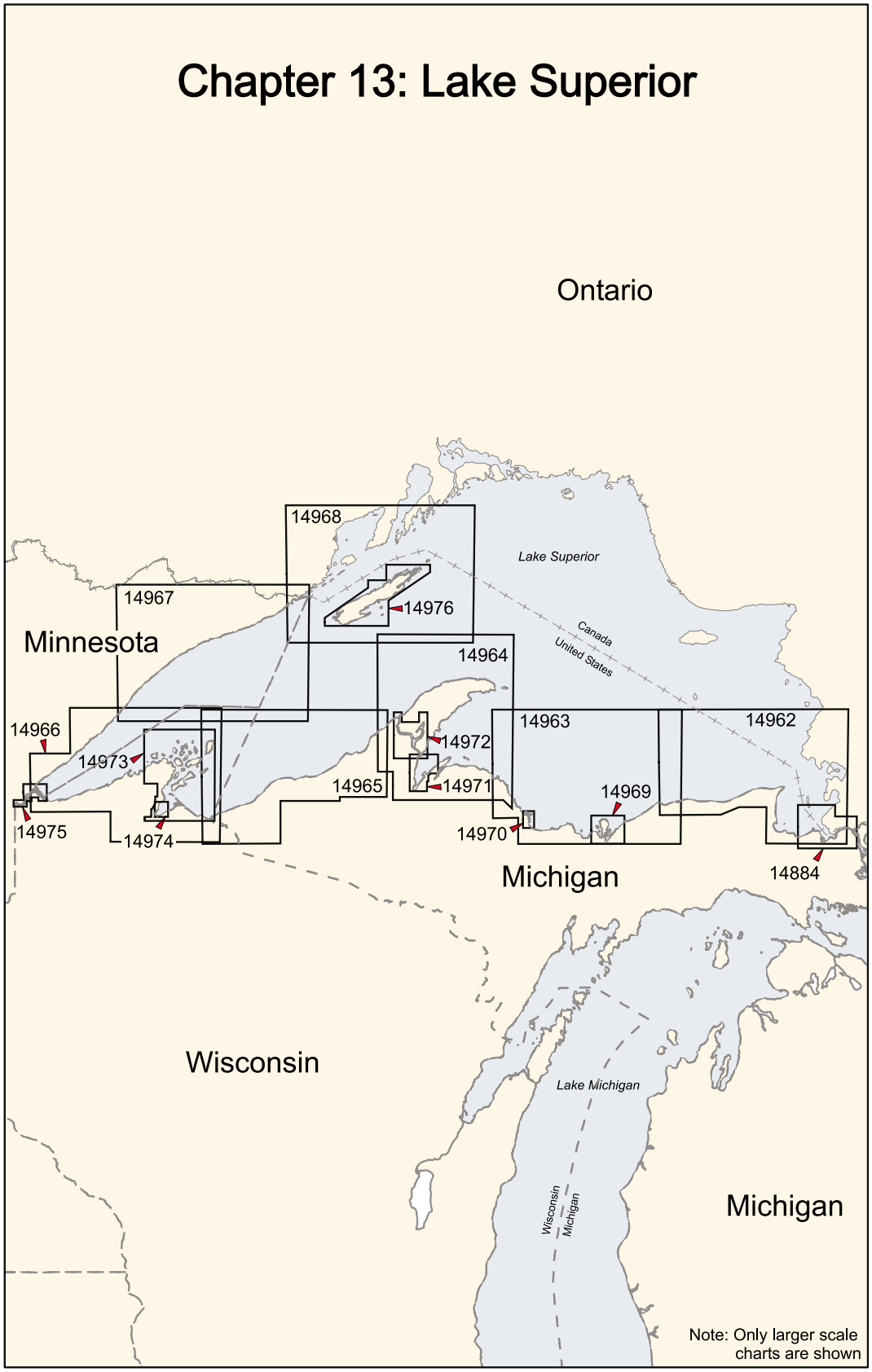
Chapter 13: Lake Superior
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Note: Only larger scale charts are shown

Lake Superior

Chart Datum, Lake Superior

(1) 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, Quebec, on International Great Lake Datum 1985 (IGLD 1985). (See Chart Datum, Great Lakes System, indexed as such, chapter 1.)

Dimensions, etc.

(2) Length, steamer track, Duluth Ship Canal to Point Iroquois; about 383 miles.

(3) Length (right line in clear), Duluth Ship Canal to Michipicoten Harbour; 350 miles.

(4) Breadth, on about longitude 86°45'W.; 160 miles.

(5) Depth, maximum recorded; 1,333 feet.

(6) Water surface of lake (including St. Marys River above Brush Point); 20,600 square miles (U.S.), 11,100 square miles (Canada).

(7) Entire drainage basin (including St. Marys River above Brush Point); 37,500 square miles (U.S.), 43,500 square miles (Canada).

General description

(8) **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 N shore.

(9) 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.

Fluctuations of water level

(10) 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.

(11) 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.

(12) 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, Quebec, on International Great Lakes Datum 1985 (IGLD 1985).

Weather, Lake Superior

(13) 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 W 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.

(14) Spring winds are variable, with N through SE winds common in the morning; southwesterlies also appear in the W. Afternoon directions are similar, with the addition of northwesterlies in the E. Gale frequencies drop to 2 percent or less by May; however, some of the highest winds of the year are encountered during

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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 (NE) was recorded. Marquette recorded 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.

(15) Summer winds are often out of the S through W; this pattern is intruded upon by afternoon northwesterlies in the E. 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 W through NW winds at Sault Ste. Marie. Marquette's light and variable breezes yield to a N-through-NE flow.

(16) As autumn progresses, winds blow more and more out of the W and N, 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 W. Onshore, similar changes are occurring. Early autumn onshore-offshore flow gives way to a variety of S through NW 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 S through NW with an increase in northerlies.

(17) 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 W half of the lake is more vulnerable to thunderstorms than the E half.

(18) 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.

(19) 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 S part of the lake. Elsewhere, seas of 25 to 30 feet (8 to 9 m) have been encountered.

(20) 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.

(21) 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.

(22) 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. W waters are the least vulnerable, while central and E waters are more susceptible to the strong winds with northerly and westerly components.

(23) 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.

(24) 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.

(25) 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

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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.

Ice

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

(27) Whitefish Bay, at the lower end of Lake Superior, is a bottleneck area. The shallow bay forms ice rapidly, and the prevailing W 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.

(28) In the N 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.

(29) In the W end of Lake Superior, fast ice about 4 to 6 inches thick builds NE 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.

(30) 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.)

Local magnetic disturbances

(31) 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 N 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 N shore. The disturbances are described in this chapter with the discussion of their locale.

(32) 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.

Routes

(33) The Lake Carriers' Association and the Canadian Shipowners Association have recommended, for vessels enrolled in the associations, the following separation of routes for upbound and downbound traffic in Lake Superior:

(34) Downbound vessels shall lay a course of **063°** for 72 miles from Duluth Ship Canal to pass not less than 12 miles off **Devils Island Light**; then a course of **078°** for 123.25 miles to pass not less than 12 miles off **Eagle Harbor Light**; thence **086°** for 14 miles to pass not less than 12 miles off **Copper Harbor Light**; thence **105°** for 18.25 miles to pass not less than 12 miles off **Manitou Light**; thence **114°** for 131.5 miles to pass not less than 2.5 miles off **Whitefish Point Light**; thence **148°** for 14.75 miles to a point 2.5 miles off **Ile Parisienne Light**; and thence **139°** for 9.75 miles to off **Gros Cap Reefs Light**; Provided, that vessels leaving Superior Harbor shall lay their course of **045°** for 19.75 miles before turning on their course for Devils Island.

(35) Downbound vessels from Two Harbors shall lay a course of **068°** for 47 miles to a position not less than 12 miles off Devils Island, then join the general downbound course.

(36) Downbound vessels from Taconite Harbor shall steer **088°** for 129.5 miles to a point not less than 12 miles N of Eagle Harbor and there join the general downbound course.

(37) Downbound vessels from Silver Bay shall steer **080°** for 147 miles to a point 12 miles N of Eagle Harbor and there join the general downbound course.

(38) Downbound vessels from Ashland shall lay a course of **062°** for 133.75 miles from South Channel to intersect the downbound course from Duluth 12 miles N of Eagle Harbor Light.

(39) Downbound vessels from Marquette shall take departure from a point **076°**, 2 miles from P**resque Isle**

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Harbor Breakwater Light and shall lay a course of **076°** for 60.25 miles to pass not less than 7 miles off **Au Sable Light**; then a course of **083°** for 48.75 miles to pass not less than 7 miles off the abandoned lighthouse at Crisp Point and continue for 5.25 miles until intersecting the downbound course from Manitou to Whitefish Point. The foregoing may be accomplished from Marquette by steering **034°** for 3.75 miles to the above point of departure, then laying the **076°** course.

(40) Downbound vessels from Thunder Bay, Kaministiquia River entrance, shall take departure from a point not more than 0.5 mile **047°** from Welcome Island Light and shall lay a course of **137°** for 9.25 miles to a position not less than 2.5 miles **227°** from Thunder Cape.

(41) From Mission River Entrance, vessels shall take a departure from the Entrance Breakwater Light, and shall lay a course of **110°** for 2.5 miles; thence **118°** for 8.75 miles to a position not less than 2.5 miles **227°** from Thunder Cape.

(42) Vessels shall now lay a course of **098°** for 26 miles passing not less than 2 miles **187°** off Thunder Cape and passing not less than 1.75 miles **187°** from Trowbridge Island Light in order to pass not more than 2.5 miles off Blake Point Light abeam; thence **121°** for 2 miles to a point not less than 1 mile **211°** from Passage Island Light; thence **148°** for 15 miles; thence **119°** for 175.25 miles to a point not less than 2.5 miles **030°** from Whitefish Point; thence joining the downbound course to Ile Parisienne.

(43) Upbound vessels for the S shore and W Lake Superior points shall lay a course from **Point Iroquois Shoal Lighted Bell Buoy 45**, E of Point Iroquois, **300°** for 5 miles; thence **319°** for 7 miles to a point 4 miles off Ile Parisienne Light; thence **328°** for 14.25 miles to a point 1 mile off Whitefish Point Light; thence lay a course not over **280°** for 14.25 miles to a point not more than 4.5 miles off the abandoned lighthouse at Crisp Point; thence **292°** for 133.25 miles to pass not more than 4 miles off Manitou Light and not more than 5 miles off Cooper Harbor Light; thence **266°** for 14 miles to pass not more than 5 miles off Eagle Harbor Light; thence **258°** for 123.5 miles to pass not more than 5 miles off Devils Island Light; and thence to destination as follows:

(44) **243°** for 67.75 miles to Superior

(45) **248°** for 69.25 miles to Duluth

(46) **258°** for 45 miles to Two Harbors.

(47) Upbound vessels for Taconite Harbor shall follow the general upbound course to a point 5 miles N of Copper Harbor, then steer **270°** for 143.5 miles to destination.

(48) Upbound vessels for Silver Bay shall follow the general upbound course to a point 8 miles N of Outer Island; then steer **279°** for 39 miles to destination.

(49) Upbound vessels for Ashland when 5 miles N of Eagle Harbor Light shall lay a course of **244°** to pass 6.5 miles off **Michigan Island Light**; thence **254°** for 12 miles to South Channel.

(50) Upbound vessels for Marquette shall lay a course of **263°** for 43 miles from a point not over 4.5 miles off the abandoned lighthouse at Crisp Point to pass not more than 4.5 miles off **Au Sable Light**; thence **256°** for 60.5 miles to destination.

(51) Upbound vessels for Thunder Bay shall take departure from a point 0.6 mile **293°** from **Gros Cap Reefs Light**; thence steer **000°** for 1.5 miles; thence head on **Whitefish Point Light** steering **319** ° for 8.6 miles to a point 1.5 miles **230°** from **Ile Parisienne Light**; thence **340°** for 13 miles to a point 6 miles **065°** from Whitefish Point Light; thence **300°** for 192 miles to a point not more than 0.5 mile **211°** from Passage Island Light; thence **310°** for 3 miles; thence **277°** for 26 miles, passing not more than 0.75 mile **187°** from Trowbridge Island Light, not more than 1 mile **187** ° off Thunder Cape and not more than 0.5 mile **170°** off Hare Island Reef Lighted Buoy A2; thence **319°** for 8 miles to pass not less than 1.25 miles from **Welcome Island Light**; thence to destination.

(52) Vessels bound for Mission River entrance, from the position not more than 0.75 mile **187°** from **Hare Island Reef Lighted Buoy A2**, shall lay a course of **292°** for 8 miles; thence **290°** for 2.5 miles to destination.

(53) Vessels upbound to other points on the N shore of Lake Superior shall follow the courses as laid down from the Gros Cap Reef Light, to the position 6 miles **065°** from Whitefish Point Light; thence to destination.

(54) It is understood that masters may exercise discretion in departing from these courses when ice and weather conditions are such as to warrant it. The recommended courses are shown on chart 14961, Lake Superior.

(55) Limits of anchorage in Whitefish Bay are recommended as follows: From a point on the Birch Point range 0.5 mile above Gros Cap, **340°** for 2.5 miles; thence **314°** to a point 2 miles off Ile Parisienne Light. From a point on the Birch Point range 0.5 mile above Gros Cap, **229°** for 0.5 mile; thence **300°** for 2.7 miles; thence to a point 3.5 miles off Ile Parisienne Light. No downbound vessel to proceed from this anchorage area unless authorized to do so by the U.S. Coast Guard.

Pilotage

(56) The waters of Lake Superior are Great Lakes undesignated waters; registered vessels of the United

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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 for addresses.) A pilot exchange point is at the head of St. Marys River about 3.5 miles SE of Point Iroquois. The pilot boat, J. P. IX, docks just above the locks at Sault Ste. Marie. (See Pilotage, chapter 3, and **46 CFR 401,** chapter 2.)

Principal ports

(57) 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.

Charts 14962, 14884

(58) **Whitefish Bay** is a large deep bay in the SE corner of Lake Superior in the approach to the head of St. Marys River. **Point Iroquois** (46°29.0'N., 84°38.0'W.), marked by an abandoned lighthouse, is on the SE side of the bay on the W side of the entrance to St. Marys River. **Nodoway Point** is 2.2 miles W of Point Iroquois. **Mission Hill** is a prominent 400-foot hill between the points. A rocky ledge, marked on the NE side by a buoy, extends about 2 miles N from Nodoway Point.

(59) From Nodoway Point, the S shore of Whitefish Bay extends 7.5 miles SW to the mouth of **Pendills Creek,** thence NW 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 E part of the bay and increase to 1 mile offshore NW of Pendills Creek.

