within 0.5 mile of shore except at a point 1.8 miles north of Saux Head Point and at Yellow Dog Point where shoals extend 0.7 mile off.

(137) **Granite Island** is a small steep island surrounded by deep water 5.6 miles east-northeast of Thoneys Point. A light on the island is a guide to vessels approaching Marquette Harbor from the north or west.

(138) **Stannard Rock**, 32 miles northeast of Big Bay Point, consists of two large detached rock ledges. The south ledge was reported awash in 1991 and the north ledge is covered 2 feet. In 1956, a few scattered rocks awash were reported between the ledges. **Stannard Rock Light** (47°11'01"N., 87°13'30"W.), 102 feet above the water, is shown from a gray conical tower on a cylindrical crib on the south side of the north ledge. A 14-foot shoal is 1,000 feet southwest of the light, and an 18-foot shoal, plainly visible to vessels passing over it in calm weather, is 0.6 mile west of the light.

(139)

Local magnetic disturbance

(140) Magnetic disturbances have been observed around Stannard Rock.

(141)

Big Bay Point to Salmon Trout Point

(142) **Big Bay Point** (46°50'36"N., 87°41'00"W.), marked by a light, is 22 miles northwest of Presque Isle Point. A shoal with a depth of 9 feet at the outer end extends 1.1 miles north from the point. A buoy marks the north end of the shoal. **Big Bay** is a deep bight enclosed by Big Bay Point on the east and **Salmon Trout Point** on the west. The south and west shores have deep water within 0.3 mile.

(143) **Big Bay Harbor** is a small-craft harbor of refuge in the southwest corner of Big Bay. A dredged entrance channel leads from deep water in Big Bay between converging breakwaters to an inner harbor basin. The outer ends of the east and west breakwaters are marked by a daybeacon and a light, respectively.

(144)

Small-craft facilities

(145) A public docking facility developed by the Michigan State Waterways Commission is in the southwest corner of the basin. Transient berths, gasoline, water, electricity, sewage pump-out, launching ramp and harbormaster

services are available. The harbormaster monitors VHF-FM channels 16 and 9.

- (146) About 750 feet northwest of Big Bay Harbor west breakwater, submerged dock ruins, covered 3 to 9 feet, extend about 500 feet from shore.

(147)

Salmon Trout Point to Point Abbaye, including Huron Bay

- (148) From Salmon Trout Point, the shore trends northwest for 8 miles to Huron River Point, thence 9 miles west to the south side of the mouth of Huron Bay. **Conway Point** and **Pine River Point** 2 and 4 miles northwest of Salmon Trout Point, respectively, are prominent. The **Huron Mountains** rise close behind the shoreline. At **Huron River Point** (46°54'36"N., 87°54'00"W.), a shoal with depths of 8 to 10 feet at the outer end extends 1.5 miles northeast. The shore in the remainder of this stretch is generally clear within 0.5 mile.

- (149) **Huron Islands** are a group of small islands centered 5 miles northwest of Huron River Point near the entrance to Huron Bay. The islands are all bold and deep-to except for the easternmost of the group, from which rocks awash extend 0.3 mile southeast. **Huron Island Light** (46°57'48"N., 87°59'55"W.), 197 feet above the water, is shown from a gray granite tower on a dwelling on the northwesternmost of the island group.

- (150) **Huron Bay**, extending about 12 miles southwest into the shoreline, is about 3 miles wide at the mouth and narrows to about 0.5 mile at the head. The bay has deep water within 0.5 mile of shore in the outer part, and the shores become deep-to in the inner part. **Point Abbaye** is the point at the outer end of the peninsula that separates the west side of Huron Bay from Keweenaw Bay. **Point Abbaye Reef**, with a depth of 6 feet at the outer end, extends 1.5 miles east from the point. Buoys mark the north and southeast edges of the reef.

- (151) **Huron Bay Light** marks the outer end of a small projection of land on the southeast side of the bay about 6 miles southwest of Point Abbaye.

- (152) **Skanee, MI**, is a small village with dilapidated wharves about 0.8 mile south of Huron Bay Light. A small-craft basin is between the light and village. In 1978, the reported controlling depths were 5½ feet in the entrance channel with 7 to 10 feet in the basin. Transient berths, gasoline, water, electricity, sewage pump-out facilities and a launching ramp are available.

- (153) **Huron Bay, MI**, is an abandoned village on the east side near the head of Huron Bay. The ruins of two wharves extend about 1,000 feet from shore. The slip between the wharves has depths less than 2 feet except at the outer end. Very shoal water is on the outer sides of both wharves.

(154)

Point Abbaye to Keweenaw Bay, MI

- (155) **Keweenaw Bay** extends about 22 miles southwest on the northwest side of Point Abbaye and is enclosed on the west by the inner end of the east side of Keweenaw Peninsula. The bay is 12 miles wide at the entrance and has a minimum width of 1.1 miles abreast Sand Point, about 2.3 miles from the head of the bay. The east shore of the bay has deep water within 0.4 mile and the west shore within 0.7 mile.

- (156) A headland, 1 mile wide at the inner end and 2 miles wide at the outer end, extends 1.7 miles northwest from shore about 13 miles southwest of Point Abbaye. **Sand Bay** is the bight on the northeast side of the headland, and **Pequaming Bay** is the bight on the southwest side. **Sand Point**, marked by a light, is a projection from the west side of the bay about 2.3 miles from the head. A 1-foot shoal, marked on the southeast side by a buoy, extends 1,000 feet south from Sand Point. **L'Anse Bay** is the part of Keweenaw Bay above Sand Point. **Portage River** flows into the west side of Keweenaw Bay about 13.5 miles west of Point Abbaye.

- (157) **Pequaming, MI**, is a village on the northwest side of Pequaming Bay, about 15 miles southwest of Point Abbaye. Dock ruins extend about 1,200 feet south from the headland that forms the west side of the bay. A wharf in poor condition parallels the dock ruins with a slip between. In 1966, depths in the slip were 17 feet at the outer end decreasing to 7 feet at the inner end, and depths were 19 feet along the outer 500 feet of the east side of the wharf. The mooring facilities on the east side of the wharf are dilapidated. northeast of the wharf, submerged dock ruins extend south from the north shore of the bay. A small island at the outer end of the ruins is the only part visible. A line of submerged cribs, in depths of 8 to 14 feet, extends east from the island to the east shore of the bay. No facilities are maintained at the village. There is excellent protection, but caution must be exercised when approaching or landing at the dock ruins.

- (158) **L'Anse, MI**, is a village at the mouth of **Falls River** on the southeast side of L'Anse Bay. A silver water tank on the south side of the river mouth and a stack on the north side of the river mouth are prominent.

- (159) **Caution**—Submerged ruins and a sunken wreck extend 500 feet northwest from the north side of the river mouth. A buoy marks the outer end of the ruins.

(160)

Wharf

- (161) The wharf of the Celotex Corp. extends 800 feet northwest from the south side of the river mouth, thence 3,000 feet southwest along the shore. The north face has depths of 19 feet, decreasing to 12 feet 300 feet from the outer end. The west face has depths of 19 to 22 feet along the northeast 900 feet. Vessels should approach the wharf on a line parallel with the northeast face to avoid a 17-foot

shoal about 650 feet west-northwest of the north corner of the wharf.

(162)

Small-craft facilities

(163) The municipal marina is on the north side of the river mouth. In 1972, the controlling depth was 4 feet in the approach and marina basin. Water is available at the marina and gasoline and most supplies are available nearby in town. L'Anse has a hospital.

(164) **Baraga, MI**, is a village on the northwest side of L'Anse Bay. The silver tank on high ground west of the village is prominent. Two jetties extend east from shore at the village. The south jetty, 1,200 feet long, has submerged ruins extending 200 feet from its outer end and 900 feet off the south side. About 200 feet north, the second jetty, wooded over, extends 700 feet from shore to depths of about 18 feet. Lime is occasionally received at the village.

(165)

Small-craft facilities

(166) In 1972, the slip between the jetties had depths of 17 to 7 feet. A Michigan State Waterways Commission dock provides transient berths, sewage pump-out and a launching ramp.

(167) **Keweenaw Bay, MI**, is a village on the west side of Keweenaw Bay opposite Pequaming. An abandoned coal dock in ruins extends east from shore. Rock bluffs just north of the dock are prominent.

(168)

Keweenaw Waterway

(169) **Keweenaw Waterway**, about 25 miles long, crosses **Keweenaw Peninsula** from Keweenaw Bay on the southeast side to the open water of Lake Superior on the northwest side. The waterway follows Portage River from its mouth in Keweenaw Bay for 5 miles to Portage Lake, thence extends for 17.5 miles through the lake to its head, and thence follows a dredged cut from the head of Portage Lake to Lake Superior.

(170)

Regulations

(171) An 8 mph (7 knots) **speed limit** is enforced in Keweenaw Waterway. (See **33 CFR 162.115**, chapter 2, for Keweenaw Waterway regulations.)

(172) On the vessel route between Sault Ste. Marie and Duluth, the distance through the waterway is about 5 miles greater than by the open lake route. However, between Marquette and Duluth the waterway provides a savings of about 22 miles, and between Marquette and Ashland a savings of about 26 miles, as compared with the route around the outside of Keweenaw Point. The use of the waterway for refuge is indicated by the fact that more freight passes through the canals in October and November, the stormy season, than at any other time in the year, although the commerce on Lake Superior, as

shown by the records at the Sault and at the head of the lake, is heaviest during July and August.

(173)

Channels

(174) A federal project provides for channel depths of 28 to 25 feet through the lower entrance (east entrance) at the mouth of Portage River to the Portage River Harbor of Refuge, thence 25 feet through Portage River to deep water in Portage Lake. The project depths in the entrance from Lake Superior (upper entrance) are 32 to 25 feet to the Lily Pond Harbor of Refuge, thence 25 feet to the upper end of Portage Lake. For detailed channel information and minimum depths as reported by the U.S. Army Corps of Engineers (USACE), use NOAA Electronic Navigational Charts. Surveys and channel condition reports are available through the USACE hydrographic survey website listed in Appendix A. The channels through the waterway are well marked by lighted and unlighted buoys, lights and lighted ranges.

(175) The lower entrance in Keweenaw Bay is protected by a breakwater that extends south from the east side of the mouth of Portage River. The breakwater should not be approached closer than 20 feet by vessels exceeding a 12-foot draft as it is lined with riprap on the channel side. The upper entrance at Lake Superior is protected by converging breakwaters.

(176) **Keweenaw Waterway Lower Entrance Light** (46°58'08"N., 88°25'52"W.), 68 feet above the water, is shown from a white octagonal tower on the outer end of the breakwater on the east side of the Keweenaw Bay entrance to the waterway. A mariner-radio-activated sound signal at the light is initiated by keying the microphone five times on VHF-FM channel 83A.

(177) **Portage River Harbor of Refuge** is just inside the lower entrance to the waterway at the mouth of Portage River. This 0.5-mile-long basin has a revetment with bollards on the west side where vessels may moor.

(178) A small settlement with docks of commercial fishermen is on the west side of the river mouth south of the mooring pier. Marinas at the settlement provide limited transient berths, gasoline, water, electricity and launching ramps. A marine railway and a 20-ton lift are available for repairs. Water and a launching ramp are available north of the mooring pier.

(179) **Portage River**, the natural outlet of Portage Lake, forms part of the Keweenaw Waterway for 5 miles from its mouth in Keweenaw Bay to Portage Lake.

(180) **Portage Lake**, about 17.5 miles long, is generally narrow, resembling a river, but has no sensible current. The lower 3.5 miles of the lake, locally known as Big Portage, is over 2 miles wide. Portage River flows from the southeast corner of the lake, and **Pike Bay** is in the southwest corner, the two being divided by the flats at the mouth of **Sturgeon River**. About 3 miles north of the head of Portage River, the lake is divided by **Grosse Point**. **Torch Bay** extends east from the point. The main body of the lake extends 2 miles north, thence turns west

at **Pilgrim Point** for about 5.5 miles between the towns of Hancock and Houghton, and thence extends north for about 5 miles to the head of the lake. Above Grosse Point, the lake narrows to 0.5 mile and in the upper part has widths of 0.15 to 0.4 mile.

- (181) A 19-foot spot and a 20-foot spot are in the north part of Portage Lake about 0.7 mile and 1.8 miles south of Pilgrim Point Light, respectively. A shoal marked by buoys extends about 240 yards off the east shore of the waterway about 1.3 miles north-northwest of Grosse Point. The shoal also extends into the north part of Portage Lake for about 0.7 mile southeast of Grosse Point.

- (182) **Pike Bay**, at the southwest corner of Portage Lake, is entered through a narrow channel with depths of about 9 feet. The pile remains of a former lumber wharf are on the west side of the bay at the village of **Chassell, MI**.

- (183) **Torch Bay** extends northeast and bends north for about 6 miles from Grosse Point. The bay narrows from about 1.3 miles wide at the mouth to 0.15 mile at the head. The lower part of the bay is deep, but the upper part is shallow. **Torch Lake Canal** connects the head of the bay with Torch Lake. A narrow channel, marked by lighted and unlighted buoys, leads for 4 miles through the upper part of Torch Bay and Torch Lake Canal. **Torch Lake** is about 4 miles long with a maximum width of 1.3 miles. The towns of **Lake Linden** and **Hubbell** are on the northwest side of the lake.

- (184) **Dollar Bay** is a small inlet 2 miles north of Grosse Point on the turn of Portage Lake opposite Pilgrim Point. A repair yard on the northwest side of the entrance to the bay at the village of **Dollar Bay, MI**, makes hull and engine repairs to small craft and fishing vessels.

