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DETROIT DISTRICT

NAVIGABLE STATUS OF MENOMINEE RIVER BASIN MICHIGAN

NAVIGABILITY REPORT: 64

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GAI CONSULTANTS, INC.

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GAI CONSULTANTS, INC.

NAVIGABILITY REPORT
MENOMINEE RIVER BASIN
MICHIGAN

This report provides data and information necessary to assess the navigable status of waterways in the Menominee River Basin, Michigan.

The report describes the physical characteristics of the watershed; natural and man-made obstructions to navigation; past, present, and potential use for interstate commerce; and other relevant data to support an assessment of navigability.

The content and format of the report complies with the appropriate requirements of 33 CFR 329. All elevations reported herein are according to USC&GS Datum of 1929.

1. Name of Waterway - The Menominee River Basin, Michigan.

2. Tributary to Lake Michigan - The largest river basin in the Upper Peninsula, the Menominee Basin drains portions of Gogebic, Baraga, Marquette, Iron, Dickinson, and Menominee Counties, Michigan, and Forest, Florence, and Marinette Counties, Wisconsin. A Location Map of Significant Features and Watersheds is included under a separate cover.

   The major tributaries in the Menominee River Basin include: Pemene Creek; East Branch Sturgeon River; West Branch Sturgeon River; the Sturgeon River; the Peshekee River; the West Branch Peshekee; East Branch Fence River; West Branch Fence River; the Fence River; the Deer River; the Michigamme River; the Net River;

North Branch Paint River; South Branch Paint River; the Paint River; the Iron River; and the Brule River.

3. Physical Characteristics -

a. Type - The Menominee River Basin, the largest in Michigan's Upper Peninsula, passes through varied topography, with major first-, second-, and third-order tributaries flowing for a total length of almost 550 miles. The Menominee River, the main artery of the river system, flows from mile 53.6 (km 86.2) to its mouth through flat to gently rolling, mostly wooded terrain; although some areas have been cleared for agriculture. The river ranges from 0.2 to 0.3 miles (0.3 to 0.5 km) in width throughout this entire reach. The rivers course is not very sinuous, with the exception of the reach between mile 36.0 (km 57.9) and mile 45.0 (km 72.4) where several oxbows have formed or are being formed. Two major developments, Menominee, Michigan, and Marinette, Wisconsin, are situated at the mouth of the river, an active lake port, but no other communities are located along this reach.

The reach above mile 53.6 (km 86.2) flows through more rugged terrain covered with second-growth forests of pine. While still fairly wide, the river traverses several steep-sided valleys not common in the lower reach. Waterfalls, at several points along the river, have been replaced by hydroelectric power dams which generally control the flow of the river from its source at mile 114.6 (km 154.4) to mile 53.6 (km 86.2). The river does not meander very much in the upper reaches. Major settlements along this reach of the Menominee include Kingsford (mile 93.2; km 150.0)

and Iron Mountain (mile 97.7; km 157.2), Michigan, and Niagara, Wisconsin (mile 87.5; km 140.8). The Menominee is formed at mile 114.6 (km 184.4) by the confluence of the Brule and Michigamme Rivers.

The Brule River originates at Brule Lake, 50.8 miles (81.7 km) above its confluence with the Michigamme. The reach between miles 1.6 (km 2.6) and 3.7 (km 6.0) is controlled by a hydroelectric power dam. From this point on, the river flows generally westward along the Wisconsin-Michigan border through mostly forested, undeveloped areas, with Pentoga, Michigan (mile 21.0; km 33.8), being the only community along this reach. The Brule narrows considerably above mile 35.6 (km 57.3) and becomes more sinuous as the river nears its source, with marshes becoming more prevalent in the upper reaches. The two major Michigan tributaries to the Brule River are the Iron and Paint Rivers.

The Iron River is formed by the confluence of its North and South Branches about 7.0 miles (11.3 km) northwest of the city of Iron River, Michigan, and 16.2 miles (26.1 km) above its junction with the Brule (mile 26.5; km 42.6). The river flows through a fairly wide valley characterized by stretches of marshes. The area surrounding the river is generally forested, rolling terrain, except where the cities of Iron River, Stambaugh, and Caspian, Michigan (miles 13.0 to 5.0; km 20.9 to 8.0) have developed.

The mainstem of the Paint River is 43.4 miles (69.9 km) long. Its South and North Branches join about 1.8 miles (2.9 km) west of Gibbs City, Michigan,

to form the mainstem. The South Branch originates at Paint River Springs, approximately 1.5 miles (2.4 km) northeast of Lac Vieux Desert. The upper 13.0-mile (20.9 km) reach of the river meanders through a wide, marshy river valley, while a short stretch of 1.6 miles (2.6 km) from mile 13.0 to mile 14.3 (km 20.9 to 23.0) flows rapidly through a narrow, steep-sided valley. After this stretch, the valley again widens, and the river meanders to its mouth. There has been no significant development along this branch, primarily because the river lies within the Ottawa National Forest.

The North Branch Paint River also has little development along its banks, as it flows through the Iron River State Forest. The branch's source at Mallard Lake is 15.7 miles (25.3 km) upstream from its mouth. Flowing through flat to rolling, heavily wooded terrain, the river channel is fairly wide for a fourth-order stream, up to 0.1 mile (0.2 km) in some locations. The river flows generally eastward for 9.6 miles (15.4 km) from its source and then turns almost due south to its confluence with the South Branch near Gibbs City. The Paint River flows through a wide valley containing several small wetland areas from its source to mile 36.6 (km 58.9), at which point the river is joined by the Net River.

The Net River flows through a heavily wooded, hilly, undeveloped area. Several falls and rapids occur on the mainstem, which is formed by the confluence of the North and East Branches, 13.7 miles (22.0 km) above the mouth. Since the entire Net River system flows south through state and national forests, no

communities of any size have developed along the waterways. The mainstem widens and deepens considerably between mile 3.1 (km 5.0) and its confluence with the Paint River.

The Paint River, below its junction with the Net River (mile 36.6; km 58.9), widens and flows through a valley bordered by steep ridges until it reaches the city of Crystal Falls (mile 13.0; km 20.8). In this reach, two sets of rapids occur, at Hemlock Rapids and at Lower Hemlock Rapids, miles 29.5 and 29.0 (km 47.5 and 46.7), respectively. The surrounding area is hilly and well forested. At Crystal Falls, the river is impounded by a hydroelectric dam operated by that city. Below the city, the Paint River meanders through wetlands to mile 5.4 (km 8.7), the former site of Little Bull Rapids, where a dam now controls the flow of water from the Paint to the Brule by shunting flow to Peavy Pond on the Michigamme River. Below this dam is Horserace Rapids (mile 3.0; km 4.8), after which the river enters Paint River Pond, the backwaters of Brule Island Dam. This pond, approximately 2.8 miles (4.5 km) in length on the Paint, continues another 2.1 miles (3.4 km) as the Brule. Brule Island Dam is situated 1.6 miles (2.6 km) upstream of the confluence of the Brule and Michigamme Rivers.