Chart 14962

(60) From Salt Point W for 3.8 miles to Naomikong Point, shoals extend 2 miles from shore, and thence the shoal limit extends NW across the mouth of Tahquamenon Bay. **Naomikong Point**, and **Menekaunee Point** close W, from the S entrance point of **Tahquamenon Bay**, the SW part of Whitefish Bay. A rocky ledge with depths less than 6 feet extends 1 mile N from Naomikong Point, and a 4-foot spot is 0.5 mile E of the point.

(61) **Tahquamenon River** flows into the W side of Whitefish Bay just N of the N entrance point to Tahquamenon Bay. A shoal with depths of 2 feet extends from the mouth of the river S 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 S side of the river mouth. Fuel is available nearby.

(62) From the Tahquamenon River N 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 **Shelldrake River,** 8.5 miles N of Tahquamenon River.

(63) **Whitefish Point Harbor**, entirely artificial, is on the NW side of Whitefish Bay about 1 mile SW of the tip of Whitefish Point. The harbor, protected by breakwaters on the N, S, and E sides, serves as a harbor of refuge for shallow-draft vessels.

Channels

(64) The harbor is entered from Whitefish Bay through a dredged channel leading N, then W, between the breakwaters to the S end of the basin. The outer ends of the breakwaters are marked by lights. In June 2002, the controlling depths were 6.3 feet in the entrance channel and between the breakwaters to the basin, thence 9.6 to 12.0 feet in the basin.

Small-craft facilities

(65) 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 N end of the basin. Gasoline and water are available at a fishery dock on the W side of the basin.

(66) **Whitefish Point,** on the W 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°46.3'N., 84°57.4'W.), 80 feet above the water, is shown from a white cylindrical tower on the point; a radar beacon (Racon) is at the light.

(67) From Whitefish Point WSW 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 which empty into the lake in this stretch are navigable.

(68) An abandoned lighthouse at **Crisp Point** and the buildings at the abandoned Coast Guard station at Vermilion, 4.5 miles E of Crisp Point, are good landmarks.

(69) **Little Lake Harbor**, 20 miles W 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.

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The lake has depths of 18 feet and more with good water close to shore.

Channels

(70) 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 ends of the breakwaters are marked by lights. In June 2002, the midchannel controlling depth was 1.8 feet through the entrance and stilling basin to the lake. The channel is subject to extensive shoaling.

(71) Boat operators using the harbor are cautioned to use care in navigating the entrance area, and are advised that storm action may cause additional shoaling.

Small-craft facilities

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

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

Charts 14962, 14963

(74) **Grand Marais, Mich.**, is a village and small-craft harbor in **West Bay,** 29 miles W 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. West Bay has depths over 18 feet for a length of 1.3 miles and a width of 0.3 mile. The bay is separated from Lake Superior at the W end by a low sand ridge and at the E 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.

Prominent features

(75) Prominent are a red brick school and chimney in the village and a white building on the W side of the harbor entrance.

(76) **Grand Marais Harbor of Refuge Outer Light** (46°41'00"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 W pier; a fog signal is at the light.

Channels

(77) A dredged entrance channel leads between parallel piers across the sandspit which separates Lake Superior and West Bay. The outer and inner ends of the W pier and the outer end of the E pier are marked by lights. In June 2000-September 2001, the controlling depth in the channel was 13.3 feet (14.1 feet at midchannel).

Anchorage

(78) 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 E end of the harbor, so anchorage in the W end is advised.

(79) **Grand Marais Coast Guard Station**, operated on weekends during the boating season, is on the W side of the entrance channel.

Small-craft facilities

(80) A public dock developed by the Michigan State Waterways Commission at the W 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.

(81) From Grand Marais, the shore extends WSW for 7 miles, thence NW 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 W of Grand Marais to within 1 mile of Au Sable Point. Shoals extend 0.2 to 0.4 mile offshore in this stretch.

(82) **Au Sable Light** (46°40.3'N., 86°08.4'W.), 100 feet above the water, is shown from a white conical tower, red dwelling attached, on **Au Sable Point.**

Local magnetic disturbance

(83) A large area of magnetic disturbance has been observed about 40 miles NW of Au Sable Point.

Chart 14963

(84) A shoal with a least depth of 6 feet extends 0.9 mile NW from Au Sable Point.

(85) **Pictured Rocks National Lakeshore** occupies the entire shore from 1.5 miles W of Grand Marais W to Au Sable Point, thence SW for 28 miles to within 2.5 miles of Munising.

(86) From Au Sable Point, the shore extends SW 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 NE of Grand Portal Point, the shore changes to sheer exposed cliffs over

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100 feet high. Except for 23- and 24-foot shoals about 0.5 mile offshore 3 and 4 miles NE of Grand Portal Point, respectively, no outlying obstructions are along this stretch.

Charts 14963, 14969

(87) From Grand Portal Point, the shore trends SW 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 SW of Grand Portal Point, respectively, are prominent. S 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 SW of Miners Castle Point, a shoal with a least depth of ½ foot makes out from shore and extends SW to a point 0.3 mile NW of Sand Point. The shoal is marked by a lighted bell buoy.

(88) **Grand Island**, about 7.5 miles long and 3.5 miles wide, is a high wooded island W of this reach. The N end is 9 miles W of Grand Portal Point, and the SE end is 0.7 mile W of Sand Point. **Grand Island Light** (46°33.7'N., 86°40.9'W.), 190 feet above the water, is shown from a white post on the NW point of the island. Shoals extend about 0.5 mile off the two points at the N end of the island, and a shoal with depths of 2 to 6 feet extends 0.5 mile S and SW from the S point of the island. A buoy marks the SW edge and the S edge of the shoal at the S end of the island. Shoals extend no more than 0.3 mile off the E and W shores of the main body of the island.

(89) The **Thumb,** the SE 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 SE 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 N of the neck, and **Murray Bay** is S. An abandoned lighthouse is on the SE side of the Thumb.

(90) A shoal with depths of 10 to 18 feet extends 0.6 mile N from **Trout Point,** the N 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 E from shore just SE of Trout Point. The shoal border for the remainder of the E side of the Thumb is narrow and is marked by a buoy opposite Sand Point.

(91) A narrow deepwater channel leads between the SE side of the Thumb and the shoal off Sand Point to Grand Island Harbor. The shoal is marked on its W 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.

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

(93) **South Bay**, between Sand Point on the E and **Powell Point** on the W, extends 2.5 miles S from Grand Island Harbor. Shoals extend about 0.2 mile from the shores of the bay.

(94) **Munising Harbor** is at the S end of South Bay at the town of **Munising, Mich.** Prominent are the lighted radio masts on the high ground W of the town and the black stack and silver tank at the Kimberly-Clark Corp. on the SE side of the town. A hospital is in the town. A **217°** lighted range in the town marks the harbor approach. **Anna River,** which flows into the SE corner of South Bay, is not navigable by even small craft.

(95) **Munising Coast Guard Station**, operated on weekends during the boating season, is in the town of Munising at the front range light.

Towage

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

Wharf

(97) The Munising Paper Division of Kimberly- Clark Corp. receives coal at a 700-foot wharf 2,000 feet W 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.

Small-craft facilities

(98) The L-shaped city dock is 0.6 mile W 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, electricity, and sewage pump-out facilities are available. Fuel is available by tank truck and some repairs are available from local garages. A launching ramp is 0.6 mile NW of the dock. The ruins of a large dock are 0.4 mile NW of the city dock.

(99) From Powell Point, on the W side of the entrance to South Bay, the shore trends SW for 1.5 miles, thence NW for 3 miles to **Fivemile Point,** and thence W for 2.5 miles to **Au Train Point. Bay Furnace** is the bight formed W of Powell Point. From a width of 0.2 mile in Bay Furnace, the shoal border increases to a width of 1.2 miles NE of Fivemile Point. **Williams Island** is near the outer edge of the shoals NE of Fivemile Point. **Wood**

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Island, surrounded by shoals, is 2 miles N 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 N of Au Train Point, and a detached shoal with a least depth of 10 feet is 1.3 miles N of the point.

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

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(101) **Au Train Bay** is the bight between Au Train Point and **Au Train Island,** 5 miles W. Au Train Island is 1.1 miles N of the mainland point that forms the W side of the bay. A shoal, with a depth of 10 feet near the outer end, extends 1.3 miles NE 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 N and 0.6 mile W from Au Train Island, respectively.

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

(103) From Shelter Bay, the shore becomes low and rocky for 2 miles NW to **Laughing Fish Point** (46°32.0'N., 87°01.2'W.), 11.7 miles NW of Au Train Point. From Laughing Fish Point, the shoreline continues low and rocky and trends SW for 5 miles to the mouth of **Sand River,** thence W for 12 miles to the mouth of **Chocolay River,** and thence become bluff again for 3 miles NW to **Lighthouse Point. Shot Point,** 3 miles W of Sand River, juts 1 mile N into the lake. Shoals extend 1 mile N 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 NW of the mouth of Chocolay River. **Marquette Bay** is the bight formed between the mouth of Chocolay River and Lighthouse Point.

(104) **Caution.**–A 20-square-mile Emergency External Stores Jettison Area for K. I. Sawyer Air Force Base is about 9 miles NE of Marquette. Aircraft in distress may jettison auxiliary fuel tanks and any other externally mounted stores capable of being jettisoned. All vessels are cautioned not to loiter in this charted area and to avoid it completely if possible, since its use will be under emergency conditions and advance warning to clear the area will not be possible.

(105) **Marquette Harbor**, also known as **Marquette Lower Harbor,** is on the NW side of Marquette Bay, about 35 miles W of Grand Island Harbor, the nearest safe harbor to the E. The town of **Marquette, Mich.,** fronts on the harbor and is a base for commercial fishermen. Coal and caustic soda are received in the harbor.

Prominent features

(106) Prominent are a silver tank about 2 miles S of the harbor, a black standpipe 500 feet above the lake on Mount Mesnard 2 miles SSW of the harbor, a stack on the SW side of the harbor, and the lighted radio masts 3 miles W of the harbor.

(107) **Marquette Light** (46°32.8'N., 87°22.6'W.), 77 feet above the water, is shown from a red square tower on a dwelling on Lighthouse Point.

Channels

(108) A breakwater extends S and SE from Lighthouse Point to enclose a dredged harbor basin on its W side. The breakwater is marked by lights at the bend and at the outer end; a fog signal is at the outer end. Buoys mark the W limit of the basin. In July 2002, the controlling depth was 25.5 feet in the basin with lesser depths along the N and E edges.

Anchorage

(109) The harbor basin affords good anchorage. It is reported that vessels also sometimes anchor SW of the outer end of the breakwater.

(110) A special anchorage is at the N end of the harbor. (See **33 CFR 110.1 and 110.80b,** chapter 2, for limits and regulations.)

(111) Marquette is a **customs station.**

Quarantine, customs, immigration, and agricultural quarantine

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

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

(114) **Marquette Coast Guard Station** is on the NE side of the harbor basin at the inner end of the breakwater.

Towage

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

Wharves

(116) Shiras Generating Plant receives coal at a wharf 1.2 miles SW of Marquette Light. The wharf has 675 feet of berthing space with dolphins, a reported depth of 23 feet alongside, a deck height of 10 feet, and open

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storage for 250,000 tons of coal. The other wharves on the W side of the harbor are either in disrepair or are seldom used.

Small-craft facilities

(117) Mooring to the breakwater is prohibited. Limited emergency mooring is available at the inner end of the northernmost dock ruins in the NW corner of the harbor. Gasoline, water, electricity, and ice are available. Repairs are available at a 50-ton marine railway at the N end of the basin.

(118) From Lighthouse Point, the shore is low and rocky for 2 miles N to Presque Isle Harbor. A shoal bank, with bare rocks near the outer end, extends 0.25 mile E from Lighthouse Point. A rock awash is 150 feet E of the point. The NE edge of the shoal bank is marked by a buoy. **Picnic Rocks,** a group of small rock islands, is 0.7 mile N of Marquette Light. A stack 0.3 mile SW and a chimney 0.9 mile NW of Picnic Rocks are prominent.

(119) **Presque Isle Harbor**, also known as **Marquette Upper Harbor** or as **North Harbor,** is an indentation in the shore N of Marquette Harbor protected on the N side by Presque Isle Point. The two northernmost stacks of the powerplant on the W shore of the harbor are prominent.

(120) **Presque Isle Harbor Breakwater Light** (46°34.5'N., 87°22.5'W.), 56 feet above the water, is shown from a white cylindrical tower on a white octagonal building on the outer end of the breakwater that encloses the harbor; a fog signal is at the light.

Channels

(121) A breakwater extends SE from the S end of Presque Isle Park to protect a dredged harbor basin W of the breakwater. A buoy marks the E side of the dredged basin and a lighted buoy marks the outer end of a submerged crib that extends from shore on the W side of the basin. In July 2002, the controlling depths were 30 feet in the approach to the basin from Lake Superior, thence 25.5 feet in the basin.

Wharves

(122) Two docks at the N end of the harbor basin are owned by the Lake Superior and Ishpeming Railroad Co. Oil is received by Murphy Oil Co. at the merchandise dock. The approach to the wharf has a controlling depth of about 20 feet and is marked on the E side by a private buoy. The slip on the S side of the dock has a reported depth of 21 feet along the outer 400 feet. Iron ore and pellets are shipped from the NE side of the ore dock, 500 feet SW 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.

(123) Presque Isle Station of Wisconsin Electric Co. receives coal on the SW side of the ore dock. The SW 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 S of the dock. Coal received at the hopper is transported to a 900,000-ton storage area.

Small-craft facilities

(124) A small-craft basin developed by the Michigan State Waterways Commission is NE of the merchandise dock. In 1978, the basin had reported depths of 5 to 6 feet. Transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out facilities, launching ramps, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9.

(125) **Presque Isle Point** (46°35.6'N., 87°22.8'W.) is the N point of the peninsula occupied by Presque Isle Park, which encloses the N side of Presque Isle Harbor. The E side of the point is deep-to, but the shoal border increases in width S to the outer end of Presque Isle Harbor breakwater. **Presque Isle Point Rocks,** a group of small rock islets, are 0.7 mile E of Presque Isle Point. A pinnacle rock covered 10 feet is 0.2 mile E 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.

(126) From Presque Isle Point NW for about 22 miles to Big Bay Point, the shore is generally bold. **Little Presque Isle (Granite Point)** (46°38.3'N., 87°27.5'W.) is about 5.9 miles NW of Presque Isle Point. The SE 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 SE and W 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 W of Partridge Island. **Larus Island,** 0.8 mile NW of Partridge Island, is the northwesternmost of the group. From Larus Island NW to Granite Point, the shores of the bight are fairly deep-to.