- (185) Heating oil and diesel fuel are received at a wharf operated by Standard Oil Co. 0.6 mile west of the mouth of Dollar Bay. The wharf has 250 feet of berthing space with dolphins, a reported depth of 22 feet alongside, a deck height of 6 feet, and tank storage for 166,000 barrels. Upper Peninsula Power Co. receives coal at a wharf 0.4 mile west. The wharf is 880 feet long with a reported depth of 20 feet alongside and a deck height of 6 feet. There is storage for 80,000 tons of coal.

- (186) **Hancock, MI**, on the north side of Portage Lake 3.5 miles west of Dollar Bay, and **Houghton, MI**, on the south side of the lake opposite, are the largest communities on Keweenaw Waterway. The wharves at Hancock are in good condition, but most of those at Houghton are becoming ruins.

- (187) A combination highway and railroad double-deck vertical lift bridge crosses Portage Lake from Houghton to Hancock. The bridge has a clearance of 7 feet down and 103 feet up. The lift span may be stopped at intermediate elevations, with a pointer on the lift span indicating the vertical clearance above high water, which for this bridge is 35 feet above Low Water Datum. Fixed red lights are shown on top of the lift span towers and a fixed white light is shown at center of top of the lift span. A light at center of the bottom of the lift span shows red and is changed to green when the lift is raised sufficiently for passage.

(See **33 CFR 117.1** through **117.59** and **117.635**, chapter 2, for drawbridge regulations.) An overhead power cable, with a reported clearance of 120 feet, crosses the channel about 1.7 miles west of the lift bridge.

- (188) Salt is received by Mattila Contracting Co. at a 550-foot wharf 1.8 miles west of the lift bridge at Hancock. The wharf has a deck height of 4 feet and reported depths of 12 feet alongside, increasing rapidly away from the dock.

(189)

Small-craft facilities

- (190) A marina developed by the Michigan State Waterways Commission at Hancock, just east of the lift bridge, provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, launching ramp and harbor master services. The harbor master monitors VHF-FM channels 16 and 9. Dock space for small craft is also available at the village of **Ripley, MI**, just east of Hancock. A public docking facility for day use only is at Houghton, just east of the lift bridge.

(191)

Ferry

- (192) A ferry service operates between Houghton, 0.5 mile east of the lift bridge, and Isle Royale in the summer. The schedule is available from Isle Royale National Park, 800 East Lakeshore Drive, Houghton, MI 49931-1869, or on the internet at www.nps.gov/isro/Transportation/ranger3.htm.

- (193) **Keweenaw Upper Entrance Light** (47°14'04"N., 88°37'49"W.), 82 feet above the water, is shown from a white square tower on a cylindrical base at the outer end of the east breakwater. A mariner-activated sound signal at the light is initiated by keying the microphone five times on VHF-FM channels 83A. The outer end of the west breakwater is also marked by a light.

- (194) **Portage Coast Guard Station** is on the east side of the waterway about 0.2 mile west of the lift bridge at Hancock.

- (195) **Lily Pond Harbor of Refuge** is a basin about 1.5 miles southeast of the breakwater entrance. A revetment on the east side of the basin may be used for mooring. Breakwater stone for stabilization extends 15 to 20 feet from the revetment.

(196)

Little Traverse Bay to Five Mile Point

- (197) From the lower entrance to Keweenaw Waterway, the southeast shore of Keweenaw Peninsula extends northeast for 15 miles to **Traverse Point** (47°08'30"N., 88°14'06"W.). Deep water is within 0.5 mile of shore. **Traverse Island** is 2 miles offshore 4.3 miles south-southwest of Traverse Point. A narrow shoal extends 0.8 mile southwest from the southwest point of the island. In 1966, a small gravel island, 3 feet high, was reported near the outer end of the shoal. Shoals extend 0.1 to 0.2 mile off the other shores of the island. A deep passage 1.7 miles wide leads between the island and the mainland shore.

(198) **Little Traverse Bay** is a semicircular bight about 2 miles wide on the southwest side of Traverse Point. The bay provides protection from west to northeast winds and has a sandy bottom. **Grand Traverse Bay** is a broad indentation on the north side of Traverse Point. A shoal with a depth of 14 feet at the outer edge extends 1.1 miles from the north shore of the bay. In 1965, the ruins of a coal dock, covered 1½ feet, were reported to extend about 150 feet from shore near the northwest corner of the bay. A stack at the village of **Gay, MI**, just north of the bay, is prominent.

(199) **Grand Traverse Bay Harbor** is a small-craft harbor near the center of the west shore of Grand Traverse Bay at the mouth of the **Traverse River**, about 18 miles northeast of the lower entrance to Keweenaw Waterway.

(200)

Channels

(201) A dredged entrance channel leads from deep water in Grand Traverse Bay between breakwaters at the mouth of Traverse River to an inner harbor basin. The outer ends of the breakwaters are marked by lights. An extension channel leads northeast from the inner basin upstream in the river for about 350 feet.

(202)

Small-craft facilities

(203) Local boaters are the major users of the harbor; facilities for recreational small craft are very limited. No dockside facilities for marine repair or maintenance are available, and the nearest store is about 5 miles by road at the village of Gay. The Michigan State Waterways Commission has developed a public docking facility on the south side of the basin. A launching ramp is available.

(204) From the north side of Grand Traverse Bay, the shore extends northeast for about 15 miles to **Point Isabelle** (47°20'35"N., 87°56'12"W.). Shoals extend as much as 0.7 mile from shore in this stretch. Point Isabelle forms the south side of Bete Grise Bay. A shallow rocky bank extends 0.9 mile northeast from the point and is marked at the outer edge by a buoy.

(205) **Bete Grise Bay** extends 2 miles west on the north side of Point Isabelle. The south shore is low and rocky, the west shore low and sandy and the north shore bluff and rocky. The bay has good holding ground with protection from west to northeast winds. **Mount Houghton** and **Mount Bohemia**, north and west-northwest of the bay, respectively, are prominent. A fire tower is on Mount Bohemia.

(206) **Lac La Belle Harbor** is at the head of Bete Grise Bay, about 36 miles northeast of the lower entrance to Keweenaw Waterway. A dredged canal leads from the head of the bay west for about 0.7 mile to **Lac La Belle**, a small inland lake about 2.5 miles long, 1 mile wide, and up to 37 feet deep. Lac La Belle has good anchorage, generally mud bottom. A public dock developed by the Michigan State Waterways Commission is at the northwest end of the lake; a launching ramp is available here.

(207) From the head of Bete Grise Bay, the shore extends east for about 11.5 miles to **Keweenaw Point** (47°24'06"N., 87°42'48"W.), the east extremity of Keweenaw Peninsula. This stretch is generally bold and deep-to. Elevations to 600 feet are close to the water. A boulder ledge, covered 3 feet, extends 0.4 mile south from Keweenaw Point and is marked on the southeast side by a lighted buoy. **Keystone Bay**, just west of Keweenaw Point, has good holding ground with protection from west to northeast winds.

(208) **Manitou Island**, 3 miles long and up to 1.4 miles wide, has its west end 2.8 miles east of Keweenaw Point. The deepwater passage between the point and the island is 1.8 miles wide. **Manitou Light** (47°25'11"N., 87°35'13"W.), 81 feet above the water, is shown from a cylindrical tower on the east point of the island; a racon is at the light.

(209) Rocky ledges extend about 0.3 mile off the north and south shores of Manitou Island, increasing in width toward the narrow west end where the ledge extends 0.8 mile west. **Gull Rock**, marked by a light, is near the outer edge of the ledge west of the island. A 12-foot shoal, marked on the west side by a buoy, is 0.7 mile south of Gull Rock. A boulder, covered 26 feet, is 1.7 miles south of Gull Rock.

(210) **Fishermans Bay**, an indentation in the east end of Manitou Island, has good holding ground with protection from west to northeast winds. A shoal with a depth of 4 feet at the outer end extends 0.4 mile east from the south side of the entrance to the bay.

(211) From the tip of Keweenaw Point, the shore extends north for 2.6 miles, thence turns northwest and bends west for 7.5 miles to the entrance to Copper Harbor. The shore in this stretch is low and rocky with high bluffs close behind. Deep water is generally close to shore.

(212) **Copper Harbor** is a broad inlet on the north side of Keweenaw Peninsula about 9 miles northwest of Keweenaw Point. Narrow points of land extend from shore on either side of the entrance and leave an opening 1.4 miles wide. Islands and shoals extend about 1.1 miles east from the west point, and shoals extend about 0.15 mile west from the east point. The entrance between the shoals, marked by a bell buoy and a **190.5°** lighted range, is about 550 feet wide with a depth of about 14 feet.

(213) **Copper Harbor Light** (47°28'28"N., 87°51'37"W.), 90 feet above the water, is shown from a white skeleton tower near a white dwelling on the east entrance point.

(214) Copper Harbor provides protection from the northeast and northwest storms that are frequent in this area. The west end of the harbor has good holding ground. Several shoals in the harbor are dangerous to navigation. A 12-foot shoal is 0.2 mile south of Copper Harbor Light.

(215) **Copper Harbor, MI**, is a village on the southwest side of Copper Harbor. A public docking facility developed by the Michigan State Waterways Commission at the village provides berths, gasoline, water, electricity, sewage pump-out and a launching ramp. The harbormaster monitors VHF-FM channels 16 and 9.

(216)

Ferry

(217) A ferry service operates between Copper Harbor and Isle Royale in the summer. The schedule is available from Superintendent, Isle Royale National Park, 87 N. Ripley Street, Houghton, MI, 49931.

(218) From Copper Harbor west for 8 miles to Agate Harbor, deep water is within 0.2 mile of shore, thence west for 5 miles to Eagle Harbor, dangerous rocks and reefs parallel the shore 0.2 to 0.5 mile off.

(219) **Agate Harbor** consists of a north and a south harbor parallel to each other and open to west. The harbors are enclosed by two narrow peninsulas that extend west from the mainland and by islets and reefs that extend west from the ends of the peninsulas. These harbors afford safe shelter and good holding ground for small craft. Extreme caution must be exercised to avoid the reefs when entering. The maximum available depth across the outer line of shoals at the entrance to the north harbor is 19 feet.

(220) **Little Grand Marais Harbor**, about 3 miles west of Agate Harbor, is nearly landlocked, with a narrow opening to north. The entrance is blocked by a shoal.

(221) **Eagle Harbor**, 13.5 miles west of Copper Harbor, is a partially enclosed bay on the north side of Keweenaw Peninsula. The harbor is about 1 mile long and 0.2 mile wide, but only the center has good depths, 12 to 20 feet. The bottom in this area is stone, and the holding ground is not good.

(222) **Eagle Harbor Light** (47°27'35"N., 88°09'33"W.), 60 feet above the water, is shown from a white octagonal tower on a red dwelling on the west entrance point to Eagle Harbor.

(223)

Channels

(224) A channel leads between two partially submerged cribs from Lake Superior to deep water inside the harbor, and a basin has been dredged off a Michigan State Waterways Commission facility at the east end of the harbor. The entrance to the harbor is marked by a bell buoy and a 149.7° lighted range.

(225) **Caution**—Two dangerous reefs are in the approach to Eagle Harbor. A reef with a least depth of 2 feet is 0.25 mile northeast of Eagle Harbor Light on the east side of the rangeline. A reef with rocks awash is 0.2 mile northwest of the light on the west side of the rangeline.

(226) The slightly deteriorated gray stone cribs on either side of the entrance channel project about 5 feet above the lake level. The west crib is about 100 feet long and the east about 50 feet long, with portions submerged. The horizontal clearance between the cribs is about 120 feet normal to the channel.

(227)

Small-craft facilities

(228) A public docking facility developed by the Michigan State Waterways Commission on the north side of the

dredged basin provides gasoline, water, electricity, sewage pump-out and a launching ramp.

(229)

From Eagle Harbor, the shore trends southwest for about 28 miles to the upper entrance to Keweenaw Waterway. The shore is generally bluff and may be closely approached with the exception of several shoals. From Eagle Harbor for 7 miles to Eagle River, a succession of dangerous shoals parallel the shore from 0.25 to 1 mile off. **Great Sand Bay** is an indentation from 3 to 6 miles southwest of Eagle Harbor. A shoal with a least depth of 6 feet extends 1.1 miles west from the east entrance point to the bay. **Eagle River Shoals**, with a least depth of 4 feet, parallels the shore from the center of Great Sand Bay southwest to Eagle River.

(230)

Eagle River, MI, a village 7 miles southwest of Eagle Harbor, has been abandoned as a commercial port. The cribs of the former dock are submerged.

(231)

Five Mile Point (47°23'30"N., 88°22'18"W.), 4 miles southwest of Eagle River, is marked by a prominent abandoned lighthouse. **Hutchinson Shoal**, with a least depth of 14 feet, is 0.5 mile offshore 1.6 miles west-southwest of Five Mile Point. About 1 mile northeast of the entrance to Keweenaw Waterway, a shoal with a depth of 8 feet near the outer end extends 1 mile north from shore. Vessels approaching or leaving the canal should take care to avoid the shoal.

(232)

Keweenaw Waterway Entrance to Ontonagon Harbor

(233)

From the Keweenaw Waterway entrance, the shore trends southwest for about 41 miles to Ontonagon Harbor. None of the rivers that flow into the lake in this stretch are navigable, nor are there any docking facilities. Prominent are stacks at **Redridge** and **Freda**, 8.5 and 11 miles southwest of the waterway, respectively.

(234)

Misery Bay to Little Girls Point

(235)

Misery Bay, 13 miles southwest of Freda, and **Sleeping Bay**, just west of Misery Bay, offer limited protection. **Fourteen Mile Point** (46°59'42"N., 89°07'42"W.), on the west side of Sleeping Bay, is marked by a prominent abandoned lighthouse.