The Michigamme flows south for approximately 61.5 miles (99.0 km) from its source at Lake Michigamme to its mouth. The river flows about 8.5 miles (13.7 km) to the town of Republic, Michigan (mile 53.0; km 85.3), where it is impounded at the Michigamme Basin (mile 51.9; km 83.5). In the reach above Republic, the river is bordered by hilly, wooded terrain, but immediately

below this city, wetlands containing extensive mine spoils and tailings ponds are found. The reach immediately below this section (mile 48.0 to 40.0; km 77.2 to 64.4) flows south through a fairly narrow valley covered with second-growth forests. At mile 40.0 (km 64.4), the river turns west along the Marquette-Dickinson County line where it enters the Michigamme State Forest becoming more sinuous as it flows through marshes, small lakes, and sloughs until impounded in Michigamme Reservoir by Way Dam at mile 20.1 (km 32.3). Below Way Dam, three other hydroelectric dams control the river: the Hemlock Falls Dam, mile 16.9 (km 27.2); the Peavy Falls Dam, mile 3.8 (km 6.1); and the Michigamme Falls Dam, mile 0.2 (km 0.3). This reach is characterized by wetlands associated with the impoundments. The Peavy Falls impoundment is the largest of the three below Michigamme Reservoir, being supplemented by waters from the Paint River. Three of the major tributaries of the Michigamme--the Peshekee, Fence, and Deer Rivers--flow indirectly to the Michigamme. The Peshekee flows into Michigamme Lake, the source of the Michigamme, while the Fence and Deer flow into the Michigamme Reservoir.

The Peshekee River system, including the mainstem, its West Branch, Baraga Creek, and Dishno Creek, drains an area typical of the northern Upper Peninsula with its rugged terrain, minimal soil cover, and forests of scrub pine. The mainstem flows 26.5 miles (42.7 km), originating in shallow marshlands approximately 13.0 miles (20.9 km) north of Michigamme, Michigan. The West Branch follows a similar pattern, draining exten-

sive wetlands at its source and meandering through rugged terrain to its mouth at mile 3.0 (km 4.8) on the Peshekee. Both Dishno Creek and Baraga Creek originate in small lakes and flow south to the Peshekee. Dishno Creek meanders through a wide valley with associated wetlands to its mouth (mile 5.0; km 8.0) on the Peshekee, while Baraga Creek flows 2.5 miles (4.0 km) from Lower Baraga Lake to mile 10.2 (km 16.4) on the Peshekee. Although the Peshekee system contains no major settlements, it has excellent road access, unlike the Deer and Fence River Basins.

The Deer River enters the eastern end of Michigamme Reservoir. Surrounded by a heavily wooded landscape, the river has no municipal development along its course. The river rises in marshlands near Deer Lake, Section 34 (T46N, R32W) 12.3 miles (19.8 km) above its mouth.

The Fence River is formed by the confluence of its East and West Branches approximately 16.3 miles (26.2 km) north of the Michigamme Reservoir. The East Branch, flows 15.6 miles (25.1 km) from its source at Fence Lake to its mouth, while the West Branch flows through three small lakes on its 10.2 mile route (16.4 km) from its source at Ned Lake. The entire system drains fairly rugged, densely wooded, and generally inaccessible terrain. The Fence River system flows through the Iron Range State Forest and, therefore, has no development along its banks. The Fence and Deer Rivers are the last major tributaries to enter the Michigamme before it joins the Menominee at mile 114.6 (km 184.4). The Menominee then flows 34.2 miles (55.0 km) from this point to its confluence with the Sturgeon River at mile 80.4 (km 129.4).

The Sturgeon River is formed by the confluence of its East and West Branches 27.2 miles (43.8 km) above its junction with the Menominee. Both branches meander through fairly wide river valleys, draining largely wetland areas. The West Branch originates at a small lake (Section 8; T42N, R30W) and has several small villages along its 30.2-mile (48.6 km) course, including Randville (mile 23.7; km 38.1), Metropolitan (mile 12.9; km 20.8), and Felch (mile 11.0; km 17.7). The East Branch flows by the communities of Hardwood (mile 7.9; km 12.7) and Foster City (mile 5.2; km 8.4) along its 26.3-mile (42.3 km) course. The East Branch has been impounded near mile 12.1 (km 19.5) for a geese management facility. The mainstem of the Sturgeon drains extensive wetlands from its source to mile 7.4 (km 11.9), at which point the river valley narrows, the surrounding terrain increases in ruggedness, and a hydroelectric dam has been erected. Little other development has occurred along the river because of its location in Sturgeon River State Forest, the town of Loretto (mile 4.5; km 7.2) being the only community on its banks. Below mile 7.4, the surrounding land is utilized for pastures and crops more so than along the upper reaches. The Sturgeon River is the last major tributary to enter the Menominee from the Michigan side, although several small streams flow into it further downstream.

One of these streams is Pemene Creek, a short stream (9.3 miles; 15.0 km) flowing from hilly terrain to a somewhat flatter area. The entire stream valley contains wetlands, and the surrounding area is divided between wooded areas and pasture land with no settlements along the banks.

b. Length - The mainstem of the Menominee is 114.6 miles (184.4 km) in length. Lengths of tributaries to the Menominee include: Pemene Creek, 9.3 miles (15.0 km) the Sturgeon River, 27.2 miles (43.8 km); the Michigamme River, 61.5 miles (99.0 km); and the Brule River, 50.9 miles (81.9 km).

The East Branch Sturgeon River, is 27.1 miles (43.6 km) long and the West Branch is 29.4 miles (47.3 km).

The Peshekee River flows 26.5 miles (42.6 km) into Lake Michigamme. Its West Branch is 16.8 miles long (27.0 km), Baraga Creek measures 2.5 miles long (4.0 km), and Dishno Creek is 5.8 miles long (9.3 km). Other tributaries to the Michigamme include the Fence and Deer Rivers. The East and West Branches of the Fence, 15.7 miles (25.3 km) and 10.2 miles (16.4 km) long, respectively, form the mainstem of the Fence which is 16.3 miles (26.2 km) long. The Deer River is 12.3 miles (19.8 km) in length.

The Paint River, formed by its North and South Branches, 15.7 miles (25.3 km), and 27.3 miles (43.9 km), in length, respectively, flows 43.4 miles (69.8 km) into the Brule. The Paint is also joined by the Net River, which is formed by its East and West Branches 13.7 miles (22.0 km) above its mouth.