Chart 14963

(127) From Little Presque Isle NW 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 NW of Little Presque Isle, Saux Head Point (Sauk Head), 2.7

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miles NW of Thoneys Point, **Yellow Dog Point** 3 miles SE of Big Bay Point, and **Granite Point** (46°46.9'N., 87°35.3'W.) 3 miles SE of Yellow Dog Point. Deep water is generally within 0.5 mile of shore except at a point 1.8 miles N of Saux Head Point and at Yellow Dog Point where shoals extend 0.7 mile off.

(128) **Granite Island** is a small steep island surrounded by deep water 5.6 miles ENE of Thoneys Point. A light on the island is a guide to vessels approaching Marquette Harbor from the N or W.

(129) **Stannard Rock**, 32 miles NE of Big Bay Point, consists of two large detached rock ledges. The S ledge was reported awash in 1991 and the N ledge is covered 2 feet. In 1956, a few scattered rocks awash were reported between the ledges. **Stannard Rock Light** (47°11.0'N., 87°13.5'W.), 102 feet above the water, is shown from a gray conical tower on a cylindrical crib on the S side of the N ledge. A 14-foot shoal is 1,000 feet SW of the light, and an 18-foot shoal, plainly visible to vessels passing over it in calm weather, is 0.6 mile W of the light.

Local magnetic disturbance

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

Charts 14963, 14964

(131) **Big Bay Point** (46°50.6'N., 87°41.0'W.), marked by a light, is 22 miles NW of Presque Isle Point. A shoal with a depth of 9 feet at the outer end extends 1.1 miles N from the point. A buoy marks the N end of the shoal. **Big Bay** is a deep bight enclosed by Big Bay Point on the E and **Salmon Trout Point** on the W. The S and W shores have deep water within 0.3 mile.

(132) **Big Bay Harbor** is a small-craft harbor of refuge in the SW corner of Big Bay.

Channels

(133) A dredged entrance channel leads from deep water in Big Bay between converging breakwaters to an inner harbor basin. The outer ends of the E and W breakwaters are marked by a daybeacon and a light, respectively. In July 2002, the midchannel controlling depth was 6.3 feet in the entrance channel to the basin, thence 9.2 feet in the basin (except for shoaling to 5.8 feet along the NE edge.)

Small-craft facilities

(134) A public docking facility developed by the Michigan State Waterways Commission is in the SW 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.

(135) About 750 feet NW of Big Bay Harbor W breakwater, submerged dock ruins, covered 3 to 9 feet, extend about 500 feet from shore.

Chart 14964

(136) From Salmon Trout Point, the shore trends NW for 8 miles to Huron River Point, thence 9 miles W to the S side of the mouth of Huron Bay. **Conway Point** and **Pine River Point,** 2 and 4 miles NW of Salmon Trout Point, respectively, are prominent. The **Huron Mountains** rise close behind the shoreline. At **Huron River Point** (46°54.6'N., 87°54.0'W.), a shoal with depths of 8 to 10 feet at the outer end extends 1.5 miles NE. The shore in the remainder of this stretch is generally clear within 0.5 mile.

(137) **Huron Islands** are a group of small islands centered 5 miles NW 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 SE. **Huron Island Light** (46°57.8'N., 87°59.9'W.), 197 feet above the water, is shown from a gray granite tower on a dwelling on the northwesternmost of the island group.

(138) **Huron Bay**, extending about 12 miles SW 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 W side of Huron Bay from Keweenaw Bay. **Point Abbaye Reef,** with a depth of 6 feet at the outer end, extends 1.5 miles E from the point. Buoys mark the N and SE edges of the reef.

(139) **Huron Bay Light** marks the outer end of a small projection of land on the SE side of the bay about 6 miles SW of Point Abbaye.

(140) **Skanee, Mich.**, is a small village with dilapidated wharves about 0.8 mile S 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.

(141) **Huron Bay, Mich.**, is an abandoned village on the E 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.

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Charts 14964, 14971

(142) **Keweenaw Bay** extends about 22 miles SW on the NW side of Point Abbaye and is enclosed on the W by the inner end of the E 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 E shore of the bay has deep water within 0.4 mile and the W shore within 0.7 mile.

(143) A headland, 1 mile wide at the inner end and 2 miles wide at the outer end, extends 1.7 miles NW from shore about 13 miles SW of Point Abbaye. **Sand Bay** is the bight on the NE side of the headland, and **Pequaming Bay** is the bight on the SW side. **Sand Point,** marked by a light, is a projection from the W side of the bay about 2.3 miles from the head. A 1-foot shoal, marked on the SE side by a buoy, extends 1,000 feet S from Sand Point. **L'Anse Bay** is the part of Keweenaw Bay above Sand Point. **Portage River** (see also chart 14972) flows into the W side of Keweenaw Bay about 13.5 miles W of Point Abbaye.

(144) **Pequaming, Mich.**, is a village on the NW side of Pequaming Bay, about 15 miles SW of Point Abbaye. Dock ruins extend about 1,200 feet S from the headland that forms the W 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 E side of the wharf. The mooring facilities on the E side of the wharf are dilapidated. NE of the wharf, submerged dock ruins extend S from the N 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 E from the island to the E 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.

(145) **L'Anse, Mich.**, is a village at the mouth of **Falls River** on the SE side of L'Anse Bay. A silver water tank on the S side of the river mouth and a stack on the N side of the river mouth are prominent.

(146) **Caution.**–Submerged ruins and a sunken wreck extend 500 feet NW from the N side of the river mouth. A buoy marks the outer end of the ruins.

Wharf

(147) The wharf of the Celotex Corp. extends 800 feet NW from the S side of the river mouth, thence 3,000 feet SW along the shore. The N face has depths of 19 feet, decreasing to 12 feet 300 feet from the outer end. The W face has depths of 19 to 22 feet along the NE 900 feet. Vessels should approach the wharf on a line parallel with the NE face to avoid a 17-foot shoal about 650 feet WNW of the N corner of the wharf.

Small-craft facilities

(148) The municipal marina is on the N 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.

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

Small-craft facilities

(150) 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.

(151) **Keweenaw Bay, Mich.**, is a village on the W side of Keweenaw Bay opposite Pequaming. An abandoned coal dock in ruins extends E from shore. Rock bluffs just N of the dock are prominent.

Charts 14964, 14972

(152) **Keweenaw Waterway**, about 25 miles long, crosses **Keweenaw Peninsula** from Keweenaw Bay on the SE side to the open water of Lake Superior on the NW 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.

Regulations

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

(154) 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

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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.

Channels

(155) The E entrance in Keweenaw Bay is protected by a breakwater that extends S from the E side of the mouth of Portage River. The dredged channel leads W of the breakwater through Portage River, Portage Lake, and thence through the dredged canal connecting Portage Lake with Lake Superior. The entrance at Lake Superior is protected by converging breakwaters. The Federal project depths through the Keweenaw Waterway are 26 to 28 feet through the lower entrance at the mouth of Portage River, thence 25 feet through the river to the deep water in Portage Lake and from the upper end of the lake through the canal, and thence 26 to 32 feet through the upper entrance at Lake Superior. The channels through the waterway are well marked by lighted and unlighted buoys, lights, and lighted ranges.

(156) The breakwater at the mouth of Portage River is riprapped on the channel side, and it should not be approached closer than 20 feet by vessels exceeding a 12-foot draft.

(157) **Keweenaw Waterway Lower Entrance Light** (46°58.1'N., 88°25.9'W.), 68 feet above the water, is shown from a white octagonal tower on the outer end of the breakwater on the E side of the Keweenaw Bay entrance to the waterway; a fog signal is at the light.

(158) **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 W side where vessels may moor.

(159) A small settlement with docks of commercial fishermen is on the W side of the river mouth S 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 N of the mooring pier.

(160) **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.

(161) In October 2001, the controlling depths were 15.8 feet (22.9 feet at midchannel) in the entrance and through the mouth of Portage River to the N end of the harbor of refuge; the mooring pier on the W side of the harbor had a depth of 20.9 feet; thence in 1999-October 2001, 20.9 feet (23.6 feet at midchannel) in the river channel above the harbor of refuge to Portage Lake.

(162) **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 SE corner of the lake, and **Pike Bay** is in the SW corner, the two being divided by the flats at the mouth of **Sturgeon River.** About 3 miles N of the head of Portage River, the lake is divided by **Grosse Point. Torch Bay** extends E from the point. The main body of the lake extends 2 miles N, thence turns W at **Pilgrim Point** for about 5.5 miles between the towns of Hancock and Houghton, and thence extends N 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.

Channels

(163) Keweenaw Waterway leads from the head of Portage River through the natural deep water of the lower part of Portage Lake. A 19-foot spot and a 20-foot spot are in the N part of Portgage Lake about 0.7 mile and 1.8 miles S of Pilgrim Point Light, respectively. A shoal marked by buoys, extends about 240 yards off the E shore of the waterway about 1.3 miles NNW of Grosse Point. The shoal also extends into the N part of Portage Lake for about 0.7 mile SE of Grosse Point and is marked by a seasonal lighted buoy on the W side; caution is advised. Above Pilgrim Point, a dredged channel continues through the upper end of Portage Lake to a revetted dredged canal. In April 2000-October 2001, the controlling depth was 18.5 feet (23.9 feet at midchannel) to the canal.

(164) **Pike Bay**, at the SW 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 W side of the bay at the village of **Chassell, Mich.**

(165) **Torch Bay** extends NE and bends N 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 buoys, leads for 4 miles through the upper part of Torch Bay and Torch Lake Canal. In 1972, the channel had a controlling depth of 19 feet. **Torch Lake** is about 5 miles long with a maximum width of 1.5 miles. The towns of **Lake Linden** and **Hubbell** and a few logging plants are on the NW side of the lake. Coal is received at a wharf at Hubbell. For several years, extensive stamp sand deposits along the W shore of the lake were in the process of being removed for reprocessing and redeposit into the lake, causing a continuing change in the shoreline and

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depths. These reclamation operations ceased prior to 1970.

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

(167) Heating oil and diesel fuel are received at a wharf operated by Standard Oil Co. 0.6 mile W 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 W. 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.

(168) **Hancock, Mich.**, on the N side of Portage Lake 3.5 miles W of Dollar Bay, and **Houghton, Mich.,** on the S side of the lake opposite, are the largest communities on Keweenaw Waterway. Houghton is a **customs station.** Hancock has two large hospitals. The wharves at Hancock are in good condition, but most of those at Houghton are becoming ruins.

(169) 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 3.3 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.)

(170) Salt is received by Mattila Contracting Co. at a 550-foot wharf 1.8 miles W 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.

Small-craft facilities

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

Ferry

(172) A ferry service operates between Houghton, 0.5 mile E of the lift bridge, and Isle Royale in the summer. The schedule is available from Superintendent, Isle Royale National Park, 87 N. Ripley Street, Houghton, Mich., 49931.

(173) The upper entrance to Keweenaw Waterway leads SE from deep water in Lake Superior between converging breakwaters to a revetted dredged canal that leads S to the upper end of Portage Lake. In October 2001, the controlling depth was 19.4 feet (24.1 feet at midchannel) in the entrance and through the dredged canal to the upper end of Portage Lake. Mooring to the revetments is prohibited.

(174) **Keweenaw Upper Entrance Light** (47°14.1'N., 88°37.8'W.), 82 feet above the water, is shown from a white square tower on the outer end of the E breakwater at the Lake Superior entrance to Keweenaw Waterway; a fog signal is at the light. The outer end of the W breakwater is marked by a light.

(175) **Portage Coast Guard Station** is on the E side of the waterway about 0.2 mile W of the lift bridge at Hancock.

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

Chart 14964

(177) From the lower entrance to Keweenaw Waterway, the SE shore of Keweenaw Peninsula extends NE for 15 miles to **Traverse Point** (47°08.5'N., 88°14.1'W.). Deep water is within 0.5 mile of shore. **Traverse Island** is 2 miles offshore 4.3 miles SSW of Traverse Point. A narrow shoal extends 0.8 mile SW from the SW 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.

(178) **Little Traverse Bay** is a semicircular bight about 2 miles wide on the SW side of Traverse Point. The bay provides protection from W to NE winds and has a sandy bottom. **Grand Traverse Bay** is a broad indentation on the N side of Traverse Point. A shoal with a depth of 14 feet at the outer edge extends 1.1 miles from the N 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 NW corner of the bay. A

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stack at the village of **Gay, Mich.,** just N of the bay, is prominent.

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

Channels

(180) 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 NE from the inner basin upstream in the river for about 350 feet. In June 2002, the controlling depths were 2.7 feet in the entrance and between the breakwaters to the basin, thence 8.3 to 10.0 feet in the basin (except for lesser depths along the N edge), thence 1.8 feet in the extension channel to the head of the project.

Small-craft facilities

(181) 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 S side of the basin. A launching ramp is available.

(182) From the N side of Grand Traverse Bay, the shore extends NE for about 15 miles to **Point Isabelle** (47°20.7'N., 87°56.2'W.). Shoals extend as much as 0.7 mile from shore in this stretch. Point Isabelle forms the S side of Bete Grise Bay. A shallow rocky bank extends 0.9 mile NE from the point and is marked at the outer edge by a buoy.

(183) **Bete Grise Bay** extends 2 miles W on the N side of Point Isabelle. The S shore is low and rocky, the W shore low and sandy, and the N shore bluff and rocky. The bay has good holding ground with protection from W to NE winds. **Mount Houghton** and **Mount Bohemia,** N and WNW of the bay, respectively, are prominent. A fire tower is on Mount Bohemia.

(184) **Lac La Belle Harbor** is at the head of Bete Grise Bay, about 36 miles NE of the lower entrance to Keweenaw Waterway. A dredged canal leads from the head of the bay W 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. An abandoned lighthouse is on the S side of the canal about 0.2 mile W of the entrance.

Channels

(185) The canal is entered between parallel piers at its mouth in Bete Grise Bay. The outer ends of the piers are marked by lights. In June 2000, the controlling depth was 8.7 feet (10.0 feet at midchannel) through the dredged channel; thence in June 1984, 6 feet in the remainder of the canal to natural deep water in Lac La Belle.

Anchorage

(186) Lac La Belle has good anchorage, generally mud bottom.

Small-craft facilities

(187) The Michigan State Waterways Commission has developed a public dock at the head of the cove at the NW end of the lake. Transient berthing, gasoline, and a launching ramp are available.