(236)

Ontonagon Harbor, serving the town of **Ontonagon, MI**, is at the mouth of **Ontonagon River**. It is the only harbor of refuge along the 79-mile stretch from the Keweenaw Waterway to Black River Harbor. The harbor is used extensively by commercial fishermen. Coal is received at a wharf on the west side of the river just above the mouth. A hospital is in the town. Prominent are a blue tank, stacks and buildings at the paper company on the west side of the river mouth and a blue water tank about 1 mile southeast of the river mouth.

(237)

Channels

- (238) A dredged entrance channel leads from deep water in Lake Superior between the parallel piers to the mouth of Ontonagon River, thence upstream for about 0.4 mile to the head of the project. The outer ends of the piers are marked by lights; a seasonal sound signal is at the west pierhead light. Shoaling in the harbor occurs annually during the winter.

(239)

Bridges

- (240) A railroad bridge, in about 46°52'03"N., 89°19'03"W., has a fixed span with a clearance of 8 feet. The SR64 highway bridge, about 200 feet above the railroad bridge, has three fixed spans with a least reported clearance of 33 feet.

(241)

Small-craft facilities

- (242) A public docking facility developed by the Michigan State Waterways Commission is in a basin on the west side of the river, 0.2 mile above the head of the dredged channel. In 1978, it was reported that local interests annually dredge the entrance and basin to a depth of 7 feet. Transient berths, gasoline, water, electricity, sewage pump-out, launching ramp and harbormaster services. The harbormaster monitors VHF-FM channels 16 and 9. A 30-ton hoist is available.

- (243) From Ontonagon, the shore extends southwest for about 6 miles to the village of **Green**, thence west for about 15 miles, and thence southwest for 18 miles to Black River Harbor. For 15 miles west from Ontonagon, the shore is low, and shoals extend 0.7 mile off.

- (244) **Silver City, MI**, is a village at the mouth of **Big Iron River**, 12 miles west-southwest of Ontonagon. In 1978, the reported controlling depth through the river mouth was 2 feet. The river should not be attempted without local knowledge. Prominent are a 500-foot stack, upper third black, on higher ground 4.5 miles south of Silver City and a television mast 6 miles west of the village. **Union Bay**, just west of Silver City, affords limited protection.

- (245) **Porcupine Mountains** rise about 2 miles west of Silver City and extend 15 miles southwest with some elevations 1,200 feet above the lake. The shoal border in the vicinity of the mountains is narrow, thence at the southwest end of the mountains, the shoal border widens to 0.5 mile southwest to Black River Harbor. A 20-foot-high rock is close offshore 14 miles northeast of Black River Harbor. None of the rivers that flow into this reach are navigable.

- (246) **Time**—Lakeshore areas of the United States west of 89°50.7'W., which is about midway between Silver City and Black River Harbor on Lake Superior, observe central standard time or central daylight saving time. Areas east of this meridian, including the lakeshore areas of the Canadian Province of Ontario, observe eastern standard time or eastern daylight saving time.

(247)

Caution—A special use airspace, bounded by the following coordinates: 47°45'N., 90°05'W.; 47°45'N., 89°28'W.; 46°55'N., 89°28'W.; 46°55'N., 90°05'W., is used periodically for air-to-air gunnery practice from the surface to an altitude of 45,000 feet. The using agency is the Commander, Second Air Force, Barksdale AFB, La., and the controlling agency is Minneapolis ARTC Center, Federal Aviation Administration.

(248)

Black River Harbor, at the mouth of the **Black River**, 37 miles southwest of Ontonagon Harbor, offers shelter for commercial fishing and recreational craft. A park and recreation area maintained by the U.S. Forest Service are adjacent to the harbor. A dredged entrance channel leads from deep water in Lake Superior between converging breakwaters and upstream in the river to a harbor basin. The outer end of the east breakwater is marked by a light and the outer end of the west breakwater is marked by a lighted buoy.

(249)

Small-craft facilities

- (250) Facilities developed by the Michigan State Waterways Commission are in the harbor basin. The surrounding area is sparsely populated, and only a few dock spaces are along the west side of the river. Gasoline, water, electricity, sewage pump-out facilities and a launching ramp are available.

(251)

From Black River Harbor, the shore is bold for 20 miles southwest to Saxon Harbor. Shoals extend about 0.3 mile from shore. **Little Girls Point**, 6 miles northeast of Saxon Harbor, is the only projection along this stretch.

(252)

Marble Point to Saxon Harbor, including Long Island

(253)

The **state boundary** between Michigan and Wisconsin, about 1 mile northeast of Saxon Harbor, follows the course of **Montreal River**. The river is not navigable.

(254)

Saxon Harbor, 57 miles southwest of Ontonagon Harbor, is at the original mouth of **Oronto Creek**. A dredged entrance channel leads from Lake Superior between converging breakwaters to an inner harbor basin and channel. The outer ends of the breakwaters are marked by lights.

(255)

Small-craft facilities

(256)

A 300-foot mooring dock with a launching ramp is on the east side of the harbor. Berths, gasoline, electricity, marine supplies and sewage pump-out facilities are available in the harbor.

(257)

Saxon Harbor to Chequamegon Point

(258)

From Saxon Harbor, the shore extends northwest for about 21 miles to the west end of Long Island at the entrance to Chequamegon Bay. **Marble Point**, about 4

miles northwest of Saxon Harbor, is at the west end of the bluffs that characterize the shore west of the Porcupine Mountains, west of Marble Point to Chequamegon Bay, the shore is low and marshy, and shoals extend no more than 0.7 mile from shore.

(259) **Long Island** is an extension of **Chequamegon Point**, separated from it by a reappearing sandbar. The island and point, both sandy and wooded, have a total length of about 7 miles and a width of less than 0.25 mile. Together they form the northeast side of Chequamegon Bay. **Chequamegon Point Light** (46°43'43"N., 90°48'33"W.), 33 feet above the water, is shown from a white cylindrical tower on the west end of Long Island.

(260) The Apostle Islands are north of this stretch of shore. Madeline Island, the south island of the group, is 1.5 miles north of Long Island. **South Channel**, the deepwater passage between Madeline and Long Islands, is the east approach to Chequamegon Bay. The north side of the channel is marked by a lighted buoy that marks the extent of shoals off the southwest end of Madeline Island. **La Pointe Light** (46°43'43"N., 90°47'06"W.), 70 feet above the water, is shown from a white cylindrical tower on the north side of Long Island.

(261)

Chequamegon Point to Ashland, WI

(262) **Chequamegon Bay**, separated from Lake Superior by Chequamegon Point and Long Island, is about 12 miles long and 5 miles wide. The bay is entered through the deep water west of Long Island. The deep water follows close to the west shore of the bay to within about 4 miles of the head, thence extends south across the bay to the wharves at Ashland. The limit of the shoal border off **Houghton Point**, on the west shore 3 miles southwest of Chequamegon Point Light, is marked by a lighted buoy. north of Ashland, the east part of the bay is filled with an extensive flat. The shoalest water is around **Oak Point** in the east corner of the bay. The west edge of the flat is marked by a lighted buoy 2.2 miles south of Houghton Point. Above Ashland, the bay shoals gradually toward the head.

(263) **Ashland Harbor**, serving the city of **Ashland, WI**, is on the southeast side near the head of Chequamegon Bay. The harbor is sheltered from the storms of Lake Superior by Chequamegon Point, Long Island, and the Apostle Islands. However, the size of the bay permits the generation of waves within itself, and in northeast storms, when accompanied by swells coming in from the lake, heavy seas occur in the bay. A breakwater northeast of the Ashland wharves provides protection for the harbor facilities. The city of Ashland is on a low bluff that fronts the southeast side of the bay. Stacks and spires in the city are prominent.

(264)

Channels

(265) A 1½-mile-long breakwater, on a northwest-southeast line about 2 miles northeast of the center of

the Ashland waterfront, provides protection for the waterfront and the dredged areas along it. The ends of the breakwater are marked by lights. A dredged basin is off the piers in the east part of the harbor, and a dredged channel leads from deep water in the bay along the piers in the west part of the harbor. The channel is well marked by lighted and unlighted buoys.

(266) A shoal area, with a least depth of 5 feet, is about 1,200 feet northeast of the dredged basin and a discontinued dumping ground is adjacent to the northeast side of the breakwater.

(267) **Caution**—Much of the Ashland waterfront is in ruins. Piles and submerged piles extend up to 2,300 feet from shore throughout the area. The remains of piles are often adrift in the harbor.

(268) In 1987, submerged debris was reported immediately north of the Ashland Breakwater, extending at least 4,900 feet off the breakwater, with heaviest concentration at a point about 2,790 feet, 061° from Ashland Breakwater Light.

(269)

Quarantine, customs, immigration and agricultural quarantine

(270) (See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(271) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(272) Ashland is a **customs port of entry**.

(273)

Towage

(274) Tugs are available from Duluth. (See Towage under Duluth.)

(275)

Wharves

(276) Ashland at one time had a thriving waterfront, but now only one deep-draft dock is in operation. The alongside depths given for the facility described are reported depths; for information on the latest depths, contact the operator.

(277) **C. Reiss Coal Co. Dock:** (46°35'33"N., 90°53'41"W.); about 1,000 feet of berthing space along west side of pier; 16 to 22 feet alongside; deck height, 4 feet; handles limestone and coal.

(278)

Small-craft facilities

(279) Berths and launching ramps for small craft are available at the city dock, 0.6 mile northeast of C. Reiss Coal Co. Dock, and at a boat club 1.8 miles northeast of the city dock. Fuel is available by tank truck.

(280) **Washburn Harbor** is on the west side of Chequamegon Bay, 5 miles north of Ashland on the north side of **Vandeventer Bay**. This harbor was formerly a shipping point for lumber. Ruins of the lumber wharves in the southwest part of the harbor are partially submerged and form a hazard to navigation.

(281)

Small-craft facilities

(282)

A marina, protected by breakwaters, provides berths with electricity, gasoline, diesel fuel, water, ice, marine supplies and sewage pump-out facilities. A 150-ton hoist is available for repairs. The city dock extends about 600 feet lakeward from the marina dock. In 1972, the city dock had depths of 17 feet along its outer end, 19 feet along the southwest face, and 17 feet along the northeast face. A launching ramp and a small dock are maintained by the city 0.9 mile west of the city dock.

(283)

Houghton Point to Cornucopia, including the Apostle Islands

(284)

From Houghton Point, the shore extends north-northwest for 4.3 miles, thence trends northeast for 5 miles to Bayfield. Except near the mouths of streams, the shore is bold, and shoals extend no more than 0.3 mile off. Most of the reach is protected from the east by Long Island and Madeline Island.

(285)

Port Superior Village, WI, is a village on the north side of **Pikes Bay**, 6.3 miles north of Houghton Point. A marina at the village is protected by a detached breakwater. The entrance to the marina is marked by private buoys and lights. Transient berths, gasoline, diesel fuel, water, electricity and marine supplies are available. Hoists to 35 tons are available for hull, engine and electronic repairs.

(286)

Bayfield, WI, a village about 15 miles north of Ashland, has a well-protected harbor used principally as a base for commercial fishing tugs and recreational craft and as a harbor of refuge for small craft. The harbor basin is entered from the east between converging breakwaters, marked at their outer ends by lights. Another basin, with its entrance marked by lights, is north of the city dock. Ferries operate between this harbor and La Pointe on Madeline Island. **Bayfield Harbor South Breakwater Light** (46°48'35"N., 90°48'41"W.), 25 feet above the water, is shown from a square green daymark on a post at the south side of the entrance to the south harbor basin. A mariner-radio-activated sound signal at the light is initiated by keying the microphone five times on VHF-FM channel 83A.

(287)

Caution—Submerged dock ruins, covered 2 feet and marked at the outer end by a buoy, extend 550 feet from shore 0.9 mile southwest of Bayfield Harbor South Breakwater Light.

(288)

Bayfield Coast Guard Station is on the south side of the city, about 1,000 feet southwest of Bayfield Harbor South Breakwater Light.

(289)

The National Park Service headquarters of Apostle Islands National Lakeshore is at the old courthouse building.

(290)

Small-craft facilities

(291)

A marina in the south basin provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out,

marine supplies and a launching ramp. A 25-ton mobile hoist can handle 65-foot craft with a 17-foot beam for repairs. Berths and other facilities are available at several other docks southwest of the basins.

(292)

From Bayfield the shore trends north-northeast for about 6 miles to **Red Cliff Point**, thence northwest for about 8 miles to **Point Detour** (46°57'42"N., 90°51'48"W.), and thence southwest for 13.5 miles to Cornucopia. The shore is generally bluff with several prominent points and bays. The shore in this stretch is generally deep-to and can safely be approached within 0.25 mile, except for shoals that connect the shore with York Island and Sand Island. These shoals are described with the Apostle Islands.

(293)

Buffalo Bay, a small indentation 3 miles north-northeast of Bayfield, is enclosed on the south side by **Roys Point**. Red Cliff is a small settlement on the hill overlooking the bay. A small-craft basin, protected by a breakwater, is on the west side of the bay. Private buoys mark the entrance to the basin, and a private light is on the end of the breakwater. A sunken wreck is 0.45 mile northeast of the basin. **Red Cliff Bay** is a small indentation on the south side of Red Cliff Point, 2.3 miles north of Buffalo Bay. A sunken wreck is close to shore on the north side of the bay.

(294)

West Channel, a deepwater north approach to Bayfield and Chequamegon Bay, leads between Basswood Island and the mainland shore from Roys Point to Red Cliff Point. A lighted buoy on the east side of Red Cliff Point marks the turn into the channel.

(295)

Raspberry Bay, southeast of Point Detour, is enclosed on the east by **Raspberry Point**.

(296)

The district office of **Apostle Islands National Lakeshore** is 1.8 miles southwest of Point Detour on the south side of **Little Sand Bay**. In 1978, the L-shaped dock at the office had reported depths of 4 to 6 feet alongside. Transient berths and water are available.

(297)

Sand Point, about 5 miles west-southwest of Point Detour, 2 miles north-northeast of Cornucopia, are prominent.