The Iron River, another tributary to the Brule, is 16.2 miles (26.1 km) long.

c. Discharge Volumes - The U. S. Geological Survey maintains 16 gaging stations within the Menominee River

Basin. The gaging station at mile 24.7 (km 39.8), southeast of the town of Koss, measures flow from a drainage area of 3,790 square miles (9,820 sq km). Records indicate a maximum discharge rate of 33,000 cubic feet per second (935 cms) on May 10, 1960 and a minimum discharge rate of 162 cubic feet per second (5 cms) on September 15, 1931, for the years from 1913 to 1977. Average daily discharge calculated for this period was 3,134 cubic feet per second (9 cms).

d. Fall Per Mile

River or Branch	Rate of Fall	
	Feet Per Mile	Meters per Kilometer
Net River	4.0	0.8
Paint River	6.2	1.2
N. Branch	10.5	2.0
S. Branch	8.6	1.6
Iron River	7.1	1.4
Brule River	8.3	1.6
Peshekee River	13.1	2.5
Fence River	8.5	1.6
E. Branch	11.5	2.2
W. Branch	17.3	3.3
Deer River	19.0	3.6
Michigamme River	6.7	1.3
Sturgeon River	5.6	1.1
E. Branch	7.1	1.3
W. Branch	12.2	2.3
Pemene Creek	13.9	2.6
Menominee River	4.8	0.9

Localized changes in stream gradient along navi-

able reaches within the basin are plotted on the Plan and Profile Sheets provided under separate cover.

e. Extent of Lake Influence - The monthly mean high water elevation of Lake Michigan is 583.68 feet (178.02 m) (Senate Doc. 71/84/1, 1955, p. 17), extending lake influence to the dam at mile 2.5 (km 4.0), which prevents further lake influence.

f. Range Between Ordinary High and Ordinary Low Water Levels - On-site determinations of the Ordinary High Water Mark (OHWM) were conducted between September 30 and November 6, 1978, at 74 locations within the Menominee River Basin. The elevations of the OHWM are listed in Appendix III.

The range between ordinary high and ordinary low water was determined at the bridge at mile 0.4 (km 0.64). Since the river at this point is within the reach of lake influence, the mean monthly low water elevation of 577.35 feet (176.09 m) for Lake Michigan was used as the low water mark and compared to the ordinary high water mark elevation of 581.76 (177.49 m) determined by field investigation and survey, resulting in a range of 4.41 feet (1.40 m). In reaches beyond the extent of lake influence, ordinary high water was observed to occur within the confines of the stream banks.

g. Improvements by Others - No documented improvements for navigation within the Menominee Basin were found.

4. Obstructions to Navigation - A detailed listing of obstructions to navigation along all navigable reaches within the Menominee River Basin is provided in Appendix III. The listing includes the elevations of Ordinary High Water and vertical clearances at significant obstructions.

   Photographs of most significant obstructions are available at the Detroit District Office of the Corps of Engineers. Additional obstruction data is also available for surveyed streams which are not considered potentially navigable.

5. Authorized Projects - The Menominee River harbor has undergone improvements since 1871. The River and Harbor Act of March 3, 1871, authorized construction of two parallel piers extending to the 16-foot contour in Green Bay with a 15-foot deep channel dredged between them. In 1890, authorization was given to increase this depth to 17 feet, and in 1899, dredging of the harbor to 20 feet below mean lake level was authorized.

   The first work approved for the Menominee River itself, adopted in 1890 and modified in 1892, originally called for dredging of the lower two miles of the river to a depth of 15 feet and a width of 200 feet. The 1892 modification reduced the width of the upper 2,000 feet of the channel to 100 feet, and an 1896 modification provided for a turning basin 250 feet wide and 600 feet long at the western end of the original channel. This modification also extended the channel 425 feet to Wells Street (Marinette, Wisconsin) with a width of 75 feet. In 1902, the depth of the entire channel was increased to 18 feet.

Major modifications, authorized in 1930, consisted of increasing the channel depth to 20 feet from the point of that depth in Lake Michigan to a point 8,700 feet upstream. The width of the channel in the bay is 600 feet, narrowing to 300 feet in the river from the mouth to the Ogden Street Bridge, 4,000 feet upstream, and to 200 feet up to the upstream limit of the channel. A turning basin of 18 feet in-depth for 600-foot vessels on the south side of the channel just below the Marinette municipal wharf was also included in this modification.

In 1935, deepening of both the channel and turning basin to 21 feet was authorized, with further work approved in 1945. The 1945 modification provided for extension of the channel 2,500 feet upstream, the extension to be 12 feet deep and 90 feet wide.

An increase in the depth of the channel to 26 feet in Green Bay and to 24 feet in the river was approved in 1960, along with enlargement of the turning basin. Economic justification was not sufficient, however, to begin construction, and the project was been classified as inactive.

The cost of improvements of Menominee harbor and River through June 30, 1976, was $3,250,000, of which $533,000 was for new work, $1,350,000 for maintenance, and $1,352,000 for rehabilitation. Non-federal costs totaled $51,000. Average annual maintenance for fiscal years 1972-1976 was $46,000 (Corps of Engineers, 1977).

Following is a listing by date of legislation authorizing the described projects.

AUTHORIZED PROJECTS

River and Harbor Act	Project Authorized	Document and/or Report
March 3, 1871	Entrance piers	Annual Report, 1867, p. 132
Sept. 19, 1890	15-foot depth in channel from entrance piers	H. Ex. Doc. 34, 51st Cong. 1st sess.
March 3, 1899	Increase in depth to 17 feet to point 1,000 feet upstream	H. Doc. 86, 54th Cong., 2d sess.
June 13, 1902	Increase in channel depth to 18 feet; consolidation project	H. Doc. 419, 56th Cong., 1st sess.
March 4, 1913	Increase of channel width; extension of improvement from Ogden Street to Marinette Wharf	H. Doc. 228, 63d Cong., 1st sess.
July 3, 1930	Increase to 20-foot depth in channel 18-foot depth in turning basin	H. Doc. 419 70th Congs., 1st sess.
Aug. 30, 1935	Increase to 21-foot depth in channel and turning basin; enlargement of turning basin	Rivers and Harbors Comm. Doc. 28, 73d Cong., 2d sess.
March 2, 1945	Extension of 12-foot deep channel 2,500 feet upstream	H. Doc. 228, 76th Cong., 1st sess.
July 14, 1960	Increase in approach depth to entrance and river channels to 24 feet, and enlargement of turning basin	H. Doc. 113, 86th Cong., 1st sess.