(188) From the head of Bete Grise Bay, the shore extends E for about 11.5 miles to **Keweenaw Point** (47°24.1'N., 87°43.0'W.), the E 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 S from Keweenaw Point and is marked on the SE side by a lighted buoy. **Keystone Bay,** just W of Keweenaw Point, has good holding ground with protection from W to NE winds.

(189) **Manitou Island**, 3 miles long and up to 1.4 miles wide, has its W end 2.8 miles E of Keweenaw Point. The deepwater passage between the point and the island is 1.8 miles wide.

Manitou Light (47°25.2'N., 87°35.2'W.), 81 feet above the water, is shown from a white cylindrical tower on the E point of the island. A fog signal, radiobeacon, and radar beacon (Racon) are at the light.

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

(191) **Fishermans Bay**, an indentation in the E end of Manitou Island, has good holding ground with protection from W to NE winds. A shoal with a depth of 4 feet at the outer end extends 0.4 mile E from the S side of the entrance to the bay.

(192) From the tip of Keweenaw Point, the shore extends N for 2.6 miles, thence turns NW and bends W 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.

(193) **Copper Harbor** is a broad inlet on the N side of Keweenaw Peninsula about 9 miles NW of Keweenaw Point. Narrow points of land extend from shore on either side of the entrance and leave an opening 1.4 miles

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wide. Islands and shoals extend about 1.1 miles E from the W point, and shoals extend about 0.15 mile W from the E point. The entrance between the shoals, marked by a bell buoy and a **190°** lighted range, is about 550 feet wide with a depth of about 14 feet.

(194) **Copper Harbor Light** (47°28.5'N., 87°51.6'W.), 90 feet above the water, is shown from a white skeleton tower near a white dwelling on the E entrance point.

(195) Copper Harbor provides protection from the NE and NW storms that are frequent in this area. The W 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 S of Copper Harbor Light.

(196) **Copper Harbor, Mich.**, is a village on the SW 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.

Ferry

(197) 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, Mich., 49931.

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

(199) **Agate Harbor** consists of a N and a S harbor parallel to each other and open to W. The harbors are enclosed by two narrow peninsulas that extend W from the mainland and by islets and reefs that extend W 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 N harbor is 19 feet.

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

(201) **Eagle Harbor**, 13.5 miles W of Copper Harbor, is a partially enclosed bay on the N 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.

(202) **Eagle Harbor Light** (47°27.6'N., 88°09.5'W.), 60 feet above the water, is shown from a white octagonal tower on a red dwelling on the W entrance point to Eagle Harbor.

Channels

(203) 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 E end of the harbor. The entrance to the harbor is marked by a gong buoy and a **150°** lighted range. In June 2000, the dredged harbor basin had depths of 8.8 to 12 feet with lesser depths along the NW edge of the basin fronting the facility.

(204) **Caution.**–Two dangerous reefs are in the approach to Eagle Harbor. A reef with a least depth of 2 feet is 0.25 mile NE of Eagle Harbor Light on the E side of the rangeline. A reef with rocks awash is 0.2 mile NW of the light on the W side of the rangeline.

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

Small-craft facilities

(206) A public docking facility developed by the Michigan State Waterways Commission on the N side of the dredged basin provides gasoline, water, electricity, sewage pump-out, and a launching ramp.

(207) From Eagle Harbor, the shore trends SW 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 SW of Eagle Harbor. A shoal with a least depth of 6 feet extends 1.1 miles W from the E 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 SW to Eagle River.

(208) **Eagle River, Mich.**, a village 7 miles SW of Eagle Harbor, has been abandoned as a commercial port. The cribs of the former dock are submerged.

(209) **Five Mile Point** (47°23.5'N., 88°22.3'W.), 4 miles SW 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 WSW of Five Mile Point. About 1 mile NE of the entrance to Keweenaw Waterway, a shoal with a depth of 8 feet near the outer end extends 1 mile N from shore. Vessels approaching or leaving the canal should take care to avoid the shoal.

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Charts 14964, 14965

(210) From the Keweenaw Waterway entrance, the shore trends SW 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 SW of the waterway, respectively.

Chart 14965

(211) **Misery Bay**, 13 miles SW of Freda, and **Sleeping Bay,** just W of Misery Bay, offer limited protection. **Fourteen Mile Point** (46°59.7'N., 89°07.7'W.), on the W side of Sleeping Bay, is marked by a prominent abandoned lighthouse.

(212) **Ontonagon Harbor**, serving the town of **Ontonagon, Mich.,** 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 W 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 W side of the river mouth and a blue water tank about 1 mile SE of the river mouth.

Channels

(213) 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 just below the Ontonagon Street bridge. The outer ends of the piers are marked by lights; a fog signal is at the W pierhead light. In June 2002, the controlling depths were 10.2 feet in the left half and 16.0 feet in the right half of the dredged channel in the entrance and between the piers to the bridge (except for shoaling to 10.3 feet in the right half of the channel just below the bridge.) Shoaling in the harbor occurs annually during the winter.

Bridges

(214) The SR64 swing highway bridge at the head of the dredged channel has a 27-foot E draw and 31-foot W draw, each with a clearance of 7 feet. (See **33 CFR 117.1 through 117.59 and 117.639,** chapter 2, for drawbridge regulations.) The fixed railroad bridge 0.4 mile upstream has a clearance of 8 feet. Overhead cables 600 feet below and above the railroad bridge have clearances of 20 and 35 feet, respectively.

Small-craft facilities

(215) A public docking facility developed by the Michigan State Waterways Commission is in a basin on the W side of the river 0.2 mile above the highway bridge. 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.

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

(217) **Silver City, Mich.**, is a village at the mouth of **Big Iron River,** 12 miles WSW 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 S of Silver City and a television mast 6 miles W of the village. **Union Bay,** just W of Silver City, affords limited protection.

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

Time

(219) Lakeshore areas of the United States W 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 E of this meridian, including the lakeshore areas of the Canadian Province of Ontario, observe eastern standard time or eastern daylight saving time.

(220) **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.

(221) **Black River Harbor**, at the mouth of the **Black River,** 37 miles SW 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.

Channels

(222) A dredged entrance channel leads from deep water in Lake Superior between converging breakwaters to a harbor basin inside the mouth of the river. The outer ends of the breakwaters are marked by lights, and the E side of the channel inside the breakwaters is marked by a buoy. In July 2001-May 2002, the controlling depth was 4.2 feet (4.7 feet at midchannel) in the entrance and in the channel to the harbor basin, thence depths of 3.7 to 8.0 feet were in the basin.

Small-craft facilities

(223) 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 W side of the river. Gasoline, water, electricity, sewage pump-out facilities, and a launching ramp are available.

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

Charts 14965, 14966, 14973

(225) The **State boundary** between Michigan and Wisconsin, about 1 mile NE of Saxon Harbor, follows the course of **Montreal River.** The river is not navigable.

(226) **Saxon Harbor**, 57 miles SW of Ontonagon Harbor, is at the original mouth of **Oronto Creek.**

Channels

(227) 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. In June 2001, the controlling depth was 6.5 feet in the entrance channel to the inner basin, thence depths of 7.1 to 8.0 feet were in the basin, thence 7.2 feet in the inner harbor channel.

Small-craft facilities

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

Charts 14966, 14973

(229) From Saxon Harbor, the shore extends NW for about 21 miles to the W end of Long Island at the entrance to Chequamegon Bay. **Marble Point,** about 4 miles NW of Saxon Harbor, is at the W end of the bluffs that characterize the shore W of the Porcupine Mountains. W of Marble Point to Chequamegon Bay, the shore is low and marshy, and shoals extend no more than 0.7 mile from shore.

(230) **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 NE side of Chequamegon Bay. **Chequamegon Point Light** (46°43.7'N., 90°48.6'W.), 33 feet above the water, is shown from a white square pyramidal skeleton tower, upper part enclosed, on the W end of Long Island; a fog signal is at the light.

(231) The Apostle Islands are N of this stretch of shore. Madeline Island, the S island of the group, is 1.5 miles N of Long Island. **South Channel**, the deepwater passage between Madeline and Long Islands, is the E approach to Chequamegon Bay. The N side of the channel is marked by a lighted buoy that marks the extent of shoals off the SW end of Madeline Island. **La Pointe Light** (46°43.7'N., 90°47.1'W.), 70 feet above the water, is shown from a white cylindrical tower on the N side of Long Island; a fog signal is at the light. A wreck, covered 9 feet, is off the NE shore of Long Island, 0.9 mile SE of La Pointe Light.

Charts 14966, 14973, 14974

(232) **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 W of Long Island. The deep water follows close to the W shore of the bay to within about 4 miles of the head, thence extends S across the bay to the wharves at Ashland. The limit of the shoal border off **Houghton Point,** on the W shore 3 miles SW of Chequamegon Point Light, is marked by a lighted buoy. N of Ashland, the E part of the bay is filled with an extensive flat. The shoalest water is around **Oak Point** in the E corner of the bay. The W edge of the flat is marked by a lighted buoy 2.2 miles S of Houghton Point. Above Ashland, the bay shoals gradually toward the head.

(233) **Ashland Harbor**, serving the city of **Ashland, Wis.,** is on the SE 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

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the generation of waves within itself, and in NE storms, when accompanied by swells coming in from the lake, heavy seas occur in the bay. A breakwater NE of the Ashland wharves provides protection for the harbor facilities. The city of Ashland is on a low bluff that fronts the SE side of the bay. Stacks and spires in the city are prominent.

Channels

(234) A 1½ -mile-long breakwater, on a NW-SE line about 2 miles NE 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 E part of the harbor, and a dredged channel leads from deep water in the bay along the piers in the W part of the harbor. The basin and channel are well marked by buoys.

(235) In 1972, the controlling depths were 26 feet in the W part of the basin and 24 feet in the E part. In October 2001, the controlling depths in the W channel were 19.7 feet (20.5 feet at midchannel) to Buoy 8, thence 16.6 feet (17.6 feet at midchannel) to the head of the project.

(236) A discontinued dumping ground is NE of the dredged basin, with a depth of 5 feet over it about 1,200 feet from the basin. The area must be avoided when entering or leaving the harbor by keeping to W of the buoys that mark the E side of the basin. Another discontinued dumping ground is adjacent to the NE side of the breakwater.

(237) **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.

(238) In 1987, submerged debris was reported immediately N 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.

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

Quarantine, customs, immigration, and agricultural quarantine

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

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

Towage

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

Wharves

(243) Ashland at one time had a thriving waterfront, but now only one deep-draft dock is in operation. (For a complete description of the port facilities, refer to Port Series No. 49, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facility described are reported depths. (For information on the latest depths, contact the operator.)

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

Small-craft facilities

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

(246) W**ashburn Harbor** is on the W side of Chequamegon Bay, 5 miles N of Ashland on the N side of **Vandeventer Bay.** This harbor was formerly a shipping point for lumber. Ruins of the lumber wharves in the SW part of the harbor are partially submerged and form a hazard to navigation.

Small-craft facilities

(247) 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 SW face, and 17 feet along the NE face. A launching ramp and a small dock are maintained by the city 0.9 mile W of the city dock.

Charts 14966, 14973

(248) From Houghton Point, the shore extends NNW for 4.3 miles, thence trends NE 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 E by Long Island and Madeline Island.

(249) **Port Superior Village, Wis.**, is a village on the N side of **Pikes Bay,** 6.3 miles N 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, marine supplies, and a launching ramp are available. Hoists to 25 tons are available for hull, engine, and electronic repairs.

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(250) **Bayfield, Wis.,** a village about 15 miles N 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. Ferries operate between this harbor and La Pointe on Madeline Island. **Bayfield Harbor South Breakwater Light** (46°48.5'N., 90°48.7'W.), 25 feet above the water, is shown from a square green daymark on a post at the S side of the entrance to the S harbor basin; a fog signal is at the light.

(251) The harbor comprises two basins formed by breakwaters that extend N and S from the city dock and from the shore N and S of the city dock. The entrance to the S basin is marked by lights on either side, and the entrance to the N basin is marked by a private light on the S side. In October 2001, the controlling depths were 9.5 feet (10.0 feet at midchannel) in the dredged entrance channel to the S basin, thence 8.2 to 10.0 feet in the S basin (except for shoaling to 5.8 feet near the W edge of the basin), thence 5.1 to 10.0 feet in the N basin.

(252) **Caution.**–Submerged dock ruins, covered 2 feet and marked at the outer end by a buoy, extend 550 feet from shore 0.9 mile SW of Bayfield Harbor South Breakwater Light.

(253) **Bayfield Coast Guard Station** is on the S side of the city, about 1,000 feet SW of Bayfield Harbor South Breakwater Light.

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

Small-craft facilities

(255) A marina in the S 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 SW of the basins.

(256) From Bayfield the shore trends NNE for about 6 miles to **Red Cliff Point,** thence NW for about 8 miles to **Point Detour** (46°57.7'N., 90°51.8'W.), and thence SW 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.

(257) **Buffalo Bay**, a small indentation 3 miles NNE of Bayfield, is enclosed on the S 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 W 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 NE of the basin. **Red Cliff Bay** is a small indentation on the S side of Red Cliff Point, 2.3 miles N of Buffalo Bay. A sunken wreck is close to shore on the N side of the bay.

(258) **West Channel**, a deepwater N 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 E side of Red Cliff Point marks the turn into the channel.

(259) **Raspberry Bay**, SE of Point Detour, is enclosed on the E by **Raspberry Point.**

(260) The district office of **Apostle Islands National Lakeshore** is 1.8 miles SW of Point Detour on the S 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.

(261) **Sand Point**, about 5 miles WSW of Point Detour, and **Squaw Point,** 2 miles NNE of Cornucopia, are prominent.

(262) 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 and Eagle 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.

(263) **Madeline Island**, the southernmost and largest of the Apostle Islands, is 12 miles long NE and SW and 1 to 3.2 miles wide. A shoal with depths less than 6 feet extends 0.5 mile SW from the SW 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 S shore of the island. **Big Bay,** the large bight midlength of the S shore, has deep water within 0.1 mile of its head. Shoals extend off 0.9 mile around the E point of the island. The NW shore of the island is bold and has deep water within 0.25 mile. At **Point De Froid,** the NW point of the island, a shoal extends 0.4 mile W. The W shore of the island has deep water within 0.35 mile.

(264) **La Pointe Harbor** serves the village of **La Pointe, Wis.,** a small old settlement and summer resort just S of Point De Froid at the W end of Madeline Island. A ferry operates between La Pointe and Bayfield.