(298)

The **Apostle Islands** are a group of about 20 wooded islands that in preglacial times were part of the peninsula that now terminates in Point Detour and Red Cliff Point. There are good deep passages around and between the islands of the group. The Apostle Islands, less Madeline Island, are part of the Apostle Islands National Lakeshore. The boundary of the Lakeshore extends 0.25 mile from the shoreline of the individual islands.

(299)

Madeline Island, the southernmost and largest of the Apostle Islands, is 12 miles long northeast and southwest and 1 to 3.2 miles wide. A shoal with depths less than 6 feet extends 0.5 mile southwest from the southwest point of the island. The outer end of the shoal is marked by a lighted buoy. Shoals extend 0.1 to 0.5 mile off the south shore of the island. **Big Bay** the large bight midlength of the south shore, has deep water within 0.1 mile of its head. Shoals extend off 0.9 mile around the east point of the island. The northwest shore of the island is bold and

has deep water within 0.25 mile. At **Point De Froid**, the northwest point of the island, a shoal extends 0.4 mile west. The west shore of the island has deep water within 0.35 mile.

- (300) **La Pointe Harbor** serves the village of **La Pointe, WI**, a small old settlement and summer resort just south of Point De Froid at the west end of Madeline Island. A ferry operates between La Pointe and Bayfield.

(301)

Channels

- (302) An L-shaped pier and breakwater extends from shore 0.4 mile south of Point De Froid to enclose a dredged small-craft basin on its southeast side. The outer end of the breakwater is marked by a light. A detached breakwater south of the L-shaped breakwater is marked by a private light on each end. Vessels may enter from north or south of the detached breakwater.

(303)

Anchorage

- (304) A **special anchorage area** is just southeast of La Pointe Harbor. (See **33 CFR 110.77b**, chapter 2, for limits and regulations.)

(305)

Small-craft facilities

- (306) Gasoline by truck and water are available at the L-shaped pier. A marina basin 0.5 mile south is entered between breakwaters marked at the outer ends by private lights. Gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, a launching ramp and a 30-ton travelift are available for hull and engine repairs.

- (307) **Basswood Island** and **Hermit Island** are small bold islands about 2 miles northwest of Madeline Island, southeast and east of Red Cliff Point, respectively. Shoals extend about 0.2 mile off the shores of these islands. Berthing is available at a small-craft pier on the west side of Basswood Island. The partially submerged ruins of a pier, which formerly serviced a quarry, are on the south end of Basswood Island; mariners are advised to use caution when transiting the area.

- (308) **Stockton Island**, 2.5 miles north of the northeast end of Madeline Island, is about 7.5 miles long and generally 2.5 miles wide. **Presque Isle Point** extends 1.5 miles south from the south side of the island. Shoals extend about 0.4 mile off the east end of the island but decrease in width toward the west end, which is deep-to. Berthing is available at small-craft piers on the east side of **Presque Isle Bay** and on the north side of **Quarry Bay**.

- (309) **Michigan Island** is about 3 miles east-northeast of Madeline Island. **Michigan Island Light** (46°52'17"N., 90°29'50"W.), 170 feet above the water, is shown from a white cylindrical tower on the south point of the island. A shoal with a depth of 12 feet near the outer end extends 0.7 mile south from the point. The light should be given a berth of at least 1 mile. Shoals extend 0.2 to 0.5 mile off the remainder of the south shore and the entire north shore. The west point of the island is deep-to. A rocky ledge extends 1.4 miles northeast from the northeast point

of the island. **Gull Island**, marked by a light, is near the middle of the ledge. Between the islands, the ledge is covered about 2 feet. **Gull Island Shoal**, a detached rocky patch with a least depth of 18 feet, is 3.6 miles northeast of Gull Island.

- (310) **Outer Island**, the northeasternmost of the Apostle Islands, is 3 miles northeast of Stockton Island. The island is about 6 miles long north and south and 2.5 miles wide with a sharp point at the southwest end. **Outer Island Light** (47°04'36"N., 90°25'00"W.), 130 feet above the water, is shown from a white conical tower with attached dwelling at the north end of the island. A rocky bank extends 0.4 mile off the southwest point and the southeast shore of the island, narrowing to 0.1 mile off the east shore. A shoal extends 0.6 mile north from the northeast point of the island. Shoals extend 0.7 mile off the northwest shore and decrease to 0.15 mile wide south along the west shore. Shoals extend about 0.5 mile off the north shore. **Outer Island Shoal**, with a least depth of 16 feet, is connected to the shoal border and extends 1.2 miles north from the island. A sunken wreck is 1.5 miles northeast of Outer Island Light. Berthing is available at a small-craft pier on the north side of the island.

- (311) **Cat Island** is 4.3 miles west of Outer Island and 2.4 miles north of Stockton Island. Shoals extend off 0.3 to 0.5 mile around the north end of the island and decrease to 0.15 mile wide toward the south end where a shoal extends 0.6 mile south.

- (312) **North Twin Island** is 1.7 miles north-northwest of Cat Island. Shoals extend 0.5 mile southwest from the south point, 0.2 mile from the east side and 0.2 to 0.4 mile from the north and west sides.

- (313) **Rocky Island** and **South Twin Island** are about 2.8 miles southwest of North Twin Island. The islands are connected at their north ends by a rocky flat with an available depth of 10 feet. Shoals extend 0.4 mile from the north and south sides of Rocky Island, 0.2 mile from the west side and 1.1 miles northeast from the northeast point. Shoals extend 0.4 mile from the south side of South Twin Island and 0.6 mile from the east side. The bay between the two islands affords good anchorage with protection from west and northwest winds, mud bottom. Shoals extend 0.15 mile from the east and west shores of the bay, and deep water extends to just south of the north end of South Twin Island. Berthing is available at small-craft piers on the west side of South Twin Island and on the east side of Rocky Island south of the bay.

- (314) **Ironwood Island** is 1.6 miles southeast of South Twin Island and 1.7 miles west of Cat Island. Shoals extend 0.2 to 0.4 mile off around the island. **Otter Island** is 0.9 mile south of Rocky Island. Shoals extend 0.4 mile off the east point of the island and 0.2 mile off the other shores. Berthing is available at a small-craft pier on the south side of the island.

- (315) **Manitou Island** is 1.1 miles southwest of Ironwood Island and 1.3 miles north of Stockton Island. Deep water is within 0.2 mile of the shores of the island, except at the west end where a shoal extends 0.6 mile northwest. **Little**

Manitou Island, a small rocky islet marked by a light, is near the outer end of the shoal.

- (316) **Oak Island**, 2 miles northeast of Red Cliff Point, is 4 miles long and 2.5 miles wide. Shoals extend no more than 0.3 mile from the island. **Oak Island Shoal**, with a least depth of 18 feet, is 0.9 mile north of Oak Island, in the middle of the deep passage between it and Otter Island. Berthing is available at a small-craft pier on the southwest side of Oak Island.

- (317) **Raspberry Island**, 2 miles northwest of Oak Island and 2.2 miles north of Raspberry Point, is marked on the southwest side by a light. An abandoned lighthouse is about 100 feet north of the light. Shoals extend 0.1 to 0.3 mile from the island. **Marina Shoal** extends 0.4 mile south from the southeast side. A buoy marks the outer edge of the shoal on the southwest side of the island. Berthing is available at a small-craft pier on the southwest side of the island.

- (318) **Bear Island** is 2.5 miles north of Oak Island. Shoals extend 0.6 mile from the northwest side, 0.2 mile from the east and west sides, and 0.3 mile from the south side. **Bear Island Shoal**, a detached shoal with a least depth of 15 feet, is 2.2 miles west-northwest of Bear Island and about 1 mile northeast of York Island Shoals.

- (319) **Devils Island** is 2.5 miles north-northeast of Bear Island. **Devils Island Light** (47°04'46"N., 90°43'41"W.), 100 feet above the water, is shown from a cylindrical tower on the north end of the island. Shoals extend about 0.1 mile off the north, east and west sides and 0.25 mile off the south end. **Devils Island Shoal**, a detached rocky spot with a least depth of 11 feet, is 1.3 miles east of the island. Berthing is available at a small-craft pier on the south side of the island.

- (320) **York Island** is about 1 mile north of Point Detour. A shoal extends about 0.6 mile south from the island and leaves a passage 0.3 mile wide with depths of 20 to 24 feet between the island and the mainland. Shoals extend about 0.5 mile off the southwest side and 0.25 mile off the north and east sides of the island. **York Island Shoals** are a group of detached rocky spots with a least depth of 15 feet about 2 miles north-northeast of York Island. The main reef is about 1 mile long and 0.4 mile wide. Several 19- to 22-foot spots are close southeast. A lighted bell buoy is off the west side at the north end of the reef. The deepwater channel between the southernmost shallow spot and York Island is about 1.4 miles wide.

- (321) **Sand Island**, 3.2 miles west of Point Detour and 1.4 miles north of Sand Point, is marked at the north end by a light. A shoal ridge with depths of 3 to 7 feet extends from the southeast point of the island south to the mouth of **Sand River**, 1.8 miles southeast of Sand Point. Shoals extend 0.6 mile off the east and north shores and 0.4 mile off the west shore. **Sand Island Shoals**, with a least depth of 15 feet, extend from 0.5 mile east of **Swallow Point**, the east point of Sand Island, north for 1.5 miles. The north end of the shoals is marked by a buoy. A sunken wreck is on the east side of the shoals. Berthing is available at a small-craft pier in **East Bay**.

- (322) The north approach to West Channel leads between Sand Island Shoals and York Island Shoals, and thence between York Island and Raspberry Island.

- (323) **Eagle Island**, 3.2 miles west of Sand Point, is the westernmost of the Apostle Islands. Shoals extend about 0.25 mile off the west, north and east sides of the island. Shoals extend 0.5 mile south and 0.8 mile south-southeast from the island. Near the inner end of these shoals, a gravel and boulder ledge, formerly a small island, is visible during storms and low water conditions. **Eagle Island Shoals**, centered about 1.5 miles southwest of Eagle Island, has a least depth of 12 feet.

(324)

Cornucopia, WI to Entry of Duluth-Superior Harbor

- (325) **Cornucopia, WI**, is a small-craft harbor at the mouth of **Siskiwit River** on the southeast side of **Siskiwit Bay**, about 13.5 miles southwest of Point Detour. The harbor is a base for commercial fish tugs and a refuge for recreational craft.

- (326) A dredged entrance channel leads east then southeast from deep water in Lake Superior between two piers to an inner basin. This basin connects with two inner channels that lead east and southwest. The outer end of the east pier is marked by a light.

- (327) A dock in the southwest basin arm provides transient berths, gasoline, electricity and a launching ramp. Other services are available nearby in the village.

- (328) From Cornucopia southwest for about 14 miles to Port Wing, the shore is relatively bold and can be approached within 0.5 mile, except at Bark Point where shoals extend 0.8 mile northeast. **Bark Point** (46°53'06"N., 91°11'06"W.) encloses the west side of **Bark Bay**. The bay has fair holding ground with protection from all but northeast winds. **Roman Point** encloses the east side of Bark Bay and separates it from Siskiwit Bay.

- (329) **Herbster, WI**, is a small settlement at the mouth of **Cranberry River**, 5.2 miles southwest of Bark Point. In 1983, the wharf at the village was in ruins.

- (330) **Port Wing, WI**, is a village and small-craft harbor at the mouth of **Flag River**, about 28 miles southwest of Point Detour and 34 miles east of Duluth. The harbor is used by commercial fish tugs and recreational craft.

- (331) A dredged entrance channel leads from deep water in Lake Superior between parallel piers to an inner basin that connects with two inner channels that lead east inside the shoreline and south into the Flag River. The outer end of the east pier is marked by a light. The south inner channel has not been maintained for several years and is subject to severe shoaling from drifting sand.

- (332) Transient berths and a launching ramp are available in the harbor. Gasoline and diesel fuel must be obtained from stations in the village, 1 mile away.

- (333) From Port Wing, the shore trends generally west-southwest for about 31 miles to Superior Entry of Duluth-Superior Harbor. The shore is relatively low and can be

approached to within 0.8 mile, except for a point about 7 miles west of Port Wing where shoals extend over 1 mile from shore. None of the streams that flow into the lake in this stretch are navigable.

(334)

Superior, WI to Duluth, MN

(335) **Duluth-Superior Harbor** is at the west end of Lake Superior. The harbor has been developed along Superior Bay and the lower part of the St. Louis River, which forms part of the **state boundary** between Wisconsin and Minnesota. It is one of the most important harbors on the Great Lakes because of its range of facilities and the magnitude of its commerce. The cities of **Superior, WI**, and **Duluth, MN**, front the south and north sides of the harbor, respectively.

(336)

Prominent features

(337) Duluth is built on the side of a steep bluff that reaches over 500 feet above the lake, and the city is visible for a long distance out in Lake Superior. Enger Memorial, a lighted stone tower on a hill overlooking the city, is prominent, as are radio and television masts north of it. Grain elevators on Rices Point and the Duluth Ship Canal Bridge (Duluth Aerial Lift Bridge) are also prominent. The Duluth Ship Canal Bridge is routinely lighted with colored lights for regional special events.

(338) Superior is built on lower ground and is relatively less prominent from the lake. The ore docks opposite Superior Entry and the grain elevators 1 mile northwest and on the southwest side of Howards Bay are prominent.

(339) **Superior Entry South Breakwater Light** (46°42'37"N., 92°00'22"W.), 70 feet above the water, is shown from a white cylindrical tower on a building. The light is on the outer end of the breakwater on the south side of the south harbor entrance. A mariner-radio-activated sound signal at the light is initiated by keying the microphone five times on VHF-FM channel 83A.