6. Past and Present Interstate Commerce -

a. Past Usage - Business and industrial enterprises have long flourished along the tributaries and mainstem of the Menominee River. Fur traders exploring the central and western portions of the Upper Peninsula were among the first to travel this extensive river

system. As early as 1796, Louis Chapee was operating a fur trading post in what is now the town of Menominee (Writer's Program, Michigan, 1941).

Abundant raw materials and inexpensive transportation supported industrial development along the Menominee River. By 1899, paper mills were in operation in both Marinette, Wisconsin, and Menominee, Michigan, and a pulp mill was also operating near Iron Mountain, Michigan, in the town of Niagara (House Document 141/72/1, 1931, p. 7). Natural falls at several locations along the Menominee provided excellent sites for construction of hydroelectric power dams, many of which still operate. As with most of the rivers in the Upper Peninsula, however, the Menominee River was used most extensively by the logging industry during the years known as the "White Pine Era" (1840 to 1900) (Maybee, 1960, p. 27).

The first logging activity along the Menominee River may have started before 1840. Marinette, Wisconsin, was the site chosen for the first water-powered sawmill in this area, completed sometime between 1831 and 1832 (Hill, 1955, p. 34; Burke, 1946, p. 8). The most productive years for the timber industry in the area were from 1868 to 1917 when more than 10.5 billion feet of logs were driven down the Menominee River by the Menominee River Boom Company (Burke, p. ix). The year 1889 was the single most productive for loggers, as more than 642 million feet of logs were cut and floated down this waterway. The value of these logs was then probably in excess of 11.5 million dollars (Sawyer, 1919, p. 379).

For the log transportation system on the Menominee River and its tributaries to be successful, careful coordination of water flow had to be exercised throughout the river basin. "The (Menominee River) Boom Company associates constructed numerous small dams on the feeder streams to augment the 40 major dams of the parent company and in this manner removed the bulk of pine timber . . ." (Hill, p. 36).

Even with careful coordination, log jams were apparently not infrequent. A description of a log jam over two miles in length on the Pine River in Wisconsin (near Iron Mountain) is given in Log Transportation in the Lake States Lumber Industry:

> But finally when (the logs jams were broken) and the last log on the several branch streams had bumped its way over rapids, bars and falls to the main river, the gates in the dam on each side stream that was nearest to its point of entry into the main Menominee River, would be closed and the business of building a "head" of water to power the main drive began.
>
> As soon as all available storage space was filled with water and the main river was at its normal driving state, a crew of drivers would be shipped to Florence, Wisconsin, to start the main river drive at the mouth of the Brule and Paint Rivers (Burke, p. 34).
>
> Each spring when the drive was completed, the Menominee River was covered with a solid mass of logs above the booms for a distance of between eight and ten miles (Hill, p. 36).

All of the logs driven by the Menominee River Boom Company were not cut exclusively along the banks of the Menominee River. Other rivers in the basin which were important as a source of timber and used for log driving

included Pemene Creek and the Sturgeon, Michigamme, Peshekee, Fence, Deer, Net, Paint, Brule, and Iron Rivers (Burke, p. 94).

Although Pemene Creek is a comparatively short tributary of the Menominee, it was an important source of timber for the annual log drive on the Menominee. Menominee River Boom Company records show that in one logging year alone, 7.5 million feet of logs were removed from the area surrounding Pemene Creek and then floated to the Menominee River (Burke, p. 94).

Timber was harvested all along the mainstem and East and West Branches of the Sturgeon River. During the winter of 1895-96, a total of 10 million feet of logs were removed from around the Sturgeon River system (Burke, p. 94). Records show that both the White and Friant and the Harmon Companies drove the East Branch in 1885. During that same season, Stack and Atkinson of Escanaba "got their logs down the West Branch of the Sturgeon River . . . (from) just north of Randville" (Sawyers, 1949, p. 22).

> The earliest record available (of logging on the Michigamme River) . . . is the construction of Eight-Mile Road for logging purposes from Badwater on the Menominee River to the Michigamme River by Crawford and McKillop in the autumn of 1875 (Hill, p. 36).

Later, loggers pushed their operations along the entire length of the Michigamme River to its headwaters and beyond. Nevue (1959, p. 4) documents timber harvesting north of Lake Michigamme along the Peshekee River. Those logs were floated to Lake Michigamme and

eventually down the Michigamme River to the mainstem of the Menominee River.

The Peshekee River was also used exclusively for logging. Some 14 million feet of timber floated down to the Menominee in 1896 (Burke, p. 94).

> In the Peshekee River and its tributaries, there were six dams (that allowed logs to pass) . . . Rock Dam, Plank Dam, Camp Dam, Hay Press Dam, Brown Dam, and Ferguson Dam. Rock Dam is the only dam of which there is any part left. It is about six miles (9.7 km) up the river from Michigamme Lake and a few feet west of the road.
>
> Only that portion of the river between the base of the bluffs and Michigamme Lake--a distance of less than a mile--was broad and deep enough to float logs all summer (Nevue, p. 71).

The Fence River also contributed a significant amount of timber to the log drive each spring. Burke has records showing the amounts of timber harvested along the Fence River and its branches for the 1895-96 season. Approximately 16 million feet were felled along the North Branch (now known as the West Branch), 9 million feet along the East Branch, and 12 million feet near the mainstem of the Fence River. There is no specific evidence defining a limit of logging activity near the Deer and Net Rivers, although in that same year (1896), these two waterways contributed 11.7 million feet of logs to the Menominee River drive (Burke, p. 94). Ames cites evidence of roads used by logging operators that "run . . . northwest and west . . . (and). . .seemed to go on forever, to the headwaters of both branches of the Fence, the Deer, and even to the Net River" (1938, p. 2).

While these rivers were used for logging operations and contributed much timber to the Menominee drive, "the three main driving rivers were the Brule, the Iron, and the Paint" (Reimann, 1951, p. 36).

While some sources suggest that there were extensive logging activities along the Brule River, accounts of operations at specific sites on or near its banks are not documented. The details of some early travels along the river, however, are available.

> Here we portaged across to the Chikagon River, up the river to and across Chikagon Lake. From Chikagon Lake, two short portages and a small lake brought us to the Brule River in Section 23-42-34. We then descended to the Menominee (Longyear, 1960).

The Brule River may even have been regularly used for travel, as "St. John recommended to the pleasure-seeking tourist a canoe trip through Lake Superior and up the Brule and down the St. Croix to the Mississippi where steamboat passage to New Orleans could be obtained" (Hybels, 1950, p. 327).