Channels

(265) An L-shaped pier and breakwater extends from shore 0.4 mile S of Point De Froid to enclose a dredged small-craft basin on its SE side. The outer end of the breakwater is marked by a light. A detached breakwater S of the L-shaped breakwater is marked by a private light on each end. Vessels may enter from N or S of the detached breakwater. In October 2001, the controlling

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depths were 8.0 feet in the S approach and 10.0 feet in the N approach (except for shoaling to 6.6 feet near the E edge of the L-shaped breakwater), thence 5.6 to 8.0 feet in the basin (except for shoaling to 3.4 feet in the NE corner.)

Small-craft facilities

(266) Gasoline by truck and water are available at the L-shaped pier. A marina basin 0.5 mile S 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.

(267) **Basswood Island** and **Hermit Island** are small bold islands about 2 miles NW of Madeline Island, SE and E 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 W side of Basswood Island.

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

(269) **Michigan Island** is about 3 miles ENE of Madeline Island. **Michigan Island Light** (46°52.3'N., 90°29.8'W.), 170 feet above the water, is shown from a white cylindrical tower on the S point of the island. A shoal with a depth of 12 feet near the outer end extends 0.7 mile S 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 S shore and the entire N shore. The W point of the island is deep-to. A rocky ledge extends 1.4 miles NE from the NE 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 NE of Gull Island.

(270) **Outer Island**, the northeasternmost of the Apostle Islands, is 3 miles NE of Stockton Island. The island is about 6 miles long N and S and 2.5 miles wide with a sharp point at the SW end. **Outer Island Light** (47°04.6'N., 90°25.0'W.), 130 feet above the water, is shown from a white conical tower with attached dwelling at the N end of the island. A rocky bank extends 0.4 mile off the SW point and the SE shore of the island, narrowing to 0.1 mile off the E shore. A shoal extends 0.6 mile N from the NE point of the island. Shoals extend 0.7 mile off the NW shore and decrease to 0.15 mile wide S along the W shore. Shoals extend about 0.5 mile off the N shore. **Outer Island Shoal,** with a least depth of 16 feet, is connected to the shoal border and extends 1.2 miles N from the island. A sunken wreck is 1.5 miles NE of Outer Island Light. Berthing is available at a small-craft pier on the N side of the island.

(271) **Cat Island** is 4.3 miles W of Outer Island and 2.4 miles N of Stockton Island. Shoals extend off 0.3 to 0.5 mile around the N end of the island and decrease to 0.15 mile wide toward the S end where a shoal extends 0.6 mile S.

(272) **North Twin Island** is 1.7 miles NNW of Cat Island. Shoals extend 0.5 mile SW from the S point, 0.2 mile from the E side, and 0.2 to 0.4 mile from the N and W sides.

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

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

(275) **Manitou Island** is 1.1 miles SW of Ironwood Island and 1.3 miles N of Stockton Island. Deep water is within 0.2 mile of the shores of the island, except at the W end where a shoal extends 0.6 mile NW. **Little Manitou Island,** a small rocky islet marked by a light, is near the outer end of the shoal.

(276) **Oak Island**, 2 miles NE 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 N 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 SW side of Oak Island.

(277) **Raspberry Island**, 2 miles NW of Oak Island and 2.2 miles N of Raspberry Point, is marked on the SW side by a light. An abandoned lighthouse is about 100 feet N of the light. Shoals extend 0.1 to 0.3 mile from the island. **Marina Shoal** extends 0.4 mile S from the SE side.

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A buoy marks the outer edge of the shoal on the SW side of the island. Berthing is available at a small-craft pier on the SW side of the island.

(278) **Bear Island** is 2.5 miles N of Oak Island. Shoals extend 0.6 mile from the NW side, 0.2 mile from the E and W sides, and 0.3 mile from the S side. **Bear Island Shoal,** a detached shoal with a least depth of 15 feet, is 2.2 miles WNW of Bear Island and about 1 mile NE of York Island Shoals.

(279) **Devils Island** is 2.5 miles NNE of Bear Island. **Devils Island Light** (47°04.8'N., 90°43.7'W.), 100 feet above the water, is shown from a cylindrical tower on the N end of the island. Shoals extend about 0.1 mile off the N, E, and W sides and 0.25 mile off the S end. **Devils Island Shoal,** a detached rocky spot with a least depth of 11 feet, is 1.3 miles E of the island. Berthing is available at a small-craft pier on the S side of the island.

(280) **York Island** is about 1 mile N of Point Detour. A shoal extends about 0.6 mile S 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 SW side and 0.25 mile off the N and E sides of the island. **York Island Shoals** are a group of detached rocky spots with a least depth of 15 feet about 2 miles NNE of York Island. The main reef is about 1 mile long and 0.4 mile wide. Several 19- to 22-foot spots are close SE. A lighted bell buoy is off the W side at the N end of the reef. The deepwater channel between the southernmost shallow spot and York Island is about 1.4 miles wide.

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

(282) The N approach to West Channel leads between Sand Island Shoals and York Island Shoals, and thence between York Island and Raspberry Island.

(283) **Eagle Island**, 3.2 miles W of Sand Point, is the westernmost of the Apostle Islands. Shoals extend about 0.25 mile off the W, N, and E sides of the island. Shoals extend 0.5 mile S and 0.8 mile SSE 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 SW of Eagle Island, has a least depth of 12 feet.

Chart 14966

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

Channels

(285) A dredged entrance channel leads E then SE from deep water in Lake Superior between two piers to an inner basin which connects two inner channels that lead E and SW. The outer end of the E pier is marked by a light. In July 2001, the controlling depths were 9.3 feet (10.0 feet at midchannel) from the entrance to the inner basin, thence 6.7 to 8.0 feet in the basin, thence 4.7 feet in the E channel and 5.4 feet in the SW channel.

Small-craft facilities

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

(287) From Cornucopia SW 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 NE. **Bark Point** (46°53.1'N., 91°11.1'W.) encloses the W side of **Bark Bay.** The bay has fair holding ground with protection from all but NE winds. **Roman Point** encloses the E side of Bark Bay and separates it from Siskiwit Bay.

(288) **Herbster, Wis.**, is a small settlement at the mouth of **Cranberry River,** 5.2 miles SW of Bark Point. In 1983, the wharf at the village was in ruins.

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

Channels

(290) A dredged entrance channel leads from deep water in Lake Superior between parallel piers to an inner basin which connects with two inner channels that lead E inside the shoreline and S into the Flag River. The outer end of the E pier is marked by a light. In October 2000, the midchannel controlling depth was 6.4 feet in the entrance channel to the inner basin, thence depths of 4.2 to 10.7 feet in the basin except for lesser depths to 2.7 feet in the S part, thence 6.3 feet (7.1 feet at midchannel) in the E inner channel. The S inner channel has not been maintained for several years, and is subject to severe shoaling from drifting sand.

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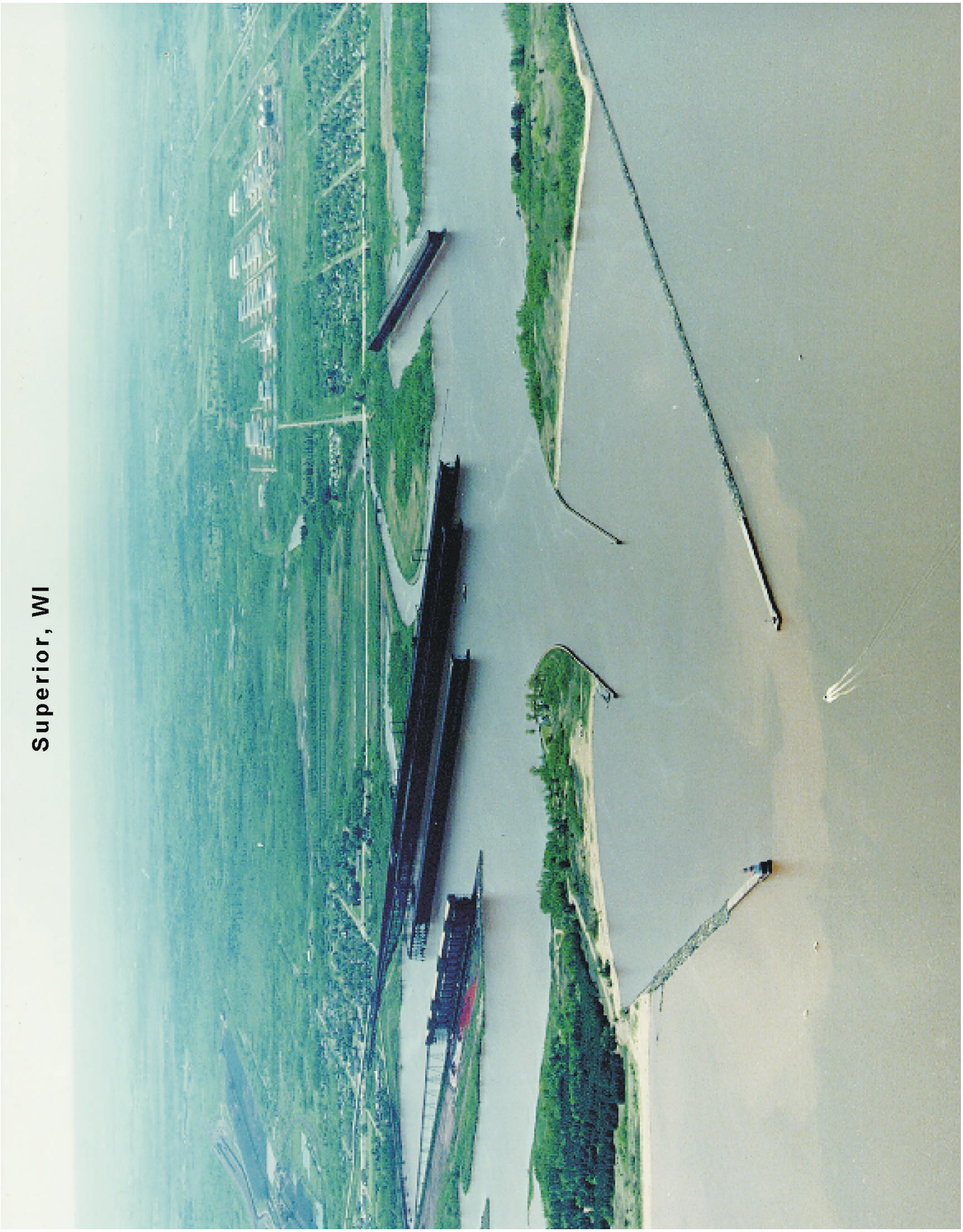

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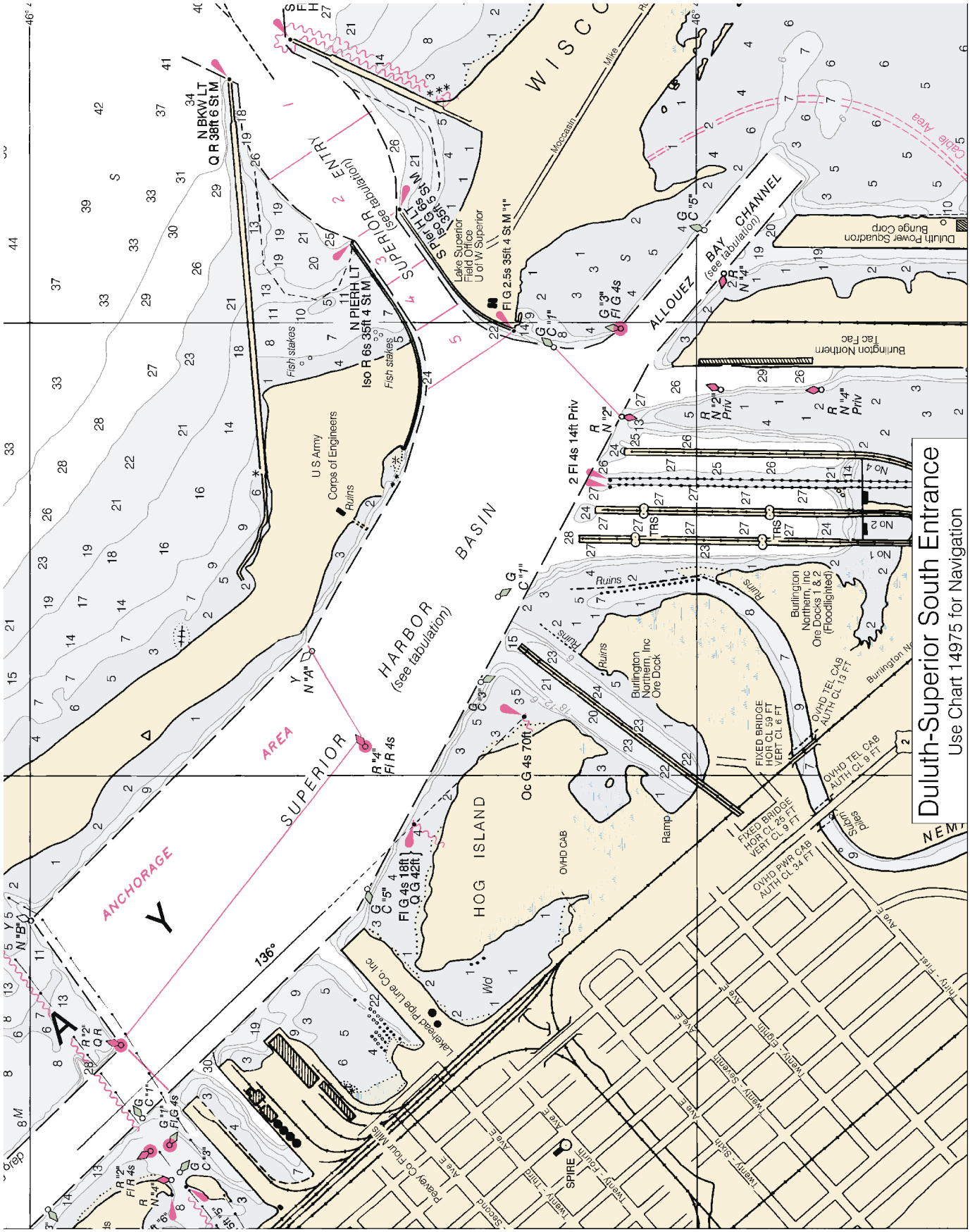