(340) **Duluth Harbor South Breakwater Inner Light** (46°46'44"N., 92°05'31"W.), 68 feet above the water, is shown from a black cylindrical tower with a white lantern room on the south side of the north harbor entrance.

(341) **Superior Bay**, about 6.5 miles long and 0.5 to 1 mile wide, is a natural shallow basin separated from Lake Superior by **Minnesota Point**, a low, narrow strip of sand and gravel. The bay is entered from Lake Superior through **Duluth Entry** at the north end of Minnesota Point and through **Superior Entry** at the south end of the point. Between the entrances, the lakeside of Minnesota Point has deep water within 0.4 mile. A submerged breakwater extends 1,000 feet south from shore in the small bight on the north side of Duluth Entry. A buoy marks the outer end of the ruins. Several cribs are on the west side of the bight.

(342) **Allouez Bay** is a very shallow bay that extends southeast from Superior Bay south of Superior Entry and is enclosed on the east by **Wisconsin Point**.

(343) **Nemadji River** flows from **Moosecamp Lake**, about 40 miles above Superior, and empties into the west side of Superior Bay opposite Superior Entry. In 1982, a depth of 4½ feet was available for 5 miles above the mouth, thence in 1976, 2 feet above that point.

(344) **St. Louis River** flows into the west side of Superior Bay near its north end through a narrow gap between **Rices Point** on the north and **Connors Point** on the south. **St. Louis Bay** is a widening in the river that extends from these points to **Grassy Point**, 3 miles southwest. **Howards Bay** is a narrow inlet that leads southeast from St. Louis Bay for 1 mile on the west side of Connors Point.

(345) Above Grassy Point, the river again widens, covers a large shallow area, and is divided by points and islands into a number of irregularly shaped bays and inlets. **Clough Island**, the largest in this area, encloses the north side of **Spirit Lake**, a section of the river mostly isolated by islands. **Minnesota Channel**, the dredged channel through this area, follows the Minnesota shore for 2 miles west from Grassy Point, thence turns south between Clough Island and the mainland, and thence turns east on the south side of Clough Island to the head of the dredged channel.

(346) **Safety Zones** have been established in the St. Louis River, along the north edge of Minnesota Channel and on the east and south sides of **Spirit Lake**, just south of Clough Island. (See **33 CFR 165.927** and **165.905**, chapter 2, for limits and regulations.)

(347) About 1.5 miles west of Grassy Point, a small-craft channel with a controlling depth of about 3 feet extends south from Minnesota Channel, and on the east side of Clough Island, joins a curving natural channel that leads south to join with the natural channel of St. Louis River southeast of Clough Island.

(348) Above Clough Island, the natural channel of the St. Louis River is navigable for varying drafts to just above **Fond du Lac**, about 8 miles above Clough Island. The river is practically a level pool at ordinary stages to the foot of the rapids just above Fond du Lac. A wreck, covered about 2½ feet, is on the east side of the river at **Oliver**, about 3.8 miles above Clough Island.

(349) At Fond du Lac, a mud island and shoal extends off the mouth of Mission Creek. A very narrow channel along the south shore affords access for about 7 feet draft to the river above the creek. The distance from the Burlington Northern Railway bridge at Grassy Point to Fond du Lac is about 13.2 miles by the main channel and about 11.8 miles by the cut-off channels.

(350)

Channels

(351) One federal project encompasses Duluth-Superior Harbor. Channels have been dredged in Superior Entry, Duluth Ship Canal, Superior Bay, Allouez Bay, Howards Bay, St. Louis Bay and St. Louis River as far as the south side of Clough Island.

(354)

Structures across Duluth-Superior Harbor, St. Louis River and Nemadji River						
Name	Type	Location	Miles*	Clearances (feet)		Information
				Horizontal**	Vertical***	
Duluth Ship Canal bridge	vertical lift	46°46'44"N., 92°05'34"W.	0.25	300	15 (down), 141 (up)	Notes 1 and 3
St. Louis Bay and River						
John A. Blatnik / I-535 bridge	fixed	46°44'57"N., 92°06'03"W.	2.74	460	123	
I-535 bridge	fixed	46°44'31"N., 92°05'52"W.		150	103	Bridge crosses Howards Bay
Bong bridge		46°43'54"N., 92°08'36"W.	5.20	400	120	
Burlington Northern Railroad / Grassy Point bridge	swing	46°43'42"N., 92°08'36"W.	5.44	175 (both draws)	12	Notes 2 and 4
Overhead cable	power	46°43'27"N., 92°08'35"W.	5.73		143	
Canadian National Railroad/Highway bridge	swing	46°39'24"N., 92°12'06"W.	13.91	125 (both draws)	22	Note 2
Overhead cable	telephone	46°39'32"N., 92°17'01"W.	18.99		24	
Fond du Lac Bridge	fixed	46°39'32"N., 92°17'02"W.	19.00	116	23	
Nemadji River						
Overhead cable	telephone	46°41'50"N., 92°01'55"W.	0.32		13	
Burlington Northern Railroad bridge	fixed	46°41'50"N., 92°01'56"W.	0.33	59	6	
Overhead cable	telephone	46°41'49"N., 92°02'04"W.	0.44		9	
U.S. Route 2 bridge	fixed	46°41'49"N., 92°02'05"W.	0.45	25	9	
Overhead cable	power	46°41'48"N., 92°02'06"W.	0.46		34	
Overhead cable	telephone	46°41'13"N., 92°02'04"W.	1.20		26	
Union Pacific Railway bridge	fixed	46°41'13"N., 92°02'04"W.	1.21	51	26	
<p>* Miles above Duluth Harbor North Pier Light for St. Louis Bay and River and miles above the mouth for Nemadji River.</p> <p>** Clear width in feet proceeding upstream</p> <p>*** Vertical clearance is referenced to Low Water Datum</p> <p>Note 1 – See 33 CFR 117.1 through 117.59 and 117.661, chapter 2, for drawbridge regulations.</p> <p>Note 2 – See 33 CFR 117.1 through 117.59, 117.669, and 117.1083, chapter 2, for drawbridge regulations.</p> <p>Note 3 – With the bridge in the down position, the vertical clearance is 16 feet for the center 192 feet of the span reducing to 14 feet at the ends of the span. The bridgetender monitors VHF-FM channel 16, and works on channel 10; call sign, KAN-388.</p> <p>Note 4 – Fixed spans adjoining each end of the draw span, outside the channel limits, have a horizontal clearance of 64 feet and a vertical of 13 feet.</p>						

(352) **Superior Harbor** is entered from deep water in Lake Superior between converging breakwaters and parallel piers to the south end of Superior Bay. The outer ends of the breakwaters and piers are marked by lights.

(353) **Duluth Harbor** is entered from deep water in the lake between parallel piers to the north end of Superior Bay. The outer ends of the piers are marked by lights. A mariner-radio-activated sound signal at the south light is initiated by keying the microphone five times on VHF-FM channel 83A. **Duluth Harbor Basin Traffic Lighted Buoy**, 0.45 mile southwest of Duluth Harbor South Breakwater Inner Light, should be left to starboard by all inbound and outbound vessels except those proceeding to or from the docks on the northwest side of the basin, in which cases the regular navigation rules apply.

(355) Water level information for Duluth Harbor may be obtained by contacting Duluth Army Corps of Engineers by telephone at 218-720-5261 or radiotelephone channel 16 between 0730 and 1600, Monday through Friday. Water levels are given in whole inches above or below chart datum.

(356) All the dredged channels in the harbor are well marked by lighted and unlighted buoys and lighted ranges. For detailed channel information and minimum

depths as reported by the U.S. Army Corps of Engineers (USACE), use NOAA Electronic Navigational Charts. Surveys and channel condition reports are available through the USACE hydrographic survey website listed in Appendix A.

(357) Vessels drawing more than 16 feet are cautioned against navigating within 50 feet of piers at Superior Entry because of stone riprap.

(358) In Duluth Ship Canal vessels drawing more than 20 feet should not navigate within 20 feet of the piers because of stone riprap.

(359) **Anchorage**

(360) Two deep-draft anchorages in Superior Bay, one in the southeast corner of Duluth Harbor Basin and one in the north corner of Superior Harbor Basin, are marked by lighted and unlighted buoys. The Duluth Harbor Basin anchorage has fair to good holding ground but is narrow and presents problems in east or west winds. The anchorage is only suitable for short-term delays such as awaiting immediate berth, boarding parties and inspections. Masters should be prepared to maneuver their vessel to safety in the event of sudden wind shifts.

Vessels awaiting berths at Duluth frequently anchor east of Duluth Harbor South Breakwater Outer Light. The Superior Harbor Basin anchorage is subject to shoaling at the south end, and a submerged pipeline crosses the northwest end of the anchorage.

(361) A special anchorage is on the east side of Superior Bay southeast of **Hearding Island**. (See **33 CFR 110.1** and **110.77a**, chapter 2, for limits and regulations.)

(362) **Caution**—A sunken wreck is 0.9 mile east-northeast of the entrance to Duluth Ship Canal.

(363) The area immediately east-southeast of Duluth Harbor Basin Traffic Lighted Buoy is subject to shoaling.

(364)

Local magnetic disturbance

(365) Differences from normal variation of from 001°E to 005°E have been observed in the lake about 10 miles from Duluth.

(366)

Currents

(367) Currents resulting from fluctuations of the water level of Lake Superior are prevalent in Duluth Ship Canal. The currents set in or out of the canal as the lake rises or falls and are usually of moderate strength and short duration. On rare occasions, a large seiche will produce a current of up to 6 mph for a few minutes, followed by a reverse current perhaps equally strong. The stronger currents cause some inconvenience to navigation, but nothing serious unless accompanied by storms.

(368) When a current setting out of the canal meets a heavy sea from the northeast, it increases the wave height, creating a choppy and turbulent sea and making entrance by vessels somewhat difficult and dangerous. Instances have been reported of vessels being thrown against the piers under these conditions. In ordinary storms, however, this danger seems to be slight, and failure to make the entrance has been rare.

(369) Currents frequently set through Superior Entry, usually simultaneous with and in the same direction as those at Duluth Ship Canal. However, they are usually of less velocity, due to the greater length of the canal and the consequent smaller degree of slope for any difference of water level between the lake and harbor.

(370)

Light Signal	Current Direction	Current Speed (mph)
Yellow	inbound / outbound	1.0 / 1.0
Solid Red	inbound	1.0 to 2.38
Flashing Red	inbound	less than 2.38
Solid Green	outbound	1.0 to 2.38
Flashing Green	outbound	greater than 2.38

(371) A lighted current meter has been installed on the Duluth Ship Canal bridge (Duluth Aerial Lift bridge) structure.

(372)

Weather, Duluth and vicinity

(373)

Duluth, MN, is located at the extreme southwestern corner of Lake Superior in northeastern Minnesota just north of the Wisconsin/Minnesota state border. The location averages only two days each year with maximum temperatures in excess of 90°F (32.2°C). July is the warmest month with an average high of 76°F (24.4°C) and an average minimum of 54°F (12.2°C). January is the coolest month with an average high of 17°F (-8.3°C) and an average minimum of -2°F (-18.9°C). The highest temperature on record for Duluth is 97°F (36.1°C), recorded in July 1988, and the lowest temperature on record is -39°F (-39.4°C), recorded in January 1972. About 186 days each year experience temperatures below 32°F (0°C) and an average 62 days each year records temperatures below 5°F (-15°C). Every month has seen temperatures at or below 35°F (1.7°C) and every month except July has recorded temperatures at or below freezing (0°C).

(374)

The average annual precipitation for Duluth is 30.58 inches (777 mm). An annual maximum occurs during the summer, due mainly to convective activity, and a marked dry period occurs during the winter months. Precipitation falls on about 223 days each year. The wettest month is June with 4.08 inches (104 mm) and the driest, February, averages only 0.82 inches (20.8 mm). An average of 34 thunderstorm days occur each year with June, July and August being the most likely months. Snow falls on about 119 days each year and averages about 81 inches (2,057 mm) each year. November, December, January and March each average over 12 inches (305 mm) in a given year. In November 1950 and again in December 1991, nearly 24 inches (610 mm) of snow fell in one 24-hour period. Snowfall amounts of greater than one foot (305 mm) in 24 hours have fallen in each month November through April. About 14 days each year have a snowfall total greater than 1.5 inches (38 mm), and snow has fallen in every month except June, July and August. Fog is present on average 132 days each year and is more prevalent during the late summer and early autumn.

(375)

The prevailing wind direction in Duluth is the northwest. Winter through early summer is the windiest period, and a maximum gust of 62 knots occurred in May 1981 and again in March 1985.