Loggers were also active along the Paint River and its tributaries. "The Kirby-Carpenter Company, one of the larger operators in that area, had their headquarters camp some six miles north of the station (at Elmwood) on the North Branch of the Paint River" (Hill, p. 36). During the 1895-96 logging season, Kirby-Carpenter removed approximately 31 million feet of timber from around the North Branch. This same company also maintained a summer rest camp for their oxen and horses on the lower Paint River in Section 25, T42N, R32W (close

to the present location of the Iron County Airport) near the 30 logging camps that they operated around Crystal Falls (Hill, p. 36). Evidence of logging at specific points along the South Branch is not available, although the Kirby-Carpenter logging company maintained a headquarters only six miles from this river at Elmwood (Hill, p. 36). During one logging season, W. P. Cook and Bros. removed 6.5 million feet of timber from around this waterway (Burke, p. 94).

There is also abundant information concerning logging activites along the Iron River. In 1882, around the area now known as Resthaven Cemetery Flats (west of the town of Iron River--Sec. 27, T43N, R35W), operators began to clear-cut the area of timber and in 1884, the first logs were floated down the Iron River to the Brule (Hill, p. 36). Map information indicates that logging activity (logging camp and possibly a sawmill) was carried on farther up the Iron near the meeting of the T43N and R36W lines (U.S.G.S., Iron River Quadrangle, 1898).

b. Present Usage - Waterborne commerce (into Menominee Harbor and River) consists primarily of carferry traffic and receipts of coal, limestone, and pulp. Commercial traffic during 1974 was 152,000 tons (U. S. Army Corps of Engineers, 1977).

Major industrial facilities within the Menominee River Basin include papermills in the towns of Menominee and Niagara, Wisconsin. Several hydroelectric power plants operated by the Wisconsin and Michigan Power Company are located on the Menominee, Sturgeon, and Brule River. Several dams (the first at mile 2.5--km

4.0), none of which have locks; rapids, and falls would restrict extensive travel or transportation for commercial purposes.

Currently, upstream commercial navigation is restricted by the low 6.5-foot (2.0 m) clearance of the U. S. - 41 bridge at mile 1.9 (km 3.1). Above this point, usage of the river and its tributaries is primarily recreational. The Wisconsin-Michigan Power Company maintains 33 recreational boat launches within the reaches of this basin, three of which have boat rentals available. Extensive recreational usage occurs in all reaches.

7. Potential Use for Interstate Commerce - The potential of the Menominee River for interstate commercial use above the extent of current Army Corps of Engineers jurisdiction appears to be limited. Several natural and man-made obstructions would restrict navigation of most commercial vessels. The Menominee is part of the border between Michigan and Wisconsin, and therefore, convenient for interstate transportation of goods between the two states. Ferrying of products, especially on the lakes formed as backwaters of the hydroelectric dams, would constitute interstate commerce. Current recreational utilization of this river will probably continue in the future, especially on these lakes.

The Brule River also forms part of the border between Michigan and Wisconsin. The same potential for interstate commercial utilization of this river exists as on the Menominee, although not to the same extent because of the lesser degree of development along its banks. Again, recreational utilization currently

exists and should continue to be the primary form of interstate commerce on the waterway.

Recreational usage appears to be the form of interstate commercial activity most likely to continue on the other streams of this basin. Generally, these waterways are in isolated areas, draining lands that are mainly a part of state and national forests which restricts their commercial development.

For these waterways to be made navigable by the larger craft utilized in interstate commerce, deepening and widening of channels; removal and/or relocation of obstructions; and providing of portages for rapids, falls, and dams would be required. Economic justification for such improvements does not appear to be great enough for the majority of streams in this system. Certain waterways, such as the Michigamme River, however, might conceivably be considered for such improvements in the future.

8. Jurisdiction Exercised by Federal Agencies - The U. S. Army Corps of Engineers and U. S. Coast Guard currently exercise jurisdiction under Section 10 of the Rivers and Harbors Act of 1899 to the U. S. - 41 Bridge at mile 1.9 (km 3.1). The Army Corps also exercises jurisdiction in all waters of the United States with an average annual discharge of 5 cfs or greater through Section 404 of the Clean Water Act of 1977. The location of streams with an average annual flow of 5 cfs is determined by the COE as needed.

9. State and Local Statutes - There is no state or local legislation specifically directed to the federal con-

cept of navigability; however, numerous statutes and ordinances regulate activities in state waters, including navigable waters of the United States. A compendium of state statutes relating to the use of waterways is available at the Detroit District Office of the Corps of Engineers.

Local ordinances which regulate activities on waterways in the Basin have been enacted by Baraga and Iron counties and the townships of Iron River, Stambaugh, Mastadon, Crystal Falls and Bates, in Iron County. Copies of the ordinances are also available at the Detroit District Office.

10. Court Decisions on Navigability - Neither the Menominee River nor any of its tributaries have been involved in legal decisions concerning navigability.

11. Conclusions - Currently, the U. S. Army Corps of Engineers maintains jurisdiction on the Menominee River as a navigable water of the United States to mile 1.9 (km 3.1). Extension of this jurisdiction to others waters in this basin must be based upon current recreational usage and documented historical usage for interstate commerce.

The Menominee River Basin was an important waterway during the lumbering era of the late 19th century. Several sources mention the Menominee River as a primary route for log transportation during this period. Burke (p. 7) reports that most of the logs from the basin ultimately traveled to Chicago. All major tributaries to the Menominee, including the Brule, Michigamme, and Sturgeon Rivers, and Pemene Creek contributed to the

volume of timber floated on the Menominee. These rivers served as collectors for tributaries of their own, extending the avenue for transportation of lumber well over 500 miles (805 km) into six counties in Michigan and three in Wisconsin.

The Brule River forms part of the headwaters of the Menominee. The Iron River and the Paint River, tributaries to the Brule, were logged extensively. Logging operations began on the Iron River near the city of Iron River at mile 11.0 (km 17.7). The river was cleared in 1882 for log driving and clear-cutting began the next year, with the first logs coming downstream in 1884 (Hill, p. 36).

Logging occurred on both branches of the Paint River. During the 1895-96 season, one company alone took 31,000,000 board feet of lumber from the North Branch (Burke, p. 94). During the same period, 6.5 million feet of wood were banked on the South Branch for transport in the spring. Both branches run through state forests. The North Branch originates at Mallard Lake, which may have been utilized for gathering logs prior to sending them downstream, or as a source of water to supply sufficient head to transport logs in the lower reaches. The South Branch flows from a small pond and marsh 27.3 miles (43.9 km) above its mouth. While no lakes feed the river, the reach from miles 13.0 to 14.6 (km 20.9 to 23.5) falls through a steep-sided valley at approximately 25.0 feet per mile (4.7 m/km). These conditions would have been most conducive to the construction of dams for holding water prior to log drives. The gradient in this reach is such that

the velocity of the water could have been maintained below a dam placed at mile 14.6 (km 23.5). Backwaters of this dam would have been available for the storage of logs until the drive began.