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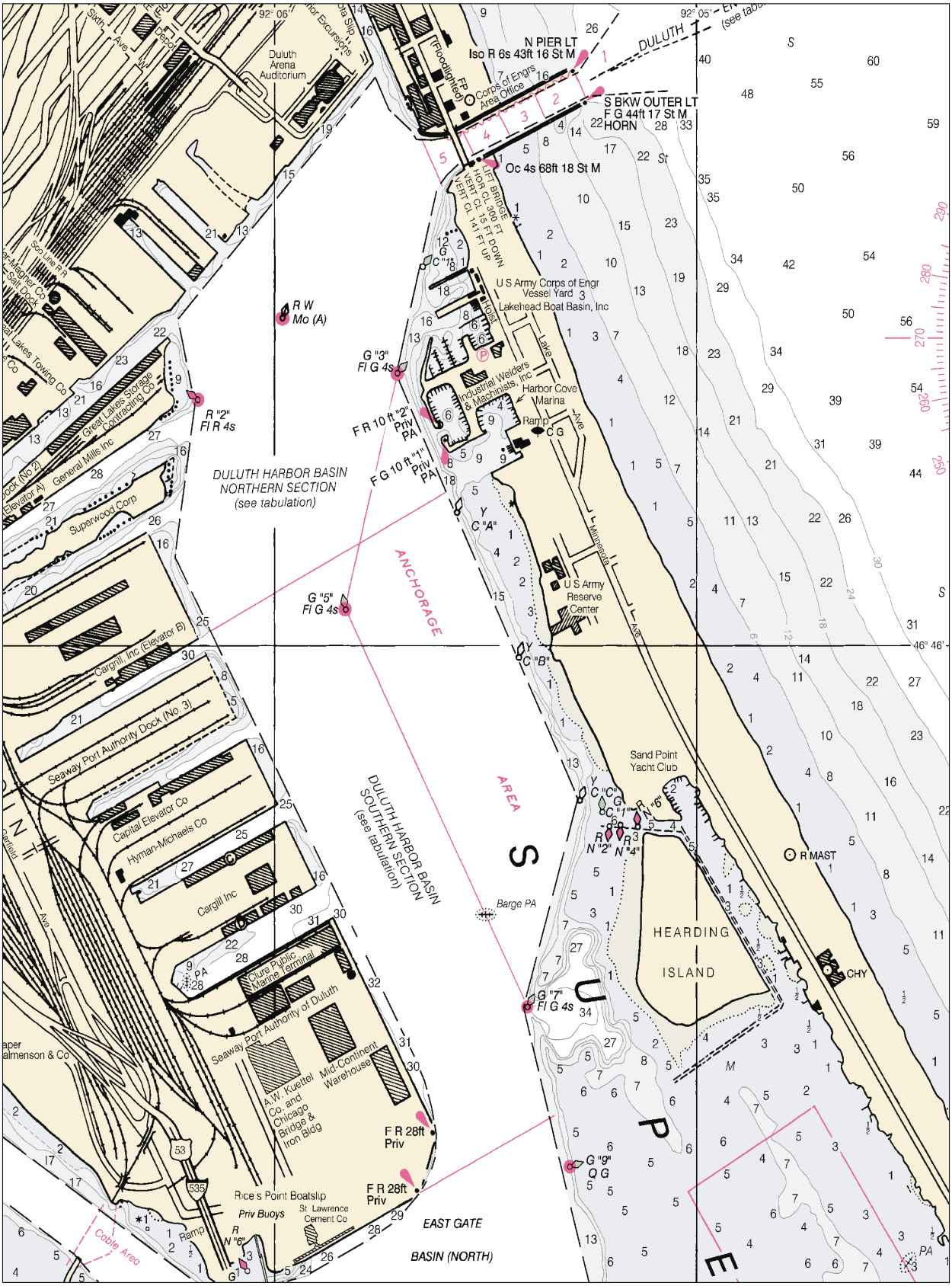

Duluth-Superior North Entrance

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Small-craft facilities

(291) 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.

(292) From Port Wing, the shore trends generally WSW 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 W 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.

Charts 14966, 14975

(293) **Duluth-Superior Harbor** is at the W 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, Wis.,** and **Duluth, Minn.,** front the S and N sides of the harbor, respectively.

Prominent features

(294) 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 N of it. Grain elevators on Rices Point and the Duluth Ship Canal bridge (Duluth Aerial Lift bridge) are also prominent.

(295) 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 NW and on the SW side of Howards Bay are prominent.

(296) **Superior Entry South Breakwater Light** (46°42.6'N., 92°00.4'W.), 70 feet above the water, is shown from a white cylindrical tower on a white building on the outer end of the breakwater on the S side of the S harbor entrance. A fog signal is at the light.

(297) **Duluth Harbor South Breakwater Inner Light** (46°46.7'N., 92°05.5'W.), 68 feet above the water, is shown from a black cylindrical tower with a white lantern room on the S side of the N harbor entrance.

(298) **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 N end of Minnesota Point and through **Superior Entry** at the S 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 S from shore in the small bight on the N side of Duluth Entry. A buoy marks the outer end of the ruins. Several cribs are on the W side of the bight.

(299) **Allouez Bay** is a very shallow bay that extends SE from Superior Bay S of Superior Entry and is enclosed on the E by **Wisconsin Point.**

(300) **Nemadji River** flows from **Moosecamp Lake,** about 40 miles above Superior, and empties into the W 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.

(301) **St. Louis River** flows into the W side of Superior Bay near its N end through a narrow gap between **Rices Point** on the N and **Connors Point** on the S. **St. Louis Bay** is a widening in the river that extends from these points to **Grassy Point,** 3 miles SW. **Howards Bay** is a narrow inlet that leads SE from St. Louis Bay for 1 mile on the W side of Connors Point.

(302) 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 N 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 W from Grassy Point, thence turns S between Clough Island and the mainland, and thence turns E on the S side of Clough Island to the head of the dredged channel.

(303) Two **safety zones** have been established in segments of the St. Louis River just south of Clough Island. Navigation of vessels through the zones and swimming within the zones are prohibited. (See **33 CFR 165.905**, chapter 2, for limits and regulations.)

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

(305) 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. The channel in this reach is well marked by buoys, and vessels of suitable draft should have no difficulty navigating it. A wreck, covered about 2½ feet, is on the E side of the river at **Oliver,** about 3.8 miles above Clough Island.

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(306) At Fond du Lac, a mud island and shoal extends off the mouth of Mission Creek. A very narrow channel along the S 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.

Channels

(307) 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 S side of Clough Island.

(308) **Superior Harbor** is entered from deep water in Lake Superior between converging breakwaters and parallel piers to the S end of Superior Bay. The outer ends of the breakwaters and piers are marked by lights. Federal project depths are 31 to 27 feet in Superior Entry, thence 27 feet in Superior Harbor Basin and anchorage area, Allouez Bay Channel, and Superior Front Channel. (See Notice to Mariners and latest editions of charts for controlling depths.)

(309) **Duluth Harbor** is entered from deep water in the lake between parallel piers to the N end of Superior Bay. The outer ends of the piers are marked by lights; a fog signal is at the S light. **Duluth Harbor Basin Traffic Lighted Buoy,** 0.45 mile SW 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 NW side of the basin, in which cases the regular navigation rules apply. Federal project depths are 32 to 28 feet in Duluth Ship Canal, 28 to 27 feet in Duluth Harbor Basin and anchorage area, and 27 feet in East Gate Basin. (See Notice to Mariners and latest editions of charts for controlling depths.)

(310) In St. Louis Bay and River the Federal project depths are 27 feet in West Gate Basin and Howards Bay channel, 27 feet in North Channel E section and 21 feet in the W section, 20 feet in 21st Avenue West Channel, 27 feet in South Channel E section and Cross Channel, 23 feet in South Channel W section and Upper Channel, and 23 feet in Minnesota Channel E section with 20 feet in the W section. (See Notice to Mariners and latest editions of charts for controlling depths.)

(311) 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.

(312) All the dredged channels in the harbor are well marked by lighted and unlighted buoys and lighted ranges.

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

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

Anchorages

(315) Two deep-draft anchorages in Superior Bay, one in the SE corner of Duluth Harbor Basin and one in the N 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 E or W 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 E of Duluth Harbor South Breakwater Outer Light. The Superior Harbor Basin anchorage is subject to shoaling at the S end, and a submerged pipeline crosses the NW end of the anchorage.

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

(317) **Caution.**–A sunken wreck is 0.9 mile ENE of the entrance to Duluth Ship Canal.

(318) The area immediately ESE of Duluth Harbor Basin Traffic Lighted Buoy is subject to shoaling.

Local magnetic disturbance

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

Currents

(320) 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.

(321) When a current setting out of the canal meets a heavy sea from the NE, it increases the wave height, creating a choppy and turbulent sea and making entrance by vessels somewhat difficult and dangerous.

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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.

(322) A LIGHTED Current Meter has been installed on the Duluth Ship Canal bridge (Duluth Aerial Lift bridge) structure.

Light Codes	Directions	Current (Speeds in MPH)
Yellow	inbound/outbound	less than 1.0
Steady Red	inbound	1.0 – 3.0
Flashing Red	inbound	greater than 3.0
Steady Green	outbound	1.0 – 3.0
Flashing Green	outbound	greater than 3.0

(323) 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.

(324) **Caution.**–A flashing amber signal light on the W side of the fixed span of Duluth Ship Canal bridge is operated by the city of Duluth for the purpose of warning outbound vessels within Duluth Harbor Basin of the approach from Lake Superior of inbound vessels exceeding 300 gross tons and barges or scows exceeding (light) 100 displacement tons. The light is not intended to regulate traffic, but to assist outbound vessels in complying with the regulation which prohibits the passing in Duluth Ship Canal by vessels of the sizes mentioned and noted in **33 CFR 162.110.** (See chapter 2.) Subject to mechanical failure or reasons beyond control, the bridge operators will cause the amber light to commence flashing when, in their opinion, a vessel or craft of the tonnage above stated will enter Duluth Ship Canal from Lake Superior within 15 minutes, the flashing to continue until the incoming vessel has cleared the canal. Masters are cautioned that the signal light does not relieve them of responsibility to observe the passing regulation or of any other responsibility inherent in their duties relating to maneuvering, signaling, or other functions.

Weather, Duluth and vicinity

(325) 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).

(326) 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 (2057 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 has 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.

(327) 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.

(328) (See Page T-15 for **Duluth climatological table**.)

Towage

(329) Tugs to 1,250 hp are available from Great Lakes Towing Co., and Zenith Tugboat Co. Arrangements for the Great Lakes Towing Co. 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 Zenith Tugboat Co. tugs can be made by calling 218-722-1702. Vessels are usually met inside the harbor, but during adverse winds they are met outside the entrance to Duluth Ship Canal.

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

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Structures across Duluth-Superior Harbor, St. Louis River, and Nemadji River
Miles above Duluth Harbor North Pier Light
****Clear width in feet proceeding upstream***

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above Low Water Datum	Remarks
				Right	Left	Center		
1	Duluth Ship Canal bridge (Duluth Aerial Lift bridge)	Highway	0.25			300	15	Vertical lift. Clearance up 141 feet. Notes 1 and 3.
	St. Louis Bay and River							
2	John A. Blatnik (I–535) bridge	Highway	2.74			460	123	Fixed.
3	I–535 bridge (Howards Bay)	Highway				150	103	Fixed.
4	Bong Bridge	Highway	5.20			400	120	Fixed.
5	Burlington Northern Ry. (Grassy Point) bridge	Railroad	5.44	175	175		12	Swing. Notes 2 and 4.
6	Overhead cable	Power	5.73				143	
7	Duluth, Missabe & Iron Range Ry. (Oliver) bridge	Highway & Railroad	13.91	125	125		22	Swing. Note 2.
8	Overhead cable	Telephone	18.99				24	
9	Fond du Lac bridge	Highway	19.00			116	23	Fixed.
	Nemadji River							
10	Overhead cable	Telephone	0.32				13	Note 5.
11	Burlington Northern Ry. bridge	Railroad	0.33			59	10	Fixed.
12	Overhead cable	Telephone	0.44				9	
13	U.S. Route 2 bridge	Highway	0.45			25	9	Fixed.
14	Overhead cable	Power	0.46				34	
15	Overhead cable	Telephone	1.20				26	
16	Chicago & North Western Ry. bridge	Railroad	1.21			70	26	Fixed.
17	Overhead cable	Power	1.85				15	
18	Bardon Ave. bridge	Highway	5.00			16	11	Fixed.
19	Soo Line Ry. bridge	Railroad	7.40				23	Fixed.

Note 1.–See **33 CFR 117.1 through 117.59 and 117.661**, chapter 2, for drawbridge regulations.

Note 2.–See **33 CFR 117.1 through 117.59, 117.669, and 117.1083**, chapter 2, for drawbridge regulations.

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 13; call sign, KAN–388.

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.

Note 5.–Mileages in Nemadji River are above the river mouth.

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Quarantine, customs, immigration, and agricultural quarantine

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

(332) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) A total of six modern hospitals are in Duluth and Superior.

Coast Guard

(333) Duluth Coast Guard Station is on the W side of Minnesota Point, 0.5 mile S of Duluth Ship Canal. A Coast Guard **Marine Safety Office** is in Duluth. (See appendix for address.)

Harbor regulations

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

Wharves

(335) 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 here described. (For complete information on the port facilities, refer to Port Series No. 49, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described 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.

Facilities in Superior Bay at Duluth:

(336) **Lafarge Corp., Duluth Cement Dock**: (46°46'34"N., 92°06'12"W.); 850-foot face; 17 to 21 feet alongside; deck height, 6 feet; pipelines extend to storage silos, total capacity 13,500 tons; receipt of bulk cement; owned and operated by Lafarge Corp.

(337) **Cutler-Magner Co., Salt Plant Wharf:** (46°46'27"N., 92°06'23"W.); 1,200-foot face; 24 feet alongside; deck height, 6 feet; covered storage for 60,000 short tons of material; receipt of dry bulk rock salt, calcium chloride, and evaporated salt; owned and operated by Cutler-Magner Co.

(338) **General Mills Elevator A Wharf:** (46°46'12"N., 92°06'38"W.); 1,982-foot face; 28 feet alongside; deck height, 6 feet; silos, tanks, and a building provide storage for 3½ million bushels; grain bagging facility has storage for 25,000 tons of bagged cargo; shipment and receipt of grain; owned by Burlington Northern Santa Fe Railroad and operated by General Mills, Inc.

(339) **Cargill Grain Elevator Dock:** (46º46'08"N., 92º06'23"W.); 1,560-foot face; 27 feet alongside; deck height, 5 feet; four ship loading spouts, loading rate, 40,000 bushels per hour; storage for 2¼ million bushels; shipment of grain; owned and operated by Cargill, Inc.

(340) **Cargill Commodities Dock:** (46º46'08"N., 92º06'23"W.); 1,700-foot face; 28 feet alongside; deck height, 6 feet; four foot square loading spouts, one 48-inch and one 66-inch conveyor belt; concrete silos, total capacity 7¼ million bushels; two buildings with combined capacity of 30,000 tons; shipment of grain by-products, pellets, and meal; owned and operated by Cargill, Inc.