(376)

Towage

(377)

Tugs from 1,250 hp to 4,600 hp are available from **Great Lakes Towing Company** and **Heritage Marine**. Arrangements for the Great Lakes Towing Company tugs are made through the dispatcher in Cleveland at 800-321-3663 or on VHF-FM channels 16, 10, 12 and 18A via remote antenna; at least 3 hours advance notice is requested. The tugs' VHF-FM channels include 16, 6, 12, 14 and 18A. Arrangements for the Heritage Marine tugs can be made by calling 218-590-0682. Vessels are

(388)

Facilities in the Port of Duluth-Superior						
Name	Location	Dock Length (feet)	Depths* (feet)	Storage and Transportation	Purpose	Contact
North American Salt Company	46°46'30"N., 92°06'17"W.	1,000	24	• 300,000-ton capacity • Rail service and truck access	Salt processing	218-740-5137
General Mills Duluth Elevator A Wharf	46°46'15"N., 92°06'29"W.	1,900	28	• 3.5 million bushel storage capacity • Rail service and truck access	Receipt and shipment of grain	218-722-7759
Duluth Storage	46°46'06"N., 92°06'29"W.	1,700 (north pier) 1,560 (south dock)	27-28	• 12 million bushel storage capacity • Rail service and truck access	Shipment of grain	218-727-7219
Northland Pier	46°45'56"N., 92°06'09"W.	1,950	27	• Open storage (35 acres) • Rail service and truck access	Handles asphalt, concrete and limestone	218-722-8170
Duluth Lake Port	46°45'50"N., 92°06'08"W.	930	27	• 4.1 million bushel capacity • Rail service and truck access	Shipment of grain	218-722-0538
Azcon Corporation	46°45'43"N., 92°06'11"W.	1,586	26	• Open storage (20 acres) • Rail service and truck access	Shipment of scrap iron and metals	218-722-7703
Clure Public Marine Terminal/ Lake Superior Warehousing Co., Inc.	46°45'21"N., 92°05'42"W.	1,620 (Berths 1&2) 1,000 (Berth 4)	30	• Open storage (40 acres) • 360,000 square feet of covered storage • Rail service and truck access	Handles general cargo and heavy-lift items	218-727-6646
CRH	46°45'06"N., 92°05'54"W.	839	27	• 43,000-short-ton capacity • Rail service and truck access	Receipt and shipment of cement	218-726-1371
Wisconsin Central	46°45'00"N., 92°07'57"W.	2,438	28	• 110,000-ton dock • Open storage (3 million tons) • Covered storage (2.7 million tons) • Rail service and truck access	Handles Iron Ore/Taconite, Limestone	218-628-4690
Hallett Dock 5	46°44'52"N., 92°08'08"W.	2,500	27	• Open storage (800,000 tons) • Covered storage (20,000 tons) • Rail service and truck access	Handles bulk materials (coal, stone, misc.)	800-637-4497 218-628-2281
C. Reiss Terminal	46°43'22"N., 92°09'21"W.	2,854	22	• 800,000-ton capacity • Rail service and truck access	Handles coal, stone, misc. bulk	218-628-2371
Hallett Dock 8	46°44'12"N., 92°07'23"W.	2,300	23-27	• Bulk storage (800,000 tons) • Liquid storage (2.1 million gallons) • Rail service and truck access	Handles bulk cargo	800-637-4497 218-628-2281
Midwest Energy Resources Co.	46°44'34"N., 92°06'53"W.	1,200	28	• Open storage (5 million net tons) • Rail service	Handles coal	715-392-9807
General Mills Superior Elevators S & X	46°44'32"N., 92°06'36"W.	1,800	28	• 12.7 million bushel capacity • Rail service and truck access	Shipment of grain	218-722-7759
CHS	46°44'25"N., 92°05'58"W.	1,250	27	• 18 million bushel capacity • Rail service and truck access	Shipment of grain	715-392-4734
Gavilon Grain, LLC	46°44'17"N., 92°04'53"W.	790	28	• 8 million bushel capacity • Rail service and truck access	Shipment of grain	715-392-9853
Graymont, LLC	46°43'56"N., 92°04'35"W.	1,250	26	• Open storage (500,000 tons) • Silo storage (10,000 tons) • Rail service and truck access	Handles limestone	715-392-5146
Hansen-Mueller Superior Elevators	46°42'41"N., 92°02'43"W.	800	28	• 3.7 million bushel capacity • Rail service and truck access	Handles grain	715-398-3541
BNSF Railway Dock 5	46°41'54"N., 92°01'07"W.	1,470	27	• 73,156-ton dock • Open storage (5.2 million tons) • Rail service and truck access	Handles iron ore/taconite	715-394-1331

usually met inside the harbor, but during adverse winds they are met outside the entrance to Duluth Ship Canal.

(378)

Quarantine, customs, immigration and agricultural quarantine

(379) (See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(380) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(381) Duluth and Superior are **customs ports of entry**.

(382)

Coast Guard

(383) Duluth Coast Guard Station is on the west side of Minnesota Point, 0.5 mile south of Duluth Ship Canal. A Coast Guard **Marine Safety Unit** is in Duluth.

(384)

Harbor regulations

(385) A **speed limit** of 8 mph (7 knots) is enforced in Duluth-Superior Harbor. (See **33 CFR 162.110**, chapter 2, for harbor regulations.)

(386)

Wharves

(387) Duluth-Superior Harbor is well equipped with facilities for handling all types of cargo. The major commodities handled in the port are grain, iron ore, coal, limestone, cement and general cargo. Only the deep-draft facilities are listed in the table. The alongside depths given for the facilities listed are reported depths; for information on the latest depths, contact the operator. Water, electrical shore-power, rail and highway connections are available at many of the wharves and docks in the harbor.

(389)

Supplies

(390) Marine supplies, provisions, Bunker C and diesel oils by barge and tank truck, potable water and other supplies are available at Duluth and Superior.

(391)

Repairs

(392) Two companies in the harbor have docking facilities for making repairs to deep-draft vessels, and three other companies have shops and make repairs to vessels at their berths. Fraser Shipyard, Inc., at the head of Howards Bay, has three graving docks. The largest has a length of 800 feet on the keel blocks and 831 feet overall, a width of 85 feet at the top of the entrance and 80 feet at the keel blocks and a depth of 18½ feet over the sill. Repairs of all types are made at these docks. Cranes to 120 tons are available. Shafts to 36 feet long can be produced.

(393)

Small-craft facilities

(394) Small-craft facilities are on the northeast side of Duluth Harbor Basin, on the west side of Minnesota Point 0.5 mile south of Duluth Ship Canal, on Barkers Island 1.6 miles northwest of Superior Entry, at the north end of Duluth Harbor Basin in the slip northeast of the Duluth Arena-Auditorium, and on the west side of the river opposite Clough Island. The marina on Minnesota Point provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out and most marine supplies. A 50-ton mobile hoist can handle 70-foot craft with a 19-foot beam and a draft of 7 feet for complete hull, engine and electronic repairs.

(395) A marina on Barkers Island has berths, gasoline, diesel fuel, water, electricity, a launching ramp and marine supplies. A mobile hoist can handle craft to 30 tons for complete hull and engine repairs. In 1982, 8½ feet was reported in the entrance channel and alongside the docks. The entrance channel is marked by private lights and lighted and unlighted buoys.

(396)

Communications

(397) Duluth and Superior have good highway and rail connections. Duluth International Airport is 7 miles west of the harbor.

(398)

Talmadge, MN to Little Two Harbors, MN

(399)

From Duluth Ship Canal northeast for 18.5 miles to Knife River, the shore is bold and rocky. Deep water is within 0.25 mile of shore. **Stony Point** (46°55'30"N., 91°49'00"W.), 2.5 miles southwest of Knife River, is prominent. A lighted red and white checkered tank on high ground 3 miles west of Stony Point is prominent.

(400)

Small-craft facilities

(401) **McQuade Small-Craft Harbor**, 10.5 miles northeast of Duluth Ship Canal, is near the town of **Talmadge**. The harbor basin, developed by the Minnesota Department of Natural Resources, is protected by large rubble mound breakwaters. The entrance to the basin, between the two breakwaters, is marked by a private light and daybeacon. In 2017, the entrance had a controlling depth of 7 feet at midchannel and the basin had depths of 6 to 8 feet with an available depth of 7 feet to the launching ramps. Lesser depths to 2 feet are located primarily around the northwest edge of the basin and around the outer end of the northwestern breakwater marked by the daybeacon. There are launching ramps available and two tie-up docks.

(402)

Local magnetic disturbance

(403) Differences from normal variation of from 002°W to 018°E have been observed in the vicinity of Stony Point.

(404) **Knife River, MN**, is a village just above the mouth of **Knife River**, 18.5 miles northeast of Duluth Ship Canal. A small-craft harbor, used principally by recreational craft, is 0.4 mile south of the river mouth on the north side of **Granite Point**.

(405) Knife River is not navigable. An offshore dock on the south side of the river mouth is in ruins, hazardous, and useless for dockage. **Knife Island** is 0.3 mile southeast of the river mouth. A shoal with rocks awash extends about 950 feet west-southwest from the island to within about 500 feet of Granite Point. The rest of the island can be approached within about 350 feet.

(406) **Knife River Harbor Entrance Light** (46°56'38"N., 91°46'42"W.), 31 feet above the water, is shown from a pile with a square green daymark on the outer end of the breakwater at Granite Point.

(407)

Channels

(408) A breakwater that extends from Granite Point protects the entrance to the harbor from the southeast. A dredged entrance channel leads from deep water in Lake Superior on the north side of the breakwater to an inner channel about 0.2 mile long.

(409)

Small-craft facilities

(410) A state-owned marina in the small-craft harbor provides transient berths, gasoline, diesel fuel, water,

ice, electricity, sewage pump-out, marine supplies and a launching ramp. A 20-ton hoist is available for hull and engine repairs. The marina monitors VHF-FM channel 16.

- (411) From the mouth of Knife River, the shore extends northeast for 7 miles to Two Harbors and is deep-to. No landings are in this stretch. A rounded promontory about 200 feet high forms the west side of Agate Bay on which Two Harbors is located. A lighted radio mast on the promontory and a tank north of town are prominent.

- (412) **Two Harbors, MN**, is a town about 7 miles northeast of Knife River on the north side of **Agate Bay**, a natural indentation about 0.75 mile long and 0.5 mile wide. Two Harbors is an important ore shipping point, and the bay is a harbor of refuge.

- (413) **Two Harbors East Breakwater Light** (47°00'38"N., 91°40'10"W.), 32 feet above the water, is shown from a square pyramidal skeleton tower on the outer end of the east breakwater. A mariner-radio-activated sound signal at the light is initiated by keying the microphone five times on VHF-FM channel 83A.

(414)

Prominent features

- (415) **Pork City Hill**, (47°00'45"N., 91°41'15"W.) and **Silver Cliff**, (47°04'10"N., 91°35'30"W.) are excellent radar targets when approaching Two Harbors.

(416)

Channels

- (417) The harbor is entered from the south between a detached breakwater on the west side and a breakwater that extends southwest from the east point of the harbor. The outer ends of the breakwaters are marked by lights. A maneuvering area has been dredged in the east part of the harbor and is marked by buoys on the north and east limits.

(418)

Towage

- (419) Tugs are available from Duluth. (See Towage under Duluth.)

(420)

Wharves

- (421) Two Harbors has two deep-draft facilities on the west side of Agate Bay. The alongside depths given for the facilities described are reported depths; for information on the latest depths, contact the operator. The facilities described have highway and rail connections.

- (422) **Wisconsin Central Railway, Ore Dock No. 1**: 1,600 feet northeast of the west breakwater light; 1,344 feet of berthing space along northeast and southwest sides; 28 feet alongside; deck heights, low deck 6 feet, top deck 75 feet; handles iron ore, iron ore pellets, and bunkering vessels.

- (423) **Wisconsin Central Railway, Ore Dock No. 2**: immediately southwest of Ore Dock No. 1; 1,368 feet of berthing space along northeast and southwest sides; 30 feet alongside; deck heights, low deck 6 feet, top deck

80 feet; handles iron ore, iron ore pellets, and bunkering vessels.

(424)

Small-craft facilities

- (425) Paved launching ramps are available in the harbor. Ruins of fishing docks and foul bottom are along the east side of the harbor basin. Caution is advised in the area. Ruins covered 5 feet are on the north side of the west end of the west breakwater.

- (426) From Two Harbors, the shore is bold for 27 miles northeast to Silver Bay Harbor. There is little shelter along this stretch, and several dangers are close to the shore.

(427)

Local magnetic disturbance

- (428) Differences from normal variation of about 007°E have been observed near **Talmadge River** and **French River**, about 12 miles northeast of Duluth.

- (429) **Burlington Bay**, 1 mile northeast of Agate Bay, is about 1 mile wide and indents the shore about 0.6 mile. The bay is protected from southwest winds by the point of land that separates it from Agate Bay, but is subject to wash from that direction. The bay is partially protected from northeast storms by the east point of land, but those storms can be so severe, with waves of such great fetch, that the sea rolls into the bay and makes it unsafe for vessels.

- (430) A rocky ledge covered 6 feet is 0.2 mile offshore at the mouth of **Silver Creek**, 4.2 miles northeast of Two Harbors Light. Encampment Island, 3.2 miles northeast of Silver Creek, is connected to the shore by a shoal with depths less than 12 feet. About 4 miles northeast of Encampment Island, a group of rocks awash extends 0.4 mile from shore.

(431)

Local magnetic disturbance

- (432) Differences from normal variation of 005°E have been observed near Encampment Island.

- (433) **Gooseberry River** flows into Lake Superior about 13.5 miles northeast of Two Harbors. An extensive gravel beach extends south from its mouth. Good water extends up to the beach. **Gooseberry Reef**, reported covered 4 feet, is 0.5 mile from shore 1 mile south of the river.

(434)

Local magnetic disturbance

- (435) Differences from normal variation of from 004°E to 008°E have been observed near Gooseberry River.

- (436) At the mouth of **Split Rock River**, a small indentation offers protection from west to north winds and limited protection from northeast and southwest winds. **Corundum Point** (47°11'30"N., 91°22'54"W.), 1.5 miles northeast of Split Rock River, offers no protection. Abandoned Split Rock Light, 1 mile northeast of Corundum Point, is a buff-colored octagonal tower with a white horizontal band. The tower is part of Split Rock Lighthouse State Park. The light is occasionally lighted for exhibition purposes.

(437)

Local magnetic disturbance

(438) Differences from normal variation of from 011°W to 011°E have been observed in the vicinity of Corundum Point.

(439) **Little Two Harbors** is a small bay between Corundum Point and the abandoned Split Rock Light. A detached rocky reef, covered 22 feet, is 0.5 mile east of Corundum Point. The reef drops off suddenly to deep water on its east side and is a danger to small craft due to the swell or wave thrown up by the steep east face.