At mile 36.6 (km 58.9), the Paint River is joined by the Net River, formed by the confluence of its West and East Branches 13.7 miles (22.0 km) above its mouth. There is no available documented evidence that either branch was used for floating logs. The West Branch does have an impoundment at mile 4.9 (km 7.9), which suggests that logging companies may have created dams along this stream. The mainstem of the Net, during the winter of 1895-96, had 8.5 million feet of logs banked along its shores awaiting the spring thaw. The branches of the Net could have supplied part of the head of water required to float these logs into the Paint.

Together with the logs from the North and South Branches of the Paint, those logs floated down the Net filled the Paint River with lumber. The logs and timber from the Iron served to make the Brule one of the most significant lumber contributing tributaries to the Menominee. The Brule was likely utilized to its source at Brule Lake (mile 50.8; km 81.7) since the reach between this lake and mile 38.7 (km 62.3) has several large lake outlets as tributaries. Sufficient water would have been available from these lakes to maintain a log drive from the headwaters. Reimann (p. 46) states that the Brule, Paint, and Iron Rivers were three of the main log driving streams in the Menominee Basin.

The Michigamme System also supplied vast quantities of lumber to the Menominee. The tributaries to the Michigamme which were used for transporting logs include the Peshekee, the Fence, and the Deer.

The Peshekee system was extensively utilized for driving logs into Lake Michigamme. While only the lower mile of the Peshekee could be utilized to carry logs in the summer, every stream in the system was a torrent during the spring thaws (Nevue, p. 71). To this day, the West Branch has logging operations at its source (mile 16.8, km 27.0). An abundance of lakes flow into the mainstem and West Branch of the Peshekee River including Dishno Lake and Lower Baraga Lake. Moreover, at least six dams were located on the Peshekee and its tributaries (Nevue, p. 75), insuring that sufficient water was available to float logs to Lake Michigamme.

Both the Fence and Deer Rivers, which empty into Michigamme Reservoir, were used extensively to float logs to the Michigamme. The winter of 1895-96 saw 12 million feet of lumber banked on the mainstem of the Fence, 16 million on its North Branch, 9 million feet banked on its East Branch, and 3.2 million on the Deer (Burke, p. 94). These logs awaited the spring thaws when they would be dumped into the rivers and floated to the Michigamme. The lakes at or near the sources of the Deer and the North and East Branches of the Fence would have provided sufficient water to carry the lumber downstream each spring.

The Michigamme collected the timber from all of these rivers and carried it to the Menominee. In

1895-96, 16,000,000 feet of lumber was added to that floated from the tributaries to total 56.2 million feet (Burke, p. 94). For that season alone, the headwaters of the Menominee received over 115 million feet of lumber from the Brule and Michigamme systems (Burke, p. 94).

The Sturgeon River Basin also contribued timber to the Menominee. Its East and West Branches both originate in lakes and their rate of fall is such that, in all probability, both branches were utilized for driving logs. Certainly the mainstem, formed by the two branches, was driven. A power dam on the river now indicates that impounding water for sufficient head to transport logs may have been feasible. Burke (p. 44) reports that 10 million feet of lumber was banked on the shores of the river in 1895-96.

Pemene Creek is 9.3 miles (15.0 km) long, but 7.5 million feet of lumber was banked upon the shores of the creek in 1895-96 (Burke, p. 94). While no other specific documentation of usage was found, the gradient of the stream and the general logging history of the area indicate that the waterway was utilized to its source.

On the basis of the documentation of historical utilization, current recreational usage, and present jurisdiction exercised by the Army Corps of Engineers, the following recommendations for extension of navigable status to the waters of the Menominee Basin are made.

The Corps maintains Section 10 jurisdiction on the Menominee River to mile 1.87 (km 3.01). Extension of this status is recommended to the source, mile 114.6,

(km 184.3) at the confluence of the Brule and Michigamme Rivers. Recreational usage occurs throughout all reaches of the river, expecially the backwaters of the hydroelectric dams located on the river. Navigable status should be extended on the Brule River to mile 50.9 (km 81.9), including Brule Lake. Since the Michigamme has been utilized for interstate commerce from its source through Lake Michigamme, a total of 68.1 miles (km 109.6), navigable status should be extended to this point. Both rivers are canoeable throughout, and recreational sites have been located along the Michigamme by the Wisconsin-Michigan Power Company.

The two major tributaries to the Brule, the Iron and Paint Rivers, are recommended for inclusion as navigable waters of the United States to their sources at mile 16.2 (km 26.1) and mile 43.4 (km 69.8), respectively. The North and South Branches of the Paint are also suggested for inclusion to mile 18.0 (km 29.0) and mile 27.3 (km 43.9), respectively. Another tributary of the Paint, the Net River is considered to be navigable on the basis of past navigational utilization to its headwaters at mile 13.7 (km 22.0), the confluence of its East and West Branches. The lack of specific documentation of navigation on the branches prevents recommending the conferral of navigable status on them.

Since Peshekee River and its West Branch were once utilized for driving logs, these streams should also have their navigable status extended. The Peshekee was driven from its source, at mile 26.5 (km 42.6), as was the West Branch from mile 16.8 (km 27.0). Two other tributaries to the Michigamme, the Deer and Fence Rivers, were also used for floating logs from their

sources. It is recommended that the Deer River, to its source at mile 12.3 (km 19.8), be extended navigable status on the basis of this past usage. The Fence and its East and West Branches should also have navigable status extended to their headwaters at mile 16.6 (km 26.7) and mile 12.6 (km 20.3), respectively. The mainstem should also be extended navigable status for its entire 16.3 mile (26.2 km) length.

The Sturgeon River and its branches should also be declared navigable to their headwaters; the East Branch extends 26.3 miles (42.3 km) long from Gene Lake, the West Branch is 30.3 miles (48.8 km) in length, and the mainstem is 27.2 miles (43.8 km) long.

Pemene Creek had large amounts of timber floated down its entire 9.3 mile (15.0 km) reach and should be extended navigable status on that basis.