(341) **AGP Grain Dock:** (46º45'50"N., 92º06'08"W.); 1,736 feet of berthing space; 27 feet alongside; deck height, 6 feet; one electric shiploader, loading rate of 50,000 bushels per hour; covered storage for 4 million bushels; shipment of grain; owned and operated by AGP Grain, Ltd.

(342) **Azcon Corp. Dock:** (46º45'39"N., 92º06'15"W.); 1,750 feet of berthing space; 26 feet alongside; deck height, 6 feet; cranes to 50 tons; 20 acres of open storage; shipment of ferrous scrap metal; owned and operated by Azcon Corp.

(343) **Northland Pier:** (46º45'40"N., 92º06'09"W.); 2,200-foot face; 27 feet alongside; ship self-unload; 35 acres of open storage; receipt of asphalt, concrete, and limestone; operated by Northland Constructors (Marine Tech, Inc.) of Duluth.

(344) **Arthur M. Clure Public Marine Terminal, Berths 1 and 2:** (46º45'30"N., 92º06'58"W.); 1,615-foot face, 30 feet alongside; deck height, 8 feet; cranes to 150 tons; 2½ acres of open storage and 4 acres of covered storage; receipt and shipment of general cargo in foreign and domestic trade; receipt of finished steel; shipment of scrap metal; owned by Duluth Seaway Port Authority and operated by Lake Superior Warehousing, Inc.

(345) **Murphy Oil Marine Terminal, Berth 3:** (46º45'34"N., 92º05'56"W.); 1,200-foot face, 30 feet alongside; deck height, 8 feet; handling of fuel and lubricating oils and waste oil services facility; fuel transfer equipment at 1,200 gpm; outside storage for 14,000 barrels; 2½ acres of open storage; owned by Duluth Seaway Port Authority and operated by Murphy Oil USA, Inc.

(346) **Arthur M. Clure Public Marine Terminal, Berth 4:** (46º45'20"N., 92º05'40"W.); 1,000-foot face, 30 feet alongside; deck height, 8 feet; 65,000 square feet of inside storage and 7 acres of outside storage; receipt and shipment of general cargo in foreign and domestic trade; receipt of break bulk commodities; owned by Duluth Seaway Port Authority and operated by Lake Superior Warehousing, Inc.

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(347) **Arthur M. Clure Public Marine Terminal, Berths 5 and 6:** (46º45'12"N., 92º05'38"W.); 500-foot face (Berth 5) and 696-foot face (Berth 6), 30 feet alongside; receipt and shipment of general cargo in foreign and domestic trade; owned by Duluth Seaway Port Authority and operated by Lake Superior Warehousing, Inc.

(348) **St. Lawrence Cement Dock 7: (46º45'06"N., 92º05'53"W.):** 600-foot face, 27 feet alongside; deck height, 8 feet; four storage silos with total capacity of 43,000 tons; receipt and shipment of cement; owned by Duluth Seaway Port Authority and operated by St. Lawrence Cement Co.

Facilities in St. Louis Bay at Duluth:

(349) **Duluth, Missabe and Iron Range Railway Co., Ore Dock No. 6:** (46º44'51"N., 92º07'42"W.); 1,308 feet of berthing space on NE side; 2,304 feet of berthing space on SW side; 28 to 30 feet alongside; deck heights, low deck 6 feet, top deck 84 feet; iron ore pellets loaded to vessels, rate 10,000 long tons per hour by shiploaders and 6,000 long tons per hour at gravity chute berths; open storage for 3 million long tons of iron ore and 2½ million long tons of other dry bulk aggregates; shipment of iron ore and iron ore pellets; receipt of limestone, coal and other dry bulk commodities; owned and operated by Duluth, Missabe and Iron Range Railway Co.

(350) **Hallett Dock Co., Dock No. 5:** (46°44'45"N., 92°07'59"W.); 2,400-foot face; 27 feet alongside; deck height, 5 feet; storage building with 20,000 ton capacity; 825,000 ton capacity outside storage area; two 120-foot long conveyors and one 145-foot mobile conveyor; receipt and shipment of bulk material; owned and operated by Hallett Dock Co., Inc.

Facilities in St. Louis River W of Grassy Point:

(351) **C. Reiss Coal Co. Duluth Dock:** (46º43'16"N., 92º09'12"W.); 0.2 mile W of Grassy Point; 2,854-foot face; 22 feet alongside; deck height, 4 feet; 840,000 ton capacity outside storage area; receipt of miscellaneous dry bulk commodities, including coal, limestone, and salt; owned and operated by C. Reiss Coal Co.

(352) **Hallett Dock Co., Dock No. 7:** (46º43'11"N., 92º09'38"W.); 0.6 mile W of Grassy Point; 2,100-foot face; 23 feet alongside; deck height, 5 feet; 25 acres of non-surfaced dock storage area outside; one stacking conveyor and one 120-foot mobile shiploader; receipt and shipment of bulk materials; owned and operated by Hallet Dock Co., Inc.

(353) **Hallett Dock Co., Dock No. 6:** (46º43'21"N., 92º10'00"W.); 0.9 mile W of Grassy Point; 2,059-foot face; 21 feet alongside; deck height, 5 feet; receipt and shipment of bulk materials, general cargo, and liquid urea; owned and operated by Hallet Dock Co., Inc.

Facilities in St. Louis Bay at Superior:

(354) **Hallet Dock Co., Dock No. 8:** (46º43'58"N., 92º07'21"W.); 2,200-foot face; 23 to 27 feet alongside; deck height, 10 feet; open storage for 800,000 tons; receipt and shipment of miscellaneous dry bulk materials; owned and operated by Hallett Dock Co., Inc.

(355) **Midwest Energy Resources Co., Superior Terminal Wharf:** (46°44'34"N., 92°06'48"W.); 1,215 feet of berthing space; 28 feet alongside; deck height, 11 feet; shipment of coal; owned and operated by Midwest Energy Resources Co.

Facilities in Howard Bay:

(356) **Cenex Harvest States Cooperatives, Elevator No. 1 Gallery Dock:** (46°44'32"N., 92°06'03"W.); 591 feet of berthing space; 24 feet alongside; deck height, 6 feet; eight vessel-loading spouts, combined loading rate 60,000 bushels per hour; shipment of grain; owned and operated by Cenex Harvest States Cooperatives.

(357) **Harvest States Cooperatives, Elevator No. 2:** (46º44'26"N., 92º05'57"W.); 1,190 feet of berthing space; 27 feet alongside; deck height, 5 feet; five vessel-loading spouts, combined loading rate 60,000 bushels per hour; shipment of grain; owned and operated by Cenex Harvest States Cooperatives.

Facilities in Superior Bay at Superior:

(358) **Peavey Grain Co., Connors Point Dock**: (46°44'17"N., 92°04'51"W.); 794-foot face; 28 to 30 feet alongside; deck height, 4 feet; six vessel-loading spouts, loading rate 50,000 bushels per hour; storage tanks and silos have a capacity for 5 million bushels; covered storage for 4 million bushels; shipment of grain; owned by ConAgra, Inc. and operated by Peavey Grain Co.

(359) **CLM Limestone Dock:** (46º43'56"N., 92º04'33"W.); 1,000 feet of berthing space; 26 feet alongside; deck height, 6 feet; open storage for 400,000 tons of limestone; receipt of limestone; operated by CLM Corporation.

(360) **Lafarge Corp., Superior Cement Dock:** (46º43'56"N., 92º04'22"W.); 1,300 feet of berthing space; 23 feet alongside; deck height, 5 feet; six concrete storage silos, total capacity 8,400 tons of cement; open storage for 150,000 tons of gypsum; receipt of gypsum and cement; owned and operated by Lafarge Corp.

(361) **ConAgra Specialty Grains Co., Superior Elevator M Dock:** (46º42'42"N., 92º02'39"W.); 800 feet of berthing space; 28 feet alongside; deck height, 5 feet; tank and silo storage for 2 million bushels; receipt of grain; owned by ConAgra, Inc. and operated by ConAgra Specialty Grains Co.

(362) **Burlington Northern Santa Fe Railroad Co., Superior Ore Dock No. 5:** (46º41'53"N., 92º01'07"W.);

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1,400 feet of berthing space; 27 feet alongside; deck heights, 6-foot low deck, 102-foot top deck; open storage for 3½ million-long-tons of material; 18 shuttle conveyors have a combined vessel-loading rate of 18,000 long tons per hour; shipment of iron ore pellets; owned and operated by Burlington Northern Santa Fe Railroad Co.

Supplies

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

Repairs

(364) 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.

Small-craft facilities

(365) Small-craft facilities are on the NE side of Duluth Harbor Basin, on the W side of Minnesota Point 0.5 mile S of Duluth Ship Canal, on Barkers Island 1.6 miles NW of Superior Entry, at the N end of Duluth Harbor Basin in the slip NE of the Duluth Arena-Auditorium, and on the W 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.

(366) 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.

Communications

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

Chart 14966

(368) From Duluth Ship Canal NE 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°55.5'N., 91°49.0'W.), 2.5 miles SW of Knife River, is prominent. A lighted red and white checkered tank on high ground 3 miles W of Stony Point is prominent.

Local magnetic disturbance

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

(370) **Knife River, Minn.**, is a village just above the mouth of **Knife River,** 18.5 miles NE of Duluth Ship Canal. A small-craft harbor, used principally by recreational craft, is 0.4 mile S of the river mouth on the N side of **Granite Point.**

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

(372) **Knife River Harbor Entrance Light** (46°56.6'N., 91°46.7'W.), 31 feet above the water, is shown from a white column with a square green daymark on the outer end of the breakwater at Granite Point.

Channels

(373) A breakwater that extends from Granite Point protects the entrance to the harbor from the SE. A dredged entrance channel leads from deep water in Lake Superior on the N side of the breakwater to an inner channel about 0.2 mile long. In May 2002, the controlling depth was 5.1 feet (7 feet at midchannel) to the head of the project. Local knowledge is advised.

Small-craft facilities.

(374) 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.

(375) From the mouth of Knife River, the shore extends NE 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 W side of Agate Bay on which Two Harbors is located. A lighted radio mast on the promontory and two tanks and a stack NNE of town are prominent.

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(376) **Two Harbors, Minn.**, is a town about 7 miles NE of Knife River on the N 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.

(377) **Two Harbors Light** (47°00.8'N., 91°39.8'W.), 78 feet above the water, is shown from a red square tower on a dwelling on the E point of the harbor.

Prominent features

(378) **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.

Channels

(379) The harbor is entered from Lake Superior N between a detached breakwater on the W side and a breakwater that extends SW from the E point of the harbor. The outer ends of the breakwaters are marked by lights; a fog signal is at the E light. A maneuvering area has been dredged in the E part of the harbor. Buoys mark the N and E limits of the area. In October 2001, the maneuvering area had depths of 25.8 to 30 feet.

(380) In 1987, a submerged obstruction covered 30 feet was reported about 700 feet N of the E breakwater light, in about 47°00'45.3"N., 91°40'09.4"W.

Towage

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

Wharves

(382) Two Harbors has two deep-draft facilities on the W side of Agate Bay. (For a complete description of the port facilities, refer to Port Series No. 49, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) 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.

(383) **Duluth, Missabe and Iron Range Railway, Ore Dock No. 1:** 1,600 feet NE of W breakwater light; 1,344 feet of berthing space along NE and SW sides; 28 feet alongside; deck heights, low deck 6 feet, top deck 75 feet; handles iron ore, iron ore pellets, and bunkering vessels.

(384) **Duluth, Missabe and Iron Range Railway, Ore Dock No. 2:** immediately SW of Ore Dock No. 1; 1,368 feet of berthing space along NE and SW sides; 30 feet alongside; deck heights, low deck 6 feet, top deck 80 feet; handles iron ore, iron ore pellets, and bunkering vessels.

Small-craft facilities

(385) Paved launching ramps are available in the harbor. Ruins of fishing docks and foul bottom are along the E side of the harbor basin. Caution is advised in the area. Ruins covered 5 feet are on the N side of the W end of the W breakwater.

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

Local magnetic disturbance

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

(388) **Burlington Bay**, 1 mile NE of Agate Bay, is about 1 mile wide and indents the shore about 0.6 mile. The bay is protected from SW 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 NE storms by the E 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.

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

Local magnetic disturbance

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

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

Local magnetic disturbance

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

(393) At the mouth of **Split Rock River,** a small indentation offers protection from W to N winds and limited protection from NE and SW winds. **Corundum Point** (47°11.5'N., 91°22.9'W.), 1.5 miles NE of Split Rock River, offers no protection. Abandoned Split Rock Light, 1 mile NE 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.

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Local magnetic disturbance

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

(395) **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 E of Corundum Point. The reef drops off suddenly to deep water on its E side and is a danger to small craft due to the swell or wave thrown up by the steep E face.

Charts 14966, 14967

(396) **Beaver Bay**, about 50 miles NE 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 S, W, and N storms, but is open and unprotected to NE, E, and SE. The most dangerous storms at this end of the lake are from NE, the seas having a fetch of more than 250 miles. Two piers are on the N side of the bay. The E pier has a depth of 5 feet at the outer end, and the W pier 9 feet at the outer end.

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

(398) 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 E and NE by **Beaver Island** and a breakwater that extends NW to shore from the N end of the island, and from the SW by **Pellet Island** and a breakwater that extends W from it to the shore. Beaver Island and Pellet Island are each marked on the NE side by a private light. In 1972, the controlling depth was 28 feet alongside the loading dock on the NW side of the harbor. A private light is off the SW end of the dock, and a radiobeacon is about 900 feet NE of the light. Shoaling to depths of less than 30 feet exists along the shore SW of the dock. A private lighted buoy is S of Beaver Island, a private buoy marks the outer edge of a shoal extending W from Beaver Island, and private lighted buoys mark the limit of deep water at the S end of the harbor.

Wharf

(399) Silver Bay has one deep-draft wharf on the NW side of the harbor. (For a complete description of the port facilities, refer to Port Series No. 49, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for this facility are reported depths. (For information on the latest depths, contact the operator.)

(400) **Northshore Mining Co. Dock:** 2,485-foot face; 29 to 32 feet alongside; deck height, 8 ½ feet; iron ore pellets, coal, diesel fuel, Bunker C, grinding rods, and bunkering vessels.

Chart 14967

(401) From Silver Bay Harbor the shore extends NE 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 NE 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 NE of Silver Bay Harbor near the summit of **Palisade Head** is prominent.

Local magnetic disturbance

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

(403) **Taconite Harbor** is a private harbor maintained by the Minnesota Power Company and Cleveland-Cliffs Inc., about 75 miles NE 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 N end of the harbor are prominent.