(440)

Beaver Bay to Silver Bay Harbor

(441) **Beaver Bay**, about 50 miles northeast of Duluth Ship Canal, is about 0.7 mile wide and indents the shore about 0.3 mile. The 16-foot depth contour is within 30 to 200 feet of shore. Large boulders are in all parts of the bay. The shore of the bay is bordered by bluffs that rise 75 to 200 feet above the lake. The bay affords some shelter from south, west and north storms but is open and unprotected to northeast, east, and southeast. The most dangerous storms at this end of the lake are from northeast, the seas having a fetch of more than 250 miles. Two piers are on the north side of the bay. The east pier has a depth of 5 feet at the outer end and the west pier 9 feet at the outer end.

(442) **Silver Bay Harbor** is a private harbor developed by a mining company about 52 miles northeast of Duluth Ship Canal. The stacks on the powerhouse just north of the harbor are prominent.

(443) The harbor is about 1 mile long and 0.25 mile wide with depths of at least 30 feet over most of its area. The harbor is protected from the east and northeast by **Beaver Island** and from the southwest by **Pellet Island**, connected to the shore by a breakwater. Private lights mark both Beaver and Pellet Islands; a private sound signal is at the light on Beaver Island. Lighted buoys mark the limit of deep water in Silver Bay and a private light is on the outer end of the wharf.

(444)

Wharf

(445) Silver Bay has one deep-draft wharf on the northwest side of the harbor. The alongside depths given for this facility are reported depths; for information on the latest depths, contact the operator.

(446) **Northshore Mining Co. Dock:** 2,775 feet of berthing space; 30 feet alongside; deck height, 8½ feet; shipment of iron ore pellets and receipt of coal; occasional receipt of steel.

(447)

Small-craft facilities

(448) A marina developed by the Minnesota Department of Natural Resources and maintained by the City of Silver Bay is in a basin on the south side of the breakwater connecting Pellet Island to the mainland. The marina can

provide transient berths, gasoline, diesel fuel, pump-out, water, electricity and launching ramps.

(449)

Silver Bay Harbor to Big Bay

(450) From Silver Bay Harbor the shore extends northeast for about 23 miles to Taconite Harbor. The shore is bold and rocky, with cliffs and steep slopes. Numerous small points and inlets afford limited shelter. There are no outlying obstructions, and the shore can be approached within 0.5 mile. **Baptism River**, 5 miles northeast of Silver Bay Harbor, is the largest stream flowing into this stretch, and the area around its mouth is a state park. A lighted radio mast about 4 miles northeast of Silver Bay Harbor near the summit of **Palisade Head** is prominent.

(451)

Local magnetic disturbance

(452) Differences from normal variation of from 004°W to 006°W have been observed in the vicinity of Baptism River and Palisade Head.

(453) **Taconite Harbor** is a private harbor maintained by the Minnesota Power Company and Cleveland-Cliffs Inc., about 75 miles northeast of Duluth at the mouth of **Two Island River**. The harbor is a basin, about 0.8 mile long and 0.3 mile wide, enclosed by **Gull Island**, **Bear Island**, and a series of breakwaters. Three lighted stacks at the powerhouse at the north end of the harbor are prominent.

(454)

Gull Island, Bear Island, the breakwater between them and the breakwater that extends northeast from Bear Island protect the harbor from the southeast. A breakwater that extends southeast from shore at the north end of the harbor protects the harbor from the northeast. The harbor is entered north from Lake Superior on the west side of Gull Island and is exited between the breakwaters at the northeast end of the harbor.

(455)

The entrance to the harbor is marked by lighted buoys, lights and a **028°** lighted range. Shoals are at the north end of the harbor and off the end of the breakwater on the south side of the harbor exit. All the aids in the harbor are private.

(456)

In 1972, the controlling depths were 27 feet in the entrance channel, 27 feet along the face of the dock on the northwest side of the harbor, and 29 feet in the exit channel. Depths inside the harbor range from 27 feet to over 50 feet.

(457)

Caution—In 1975, an anchor was lost in the entrance channel, about 600 feet north of the light on the east side of the entrance.

(458)

Wharf

(459) Taconite Harbor has one deep-draft facility on the northwest side of the harbor. The alongside depths given for the facility described are reported depths; for information on the latest depths, contact the operator.

(460)

Cleveland-Cliffs Inc. Coal Dock: 2,332-foot face; 30 feet alongside; deck height, 10½ feet; receives coal

for nearby Taconite Harbor Energy Center; owned and operated by Cleveland-Cliffs Inc. and Minnesota Power Co.

(461)

Small-craft facilities

(462)

A small-craft harbor of safety developed by the Minnesota Department of Natural Resources is northwest of Gull Island along the mainland shore at the entrance to Taconite Harbor. The basin is protected by a large rubble mound breakwater on the south facing sides. In 2018, depths in the basin were 8 to 10 feet with lesser depths to 6 feet just northwest of the boat ramp. The breakwater and entrance to the harbor are marked by private lights. A dock and two paved launching ramps are available; transient moorings are also available for day use only.

(463)

From Taconite Harbor, the shore extends northeast for 31 miles to Grand Marais. Steep slopes and cliffs in this reach rise to elevations over 900 feet above the lake within 1 to 2 miles of shore. **Carlton Peak**, 4.5 miles north-northeast of Taconite Harbor, and **Leveaux Mountain**, 8 miles northeast of the harbor, are two of the tallest peaks. **Rock Island**, a low rocky projection in the east approach to **Good Harbor Bay**, 3.6 miles southwest of Grand Marais, is the only off-lying obstruction in this reach. Otherwise, the shore can be approached within 0.5 mile.

(464)

The settlements of **Schroeder**, **Tofte** and **Lutsen** are close to shore in this reach, 1.3, 5 and 14.5 miles northeast of Taconite Harbor, respectively. Landings at these places may be made by light-draft vessels in calm weather, but no shelter or dockage is provided. Tofte has a launching ramp. None of the streams that empty into this reach are navigable. **Temperance River** and **Cascade River**, 2.5 and 22 miles northeast of Taconite Harbor, respectively, are the largest.

(465)

Grand Marais Harbor is a small-craft harbor 31 miles northeast of Taconite Harbor and 106 miles northeast of Duluth. It is the only harbor with facilities and adequate protection for small craft in the 125-mile stretch between Two Harbors and the International boundary at Pigeon River. The harbor is a semicircular bay with a narrow opening to south between two points of land. The harbor is a commercial fishing base. **Grand Marais, MN**, is a town on the north side of the harbor.

(466)

Grand Marais Light (47°44'43"N., 90°20'16"W.), 48 feet above the water, is shown from a white square pyramidal skeleton tower with upper part enclosed, on the east side of the harbor entrance. A mariner-radio-activated sound signal, initiated by keying the microphone five times on VHF-FM channel 83A, is at the light.

(467)

Channels

(468)

The dredged harbor basin is entered from the south between breakwaters that extend from the east and west sides of the entrance. An inner breakwater protects a dredged small-craft basin in the north part of the harbor.

The outer ends of the entrance breakwaters and the inner breakwater are marked by lights.

(469)

Anchorage

(470)

The east part of the harbor is fairly well protected from all storms, and fair anchorage is available in the east part of the dredged area for a few vessels. The west part of the harbor is shoal, exposed to southeast storms, and considerably exposed to northeast swells.

(471)

Caution—Vessels entering the harbor during northeast storms should keep well over to the east breakwater to avoid the shoals to west.

(472)

Local magnetic disturbance

(473)

Large magnetic disturbances have been reported in the vicinity of Grand Marais Harbor.

(474)

Quarantine, customs, immigration and agricultural quarantine

(475)

(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(476)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(477)

Coast Guard

(478)

North Superior Coast Guard Station is on the southeast side of the harbor basin.

(479)

Small-craft facilities

(480)

Two wharves in the southeast corner of the harbor basin, one partly in ruins, are not safe for mooring. A marina in the basin at the north end of the harbor provides gasoline, diesel fuel, water, electricity, sewage pump-out and limited supplies and repairs. Small craft can find safe moorings in the basin. Mooring to the breakwaters is prohibited.

(481)

At the southeast end of the point that encloses the east side of Grand Marais Harbor, a reef with a depth of 8 feet at the outer end extends 1,000 feet east from shore.

(482)

From Grand Marais Harbor northeast for 34 miles to Grand Portage Bay, the shore is rocky and bold, with deep water close-to and a few outlying rocks. **Five Mile Rock**, awash, is 0.8 mile offshore 5 miles northeast of Grand Marais Light. **Marr Island**, low and rocky, is on the outer end of a reef that extends 0.4 mile from a small point 12.5 miles northeast of Grand Marais. A detached rock, covered 5 feet, is 0.4 mile offshore 0.7 mile southwest of the south entrance point to Grand Portage Bay. **Chicago Bay** and **Big Bay**, 18 and 21 miles northeast of Grand Marais, respectively, are the largest indentations in this stretch and afford limited protection. **Hovland**, a settlement on Chicago Bay, has a small privately owned dock.

- (483) **Caution**—This stretch of shore should be given a berth of 1 mile because of frequent fogs and local magnetic disturbances.

(484)

Grand Portage Bay to Pigeon Point, and Canadian Border

- (485) **Grand Portage Bay**, about 5 miles southwest of the International boundary, is about 2 miles wide and extends 1.3 miles into the shoreline. **Hat Point** (47°57'12"N., 89°38'18"W.), marked by a light, encloses the northeast side of the bay and separates it from Wauswaugoning Bay. **Grand Portage Island**, in the middle of the entrance to the bay, affords some protection from offshore winds. Inside Grand Portage Island, the bay has depths of 6 to 12 feet. Boats drawing 8 feet or more should not approach nearer than 0.25 mile to shore. A 6-foot shoal, marked by a lighted bell buoy, midway between Grand Portage Island and Hat Point, renders the bay entrance northeast of the island hazardous.

(486)

Small-craft facilities

- (487) Marinas on the north and west sides of the bay provide berths, gasoline, diesel fuel, water, electricity, sewage pump-out and launching ramps. A small store is near the ferry dock on the northwest side of the bay. Small passenger ferries run from this dock to several harbors on Isle Royale.

(488)

Ferries

- (489) A ferry service operates between Grand Portage and Isle Royale National Park in the summer. The schedule is available from Superintendent, Isle Royale National Park, 87 N. Ripley Street, Houghton, MI 49931.

- (490) **Wauswaugoning Bay** is just northeast of Grand Portage Bay, separated from it by Hat Point. The shore of the bay along Hat Point is a continuous rocky cliff rising to about 100 feet above the lake. **Mount Josephine**, at the inner end of Hat Point, rises 700 feet above the lake. The northwest side of the bay is bordered by a 500-foot bluff with a boulder beach broken by cliffs. The northeast side of the bay is low and heavily wooded.

- (491) A rocky reef, covered 5 feet, is about 0.6 mile offshore on the northwest side of Wauswaugoning Bay. **Francis Island**, small and rocky, is on a rocky ledge that extends 0.4 mile west from the east point of the bay. Aside from these hazards and the shallows at the northeast end of the bay, there are good depths and the shores are fairly deep-to. The bay has good holding ground for anchorage but is exposed to southeast to southwest winds.

- (492) Wauswaugoning Bay is partially protected by a group of small islands that extend 2 miles southeast from the east point of the bay. **Lucille Island**, the outermost, **Susie Island** and **Magnet Island** are the largest in the group. A dangerous detached rock is 0.3 mile southeast of the southwest point of Lucille Island. Caution is advised when navigating around and between these islands.

- (493) From Wauswaugoning Bay, the shore trends east-northeast for 5.5 miles to Pigeon Point (48°00'12"N., 89°29'48"W.). **Clark Bay**, at the inner end of Pigeon Point, is a small inlet open to east and protected on the south side by a point and two small islands. **Pigeon Point** is a rocky peninsula that extends 3.5 miles east-northeast and encloses the south side of **Pigeon Bay**. The bay, about 3.5 miles long and 1 mile wide, is bordered by high hills and bluffs that protect it from all directions but east. **Pigeon River** flows into the west end of the bay at the base of Pigeon Point.

(494)

Local magnetic disturbance

- (495) Large magnetic disturbances have been reported near Pigeon Point.

- (496) The **international boundary** between the United States and Canada extends through Pigeon Bay and then follows the Pigeon River.

(497)

Time

- (498) Lakeshore areas of Ontario, Canada, observe eastern standard time or eastern daylight saving time. Areas south of the Pigeon River on the west shore of Lake Superior observe central standard time or central daylight saving time.

- (499) **Boundary Island** is a dangerous reef with several small islets near the center of Pigeon Bay. Close northwest of Boundary Island, a narrow point extends 1 mile east from shore to divide the inner part of the bay into two arms. A reef with small islets extends off the end of the point. **Acadia Rock**, covered 6 feet, is 1 mile west-southwest of Boundary Island. **Laura Grace Rock**, covered 9 feet, is 0.3 mile west of Acadia Rock. Other than these dangers, the bay has deep water. Caution is advised when anchoring, because the rocks limit the available room and the holding ground is not good.

(500)

Isle Royale and Surrounding Islands

- (501) **Isle Royale** is 44 miles long northeast and southwest and has a maximum width near its southwest end of 8.5 miles. **Mount Desor**, 794 feet above the lake and the highest point on the island, is 12.5 miles from the southwest end. The shores of the island have numerous indentations and many detached islets and reefs, almost all with a northeast and southwest trend. Good lees can be found in many bays and channels.

(502)

Local magnetic disturbance

- (503) Magnetic disturbances have been observed around Isle Royale.

- (504) Isle Royale and its surrounding islands form **Isle Royale National Park**. The park is retained as much as possible in its natural state. There are no roads, only trails for hikers.