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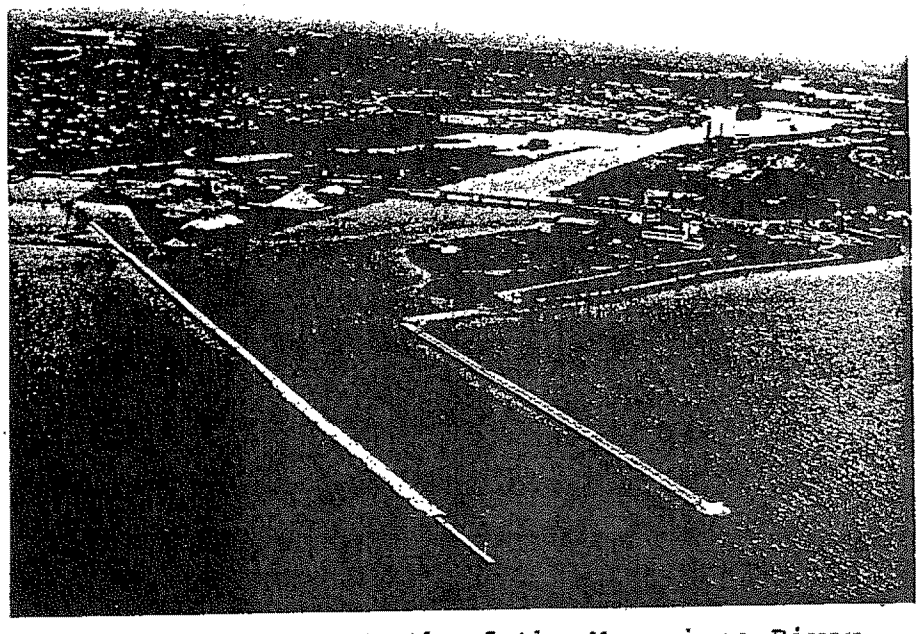
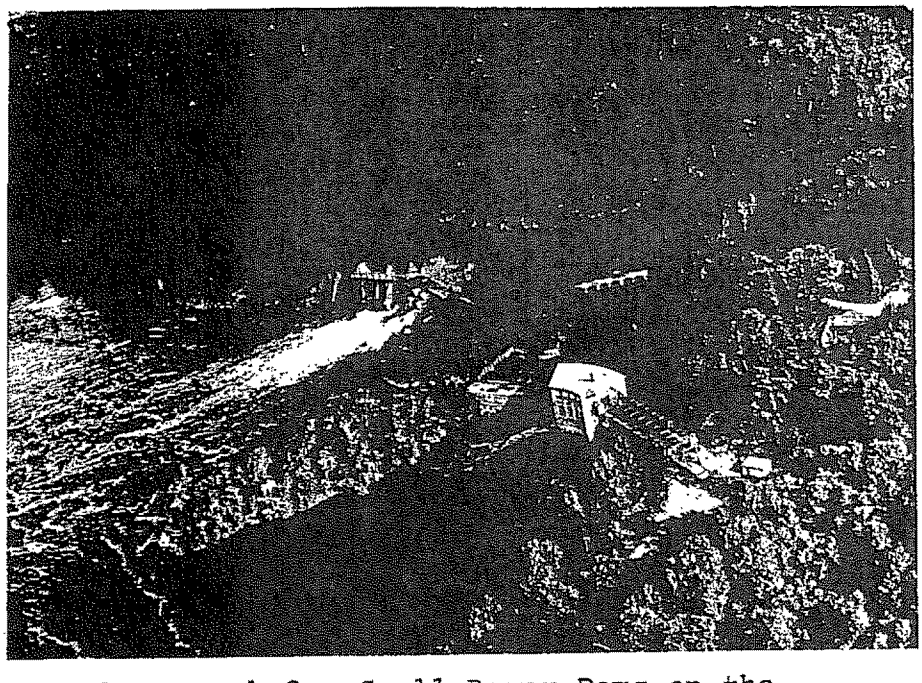
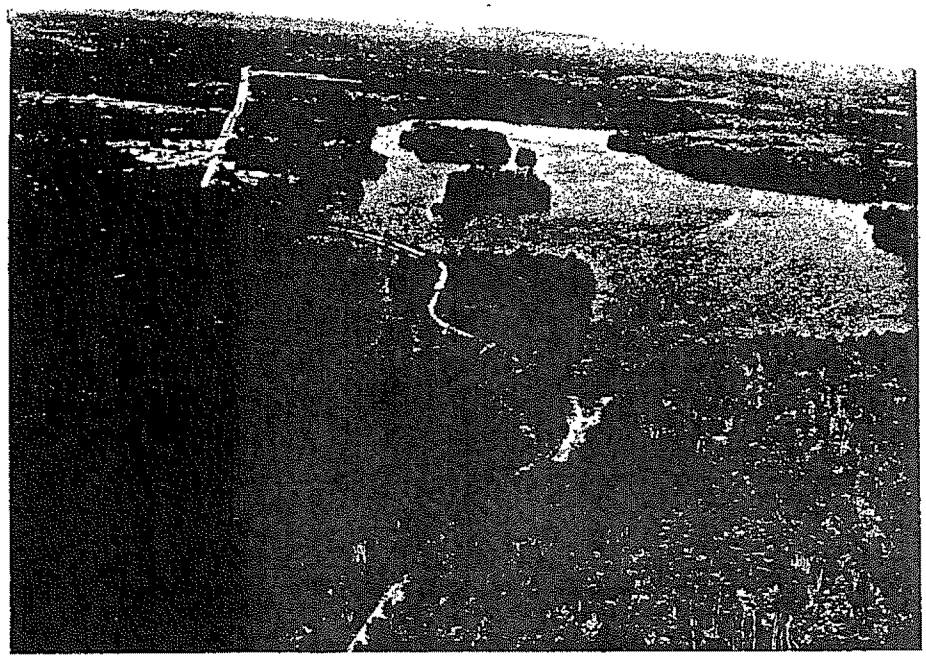
Appendix I: Photographs



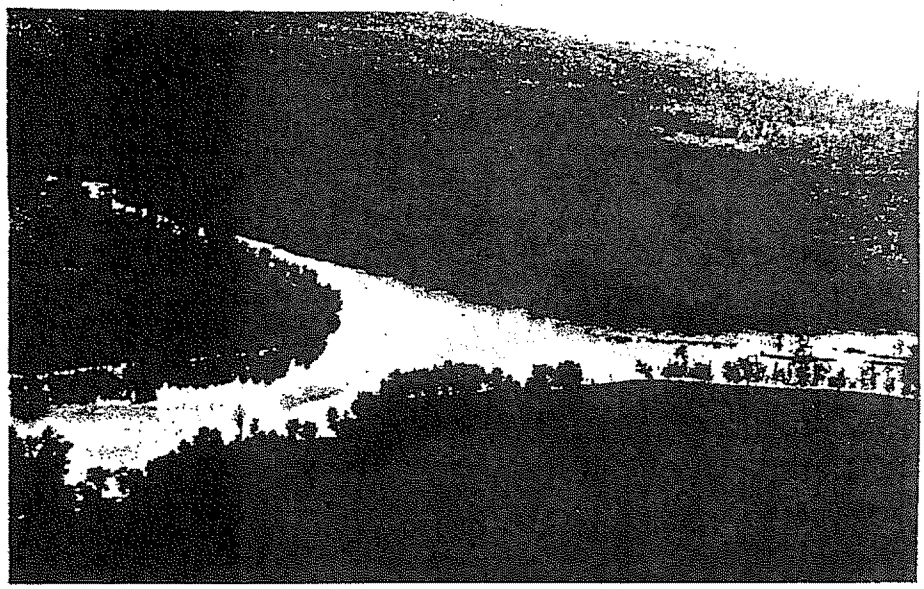
Photograph 1: Mouth of the Menominee River, mile 0.4 (km 0.6).