(404) Gull Island, Bear Island, the breakwater between them, and the breakwater that extends NE from Bear Island protect the harbor from the SE. A breakwater that extends SE from shore at the N end of the harbor protects the harbor from the NE. The harbor is entered N from Lake Superior on the W side of Gull Island and is exited between the breakwaters at the NE end of the harbor.

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

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

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(407) **Caution.**–In 1975, an anchor was lost in the entrance channel, about 600 feet N of the light on the E side of the entrance.

Wharf

(408) Taconite Harbor has one deep-draft facility on the NW side of the harbor. (For a complete description of the port facilities, refer to Port Series No. 49, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facility described are reported depths. (For information on the latest depths, contact the operator.)

(409) **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.

(410) From Taconite Harbor, the shore extends NE 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 NNE of Taconite Harbor, and **Leveaux Mountain,** 8 miles NE of the harbor, are two of the tallest peaks. **Rock Island,** a low rocky projection in the E approach to **Good Harbor Bay,** 3.6 miles SW of Grand Marais, is the only off-lying obstruction in this reach. Otherwise, the shore can be approached within 0.5 mile.

(411) The settlements of **Schroeder, Tofte,** and **Lutsen** are close to shore in this reach, 1.3, 5, and 14.5 miles NE 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 NE of Taconite Harbor, respectively, are the largest.

(412) **Grand Marais Harbor** is a small-craft harbor 31 miles NE of Taconite Harbor and 106 miles NE 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 S between two points of land. The harbor is a commercial fishing base. **Grand Marais, Minn.,** is a town on the N side of the harbor.

(413) **Grand Marais Light** (47°44.7'N., 90°20.3'W.), 48 feet above the water, is shown from a white square pyramidal skeleton tower, upper part enclosed, on the E side of the harbor entrance. A fog signal is at the light.

Channels

(414) The dredged harbor basin is entered N from Lake Superior between breakwaters that extend from the E and W sides of the entrance. An inner breakwater protects a dredged small-craft basin in the N part of the harbor. The outer ends of the entrance breakwaters and the inner breakwater are marked by lights. In September 2000-October 2001, the controlling depth was 16.0 feet in the main harbor basin (except for gradual shoaling to 13.7 feet along the N edge); thence in 1999-October 2001, 5.2 to 8.0 feet in the small-craft basin with lesser depths along the S edge.

Anchorage

(415) The E part of the harbor is fairly well protected from all storms, and fair anchorage is available in the E part of the dredged area for a few vessels. The W part of the harbor is shoal, exposed to SE storms, and considerably exposed to NE swells.

(416) **Caution.**–Vessels entering the harbor during NE storms should keep well over to the E breakwater to avoid the shoals to W.

Local magnetic disturbance

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

Quarantine, customs, immigration, and agricultural quarantine

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

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

Coast Guard

(420) **North Superior Coast Guard Station** is on the SE side of the harbor basin.

Small-craft facilities

(421) Two wharves in the SE corner of the harbor basin, one partly in ruins, are not safe for mooring. A marina in the basin at the N 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.

(422) At the SE end of the point that encloses the E side of Grand Marais Harbor, a reef with a depth of 8 feet at the outer end extends 1,000 feet E from shore.

(423) From Grand Marais Harbor NE 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 NE 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

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point 12.5 miles NE of Grand Marais. A detached rock, covered 5 feet, is 0.4 mile offshore 0.7 mile SW of the S entrance point to Grand Portage Bay. **Chicago Bay** and **Big Bay,** 18 and 21 miles NE 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.

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

Charts 14967, 14968

(425) **Grand Portage Bay**, about 5 miles SW of the International boundary, is about 2 miles wide and extends 1.3 miles into the shoreline. **Hat Point** (47°57.2'N., 89°38.3'W.), marked by a light, encloses the NE 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 midway between Grand Portage Island and Hat Point renders the bay entrance NE of the island hazardous.

Small-craft facilities

(426) Marinas on the N and W 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 NW side of the bay. Small passenger ferries run from this dock to several harbors on Isle Royale.

Ferries

(427) 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, Mich. 49931.

(428) **Wauswaugoning Bay** is just NE 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 NW side of the bay is bordered by a 500-foot bluff with a boulder beach broken by cliffs. The NE side of the bay is low and heavily wooded.

(429) A rocky reef, covered 5 feet, is about 0.6 mile offshore on the NW side of Wauswaugoning Bay. **Francis Island,** small and rocky, is on a rocky ledge that extends 0.4 mile W from the E point of the bay. Aside from these hazards and the shallows at the NE 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 SE to SW winds.

(430) Wauswaugoning Bay is partially protected by a group of small islands that extend 2 miles SE from the E 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 SE of the SW point of Lucille Island. Caution is advised when navigating around and between these islands.

(431) From Wauswaugoning Bay, the shore trends ENE for 5.5 miles to Pigeon Point (48°00.2'N., 89°29.8'W.). **Clark Bay,** at the inner end of Pigeon Point, is a small inlet open to E and protected on the S side by a point and two small islands. **Pigeon Point** is a rocky peninsula that extends 3.5 miles ENE and encloses the S side of **Pigeon Bay.** The bay, about 3.5 miles long and 1 mile wide, is bordered by high hills and bluffs which protect it from all directions but E. **Pigeon River** flows into the W end of the bay at the base of Pigeon Point.

Local magnetic disturbance

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

(433) The **International boundary** between the United States and Canada extends through Pigeon Bay and then follows the Pigeon River.

Time

(434) Lakeshore areas of the Canadian Province of Ontario observe eastern standard time or eastern daylight saving time. Areas S of the Pigeon River on the W shore of Lake Superior observe central standard time or central daylight saving time.

(435) **Boundary Island** is a dangerous reef with several small islets near the center of Pigeon Bay. Close NW of Boundary Island, a narrow point extends 1 mile E 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 4 feet, is 1 mile WSW of Boundary Island. **Laura Grace Rock,** covered 6 feet, is 0.3 mile W 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.

Charts 14968, 14976

(436) **Isle Royale** is 44 miles long NE and SW and has a maximum width near its SW 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 SW end. The shores of

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the island have numerous indentations and many detached islets and reefs, almost all with a NE and SW trend. Good lees can be found in many bays and channels.

Local magnetic disturbance

(437) Magnetic disturbances have been observed around Isle Royale.

(438) Isle Royale and its surrounding islands form **Isle Royale National Park,** established in 1940 under the jurisdiction of the National Park Service, U.S. Department of the Interior. The park is retained as much as possible in its natural state. There are no roads, only trails for hikers.

(439) 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 SW 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, Mich. 49931.

(440) **Caution.**–Designated aircraft landing areas are in Washington Harbor, Rock Harbor, and Tobin Harbor. (See **36 CFR 2.2 and 7.38,** chapter 2, for limits and regulations.)

(441) **Rock of Ages Light** (47°52.0'N., 89°18.8'W.), 130 feet above the water, is shown from a white conical tower on a small islet 3.8 miles W of **Cumberland Point,** the southwesternmost point of Isle Royale. A fog signal is at the light.

(442) A reef extends 0.4 mile SW and 0.1 mile NE from Rock of Ages. **Fisherman Reef,** 5.5 miles SW 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 NE of the light. Several shoals with depths of 3 to 14 feet are within 1.2 miles S and SW of the light. The southernmost spot, covered 12 feet, is marked on the W side by a buoy. An 11-foot spot is 0.3 mile SE of the light.

(443) **Grace Harbor** and **Washington Harbor,** at the SW end of Isle Royale, have good holding ground and provide protection from all winds except SW winds in Grace Harbor. Grace Harbor is enclosed on the S by **Cumberland Point** and on the N 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 W from Washington Island. The outermost are a 2-foot spot 0.7 mile SW and an 18-foot spot 1.1 miles WSW. A narrow 20-foot channel marked by buoys leads between the E end of Washington Island and **Booth Island** N to Washington Harbor. The N 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 SW from Johns Island, the westernmost, and a detached 13-foot shoal is 0.2 mile SE of the island. The entrance to Washington Harbor is 0.3 mile wide between Washington Island and the shoals SW of Johns Island. A narrow deep channel leads between Thompson Island and Isle Royale into the harbor. A private daybeacon marks the NE side of Thompson Island, and a private buoy marks a sunken wreck on the E side of the channel. A small islet and a 3-foot shoal are 0.2 mile N of Grace Island.

(444) The inner part of Washington Harbor extends 3.3 miles into the shoreline of Isle Royale. **Beaver Island** is near the E end of the harbor and may be passed by small craft on either side. A rock awash is off the N shore of the harbor, 0.25 mile W of the SW 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.

Ferries

(445) 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, Mich. 49931.

(446) From Washington Harbor, the shore of Isle Royale trends N for 1.2 miles to the NW corner of the island. A small island and a detached 7-foot shoal are 0.25 mile offshore about 0.6 mile N of Thompson Island.

(447) **McGinty Cove** is a small indentation 1 mile NE of the NW corner of the island. From the cove NE 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 NE of McGinty Cove. A 3-foot spot is close to shore 5.3 miles NE of Finlander Reef. **Gull Rocks,** marked by a private marker, are 0.5 mile from shore about 6 miles SW of Todd Harbor. A 3-foot and a 14-foot spot are close inshore adjacent to Gull Rocks.

(448) **Todd Harbor**, about midlength of the N shore of the island, is about 5 miles long and indents the shore 0.75 mile. The harbor affords good protection from all but N

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winds. Care must be taken to avoid the many detached shoals and rocks in the harbor.

(449) 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 SW of Hawk Island. A 3-foot shoal is 0.15 mile N and rocks awash are 0.75 mile NNE of the island.

(450) **McCargoe Cove**, about 4.5 miles NE of Todd Harbor, is a narrow inlet that extends over 2 miles SSW into the shore of Isle Royale. A rocky ledge extends NE from the W 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 NNW. 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 E side of the cove entrance and near the head of the cove.

(451) The NE 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 NE trend. The area is obstructed by numerous shoals and reefs which render navigation dangerous. **Amygdaloid Island, Canoe Rocks,** and the line of islands and reefs between them form the N limit of this area from McCargoe Cove NE for 10 miles. Amygdaloid Ranger Station is on the SW end of Amygdaloid Island. **Amygdaloid Channel** parallels the S 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 S side near the E end of Belle Isle. **Hill Point,** the SE entrance point to Robinson Bay, separates it from **Five Finger Bay.** A peninsula that terminates in **Locke Point** separates the S side of Five Finger Bay from Duncan Bay. A reef that extends 0.3 mile NE from Locke Point is marked at the outer end by a buoy.

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

(453) **Blake Point,** the northeasternmost point of Isle Royale, forms the S entrance point to Duncan Bay. **Blake Point Light** (48°11.5'N., 88°25.3'W.), 40 feet above the water, is shown from a skeleton tower with a small house and a red and white diamond-shaped daymark on the point. An 11-foot shoal is 0.3 mile E of the light. **Five Foot Reef,** 0.9 mile E of the light, has a least depth of 4 feet and is marked on the S side by a buoy. A 13-foot shoal is 1.2 miles E of the light.

(454) **Passage Island Light** (48°13.4'N., 88°22.0'W.), 78 feet above the water, is shown from a gray octagonal tower on a dwelling on the SW end of **Passage Island, MI,** 3.5 statute miles (3 nm) NE of Blake Point. A fog signal, a radiobeacon, and a racon are at the light.

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

(456) **Tobin Harbor** parallels Duncan Bay on the S side of Blake Point. **Scoville Point** is on the NE end of the peninsula that encloses the S 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 N side of the harbor about 1.1 miles SW of Scoville Point.

(457) **Rock Harbor**, S of Tobin Harbor, is about 13 miles long NE and SW. The outer 9.5 miles of the harbor is enclosed on the S side by a chain of islands and shoals. The harbor has good holding ground with protection from all winds. The fully enclosed W 3.5 miles of the harbor is obstructed near its midlength by shoals through which an 11-foot channel is marked by buoys.

(458) Rock Harbor can be entered at the NE end between **North Government Island** and **South Government Island.** Another wide, deep passage enters the harbor from S opposite Scoville Point. **Middle Islands Passage** enters the harbor from S 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. **Caribou Island** is on the E side of the passage.

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

(460) The National Park Headquarters is in a bight on the NW side of **Mott Island,** 1.6 miles NE 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.

Ferries

(461) A ferry service operates between Copper Harbor on the Keweenaw Peninsula and Rock Harbor in the summer. The schedule is available from Superintendent,

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Isle Royale National Park, 87 N. Ripley Street, Houghton, Mich. 49931

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

(463) **Conglomerate Bay**, 0.8 mile S of Middle Islands Passage, has deep water and good protection from all but E winds.

(464) **Chippewa Harbor**, 5.4 miles SW of Middle Islands Passage, extends 2 miles W and SW 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 N side of the harbor just inside the first narrows.

(465) 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.

(466) **Malone Bay**, just W of Schooner Island, is an indentation 3.5 miles wide, open to S 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.

(467) 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 NE side of the bay.

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

(469) **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 NE to E winds. Good holding ground is 1.5 miles S of Wright Island. A dock on the S side near the head of the bay has a depth of 6 feet at the outer end. The bay is enclosed on the S side by a peninsula that terminates in **Point Houghton** (47°54.1'N., 88°54.0'W.) and by a double line of islets and reefs that extends 8 miles NE from the point, parallel to the S shore of Isle Royale. The only channel through the chain is 0.5 mile E of Point Houghton. The channel, marked by a lighted bell buoy and other buoys, has a depth of about 17 feet. **Harlem Reef,** with a least depth of 2 feet, is on the S side of the islet chain, 2.8 miles E of Point Houghton. A buoy marks the S side of the reef.

(470) **Isle Royale Light** (47°56.9'N., 88°45.7'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 S side of Siskiwit Bay. **Glenlyon Shoal,** with a least depth of 4 feet, is 0.7 mile NE of the light, and an 18-foot spot is 1.3 miles NE of the light.

(471) From Point Houghton, the shore of Isle Royale extends about 13 miles SW 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 SW of Point Houghton, has a commercial fishing operation with two docks. A narrow channel with a depth of 5 feet leads along the N side of the entrance into the cove. The entrance is deceptive and must be navigated with caution.

(472) From The Head, the shore extends NW for 4 miles to Cumberland Point on the S side of Grace Harbor.

Canadian Waters

(473) The **International Boundary** between the United States and Canada extends through Pigeon Bay and then follows the Pigeon River upstream. The N shore of Lake Superior from the **International Boundary** in Pigeon Bay E to the head of the St. Marys River is in Canadian waters. For a description of this area consult **Canadian Sailing Directions-Great Lakes, Volume II**.

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