- (505) Recreational docks operated by concessions for the National Park Service at Rock Harbor and at Windigo Ranger Station at Washington Harbor offer groceries, gasoline and water for the convenience of visitors. Small docks, generally in good repair and in sheltered areas, are maintained at the many campsites around the island. Most of them have from 5 to 10 feet at their outer ends. Lights are operated on the docks at Windigo, Rock Harbor and the Park Service Headquarters dock on Mott Island on the southwest side of Rock Harbor. Complete details regarding the island and its use are available from the Superintendent, Isle Royale National Park, 87 N. Ripley Street, Houghton, MI 49931.
- (506) **Caution**—Designated aircraft landing areas are in Washington Harbor, Rock Harbor, and Tobin Harbor. (See **36 CFR 7.38**, chapter 2, for limits and regulations.)
- (507) **Rock of Ages Light** (47°51'59"N., 89°18'53"W.), 130 feet above the water, is shown from a white conical tower on a small islet 3.8 miles west of Cumberland Point, the south-westernmost point of Isle Royale.
- (508) A reef extends 0.4 mile southwest and 0.1 mile northeast from Rock of Ages. **Fisherman Reef**, 5.5 miles southwest of Rock of Ages Light, has a least depth of 23 feet. Five shoal spots with depths of 7 to 16 feet are from 0.7 to 1.4 miles northeast of the light. Several shoals with depths of 3 to 14 feet are within 1.2 miles south and southwest of the light. The southernmost spot, covered 12 feet, is marked on the west side by a buoy. An 11-foot spot is 0.3 mile southeast of the light.
- (509) **Grace Harbor** and **Washington Harbor**, at the southwest end of Isle Royale, have good holding ground and provide protection from all winds except southwest winds in Grace Harbor. Grace Harbor is enclosed on the south by **Cumberland Point** and on the north by a line of islands, of which **Washington Island** is the largest and **Grace Island** the easternmost. The islands separate Grace Harbor from the outer part of Washington Harbor. A rock, covered 2 feet and marked by a buoy, is on the outer edge of the shoals off Cumberland Point. Several shoals and small islands extend west from Washington Island. The outermost are a 2-foot spot 0.7 mile southwest and an 18-foot spot 1.1 miles west-southwest. A narrow 20-foot channel marked by buoys leads between the east end of Washington Island and **Booth Island** north to Washington Harbor. The north side of the outer part of Washington Harbor is enclosed by **Johns Island** and **Thompson Island**. Shoal spots of 3 to 11 feet extend 0.5 mile southwest from Johns Island, the westernmost, and a detached 13-foot shoal is 0.2 mile southeast of the island. The entrance to Washington Harbor is 0.3 mile wide between Washington Island and the shoals southwest of Johns Island. A narrow deep channel leads between Thompson Island and Isle Royale into the harbor. A private daybeacon marks the northeast side of Thompson Island, and a private buoy marks a sunken wreck on the east side of the channel. A small islet and a 3-foot shoal are 0.2 mile north of Grace Island.
- (510) The inner part of Washington Harbor extends 3.3 miles into the shoreline of Isle Royale. **Beaver Island** is near the east end of the harbor and may be passed by small craft on either side. A rock awash is off the north shore of the harbor, 0.25 mile west of the southwest end of Beaver Island. A wharf is at Windigo Ranger Station at the head of the harbor. Gasoline, diesel fuel, water and sewage pump-out facilities are available. A small store is nearby.
- (511) **Ferries**
- (512) A ferry service operates between Grand Portage and Windigo in Washington Harbor in the summer. The schedule is available from Superintendent, Isle Royale National Park, 87 N. Ripley Street, Houghton, MI 49931.
- (513) From Washington Harbor, the shore of Isle Royale trends north for 1.2 miles to the northwest corner of the island. A small island and a detached 7-foot shoal are 0.25 mile offshore about 0.6 mile north of Thompson Island.
- (514) **McGinty Cove** is a small indentation 1 mile northeast of the northwest corner of the island. From the cove northeast for about 19 miles to Todd Harbor, the shore is bold, clear, and deep-to except for several small detached shoals. **Finlander Reef**, comprising 6-foot and 7-foot spots, is 0.25 mile from shore 6.3 miles northeast of McGinty Cove. A 3-foot spot is close to shore 5.3 miles northeast of Finlander Reef. **Gull Rocks**, marked by a private marker, are 0.5 mile from shore about 6 miles southwest of Todd Harbor. A 3-foot and a 14-foot spot are close inshore adjacent to Gull Rocks.
- (515) **Todd Harbor**, about midlength of the north shore of the island, is about 5 miles long and indents the shore 0.75 mile. The harbor affords good protection from all but north winds. Care must be taken to avoid the many detached shoals and rocks in the harbor.
- (516) From Todd Harbor to McCargoe Cove, the shore should be given a berth of 1 mile. **Hawk Island** parallels the shore in this stretch. An islet and rocks awash are 0.8 mile southwest of Hawk Island. A 3-foot shoal is 0.15 mile north and rocks awash are 0.75 mile north-northeast of the island.
- (517) **McCargoe Cove**, about 4.5 miles northeast of Todd Harbor, is a narrow inlet that extends over 2 miles south-southwest into the shore of Isle Royale. A rocky ledge extends northeast from the west side of the entrance and is marked at the outer end by a private buoy. The cove is entered between this and another private buoy close north-northwest. Coming around the ledge, vessels must turn through 090° on a radius of about 200 feet to keep in depths of 18 feet or more. The channel into the cove has a least depth of 15 feet, but inside depths are 30 to 40 feet. Small docks are on **Birch Island** on the east side of the cove entrance and near the head of the cove.
- (518) The northeast end of Isle Royale, quite rugged and broken, consists of many peninsulas, islands and ridges separated by narrow channels and bays of deep water, all with a northeast trend. The area is obstructed

by numerous shoals and reefs that render navigation dangerous. **Amygdaloid Island, Canoe Rocks** and the line of islands and reefs between them form the north limit of this area from McCargo Cove northeast for 10 miles. Amygdaloid Ranger Station is on the southwest end of Amygdaloid Island. **Amygdaloid Channel** parallels the south side of Amygdaloid Island and is separated from **Robinson Bay** by a narrow peninsula, **Belle Isle, Green Island** and a series of small islands and reefs. A small-craft dock is on the south side near the east end of Belle Isle. **Hill Point**, the southeast entrance point to Robinson Bay, separates it from **Five Finger Bay**. A peninsula that terminates in **Locke Point** separates the south side of Five Finger Bay from Duncan Bay. A reef that extends 0.3 mile northeast from Locke Point is marked at the outer end by a buoy.

(519) **Duncan Bay**, entered at the northeast end of Isle Royale between Locke Point and Blake Point, extends about 4.5 miles southwest. A point about 1 mile above the entrance divides the bay. The main body of the bay leads south of the point, through a narrow passage to a large bay. A rock awash is in midchannel of the narrowest part of the passage south of the point. The channel, south of the rock, has depths less than 12 feet. A 17-foot shoal is near midchannel south of the point that divides the bay. A small dock is on the south side of the narrow passage.

(520) **Blake Point**, the northeasternmost point of Isle Royale, forms the south entrance point to Duncan Bay. **Blake Point Light** (48°11'28"N., 88°25'21"W.), 40 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the point. An 11-foot shoal is 0.3 mile east of the light. **Five Foot Reef**, 0.9 mile east of the light, has a least depth of 4 feet and is marked on the south side by a buoy. A 13-foot shoal is 1.2 miles east of the light.

(521) **Passage Island Light** (48°13'25"N., 88°21'56"W.), 78 feet above the water, is shown from an octagonal tower on the southwest end of **Passage Island, MI**, 3.5 miles northeast of Blake Point. A mariner-radio-activated sound signal and racon are at the light. The sound signal is initiated by keying the microphone five times on VHF-FM channel 83A.

(522) **Gull Islands** are 3.5 miles northeast of Passage Island. A shoal covered 2 feet is 0.5 mile south of the islands, and a group of detached rocky spots, covered 7 to 12 feet, is 0.7 to 2.5 miles northwest of the islands.

(523) **Tobin Harbor** parallels Duncan Bay on the south side of Blake Point. **Scoville Point** is on the northeast end of the peninsula that encloses the south side of the harbor. The harbor has good holding ground with protection from all winds but is available only to small craft because of the narrow entrance. A dock is on the north side of the harbor about 1.1 miles southwest of Scoville Point.

(524) **Rock Harbor**, south of Tobin Harbor, is about 13 miles long northeast and southwest. The outer 9.5 miles of the harbor is enclosed on the south side by a chain of islands and shoals. The harbor has good holding ground with protection from all winds. The fully enclosed west

3.5 miles of the harbor is obstructed near its midlength by shoals through which an 11-foot channel is marked by buoys.

(525) **Rock Harbor** can be entered at the northeast end between **North Government Island** and **South Government Island**. Another wide, deep passage enters the harbor from south opposite Scoville Point. **Middle Islands Passage** enters the harbor from south at the inner end of the island chain. The channel has an available depth of 26 feet and is marked by a lighted bell buoy and two unlighted buoys. A 14-foot shoal was reported in the entrance to Middle Island Passage at about 48°05'22"N., 88°34'20"W.; mariners should transit the area with caution. **Caribou Island** is on the east side of the passage.

(526) **Rock Harbor Lodge** is in a bight on the north side of Rock Harbor, 2 miles southwest of Scoville Point. A 12-foot spot off the east entrance point to the bight is marked by a buoy. A wharf marked by a private light on the north side of the bight provides gasoline, diesel fuel, water, sewage pump-out and electricity. Transient berths are available at several piers in the bight.

(527) The National Park Headquarters is in a bight on the northwest side of **Mott Island**, 1.6 miles northeast of Middle Islands Passage. The wharf at the headquarters has depths of 20 feet at the outer end, decreasing to 13 feet at its midlength, and with the inner end available for small boats. Gasoline, sewage pump-out facilities and a hoist that can handle 60-foot craft for emergency repairs are available.

(528) Ferries

(529) A ferry service operates between Copper Harbor on the Keweenaw Peninsula and Rock Harbor in the summer. The schedule is available from Superintendent, Isle Royale National Park, 87 N. Ripley Street, Houghton, MI 49931

(530) From Middle Islands Passage, the shore of Isle Royale extends south for 2 miles and thence southwest for 23 miles to the head of Siskiwit Bay. This bay parallels the shore in the southwest 12 miles of this reach and is enclosed on the south by a chain of islands and reefs. From Middle Islands Passage to Chippewa Harbor, shoals extend no more than 0.2 mile from shore.

(531) **Conglomerate Bay**, 0.8 mile south of Middle Islands Passage, has deep water and good protection from all but east winds.

(532) **Chippewa Harbor**, 5.4 miles southwest of Middle Islands Passage, extends 2 miles west and southwest into the shoreline of Isle Royale. The harbor is divided into deepwater areas by two narrows. Depths are about 14 feet through the first narrows and about 10 feet through the second. A dock is on the north side of the harbor just inside the first narrows.

(533) From Chippewa Harbor, the shore is free of outlying obstructions for about 6 miles to **Schooner Island** where shoals and submerged rocks extend 0.4 mile from shore.

(534) **Malone Bay**, just west of Schooner Island, is an indentation 3.5 miles wide, open to south except for protection behind **Hat Island, Ross Island, Malone Island** and **Wright Island**. Shoals around these and other small islands, as well as numerous detached shoals, render navigation of Malone Bay hazardous.

(535) A channel with a depth of about 18 feet extends into Malone Bay between Malone Island and Wright Island. The channel is marked by buoys that mark dangerous shoals on either side of the channel. The bay has protection from all winds in depths of 36 to 48 feet, mud and clay bottom. Malone Bay Ranger Station is on the northeast side of the bay.

(536) **Hopkins Harbor** is a sheltered inlet in the west side of Wright Island. A wharf on the south side of the inlet has depths of 15 feet alongside. Caution is advised when entering the inlet, because submerged boulders extend from the north side of the entrance.

(537) **Siskiwit Bay**, 12 miles long and 1.5 to 3 miles wide, is the largest indentation on the island. The bay has protection from all but northeast to east winds. Good holding ground is 1.5 miles south of Wright Island. A dock on the south side near the head of the bay has a depth of 6 feet at the outer end. The bay is enclosed on the south side by a peninsula that terminates in **Point Houghton** (47°54'06"N., 88°54'00"W.) and by a double line of islets and reefs that extends 8 miles northeast from the point, parallel to the south shore of Isle Royale. **Houghton Point Passage**, the only passage through the chain, is 0.5 mile east of Point Houghton. The passage, marked by buoys, has a depth of about 17 feet. In 2005, depths of 12 feet were reported in the passage. **Harlem Reef**, with a least depth of 2 feet, is on the south side of

the islet chain, 2.8 miles east of Point Houghton. A buoy marks the south side of the reef.

(538) **Isle Royale Light** (47°56'53"N., 88°45'40"W.), 72 feet above the water, is shown from a white octagonal tower with an attached dwelling on **Menagerie Island**, near the outer end of the islet chain on the south side of Siskiwit Bay. **Glenlyon Shoal**, with a least depth of 4 feet, is 0.7 mile northeast of the light, and an 18-foot spot is 1.3 miles northeast of the light.

(539) From Point Houghton, the shore of Isle Royale extends about 13 miles southwest to **The Head**, the southernmost point of the island. Numerous ledges and rocky spots obstruct this stretch, and it should be given a berth of at least 1 mile. **Fishermans Home**, a small cove 0.9 mile southwest of Point Houghton, has a commercial fishing operation with two docks. A narrow channel with a depth of 5 feet leads along the north side of the entrance into the cove. The entrance is deceptive and must be navigated with caution.

(540) From The Head, the shore extends northwest for 4 miles to Cumberland Point on the south side of Grace Harbor.

(541)

Canadian Waters

(542) The **international boundary** between the United States and Canada extends through Pigeon Bay and then follows the Pigeon River upstream. The north shore of Lake Superior from the **international boundary** in Pigeon Bay east to the head of the St. Marys River is in Canadian waters. For a description of this area consult **Canadian Sailing Directions CEN305**.