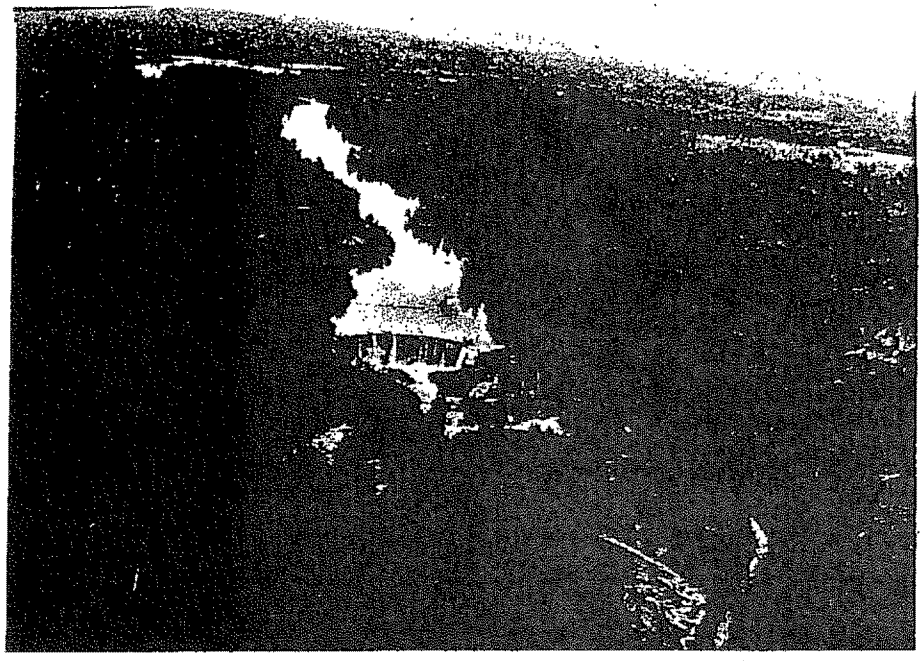
Photograph 2: Small Power Dams on the Menominee River, mile 79.6 (km 128.1).



Photograph 3: Road Bridge Across the Menominee River, mile 104.4 (km 168.0).

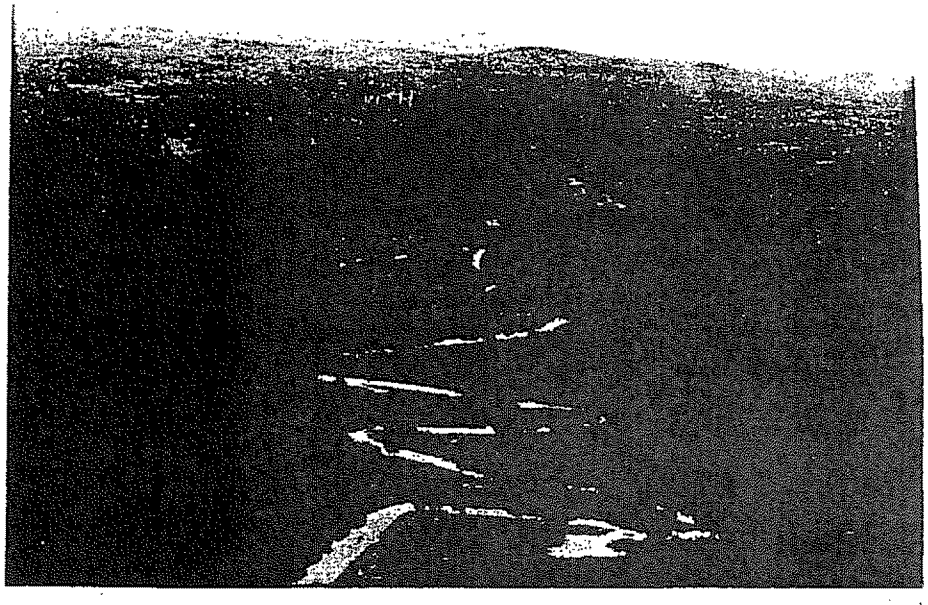


Photograph 4: Mouth of the Sturgeon River, mile 0.0 (km 0.0).

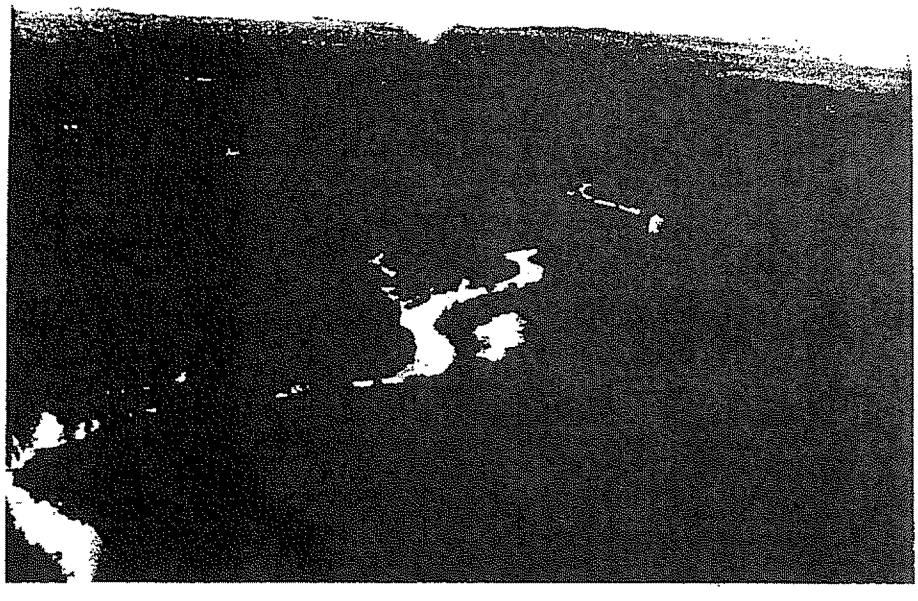


Photograph 5: Dam Across Sturgeon River, mile 7.4 (km 11.9).

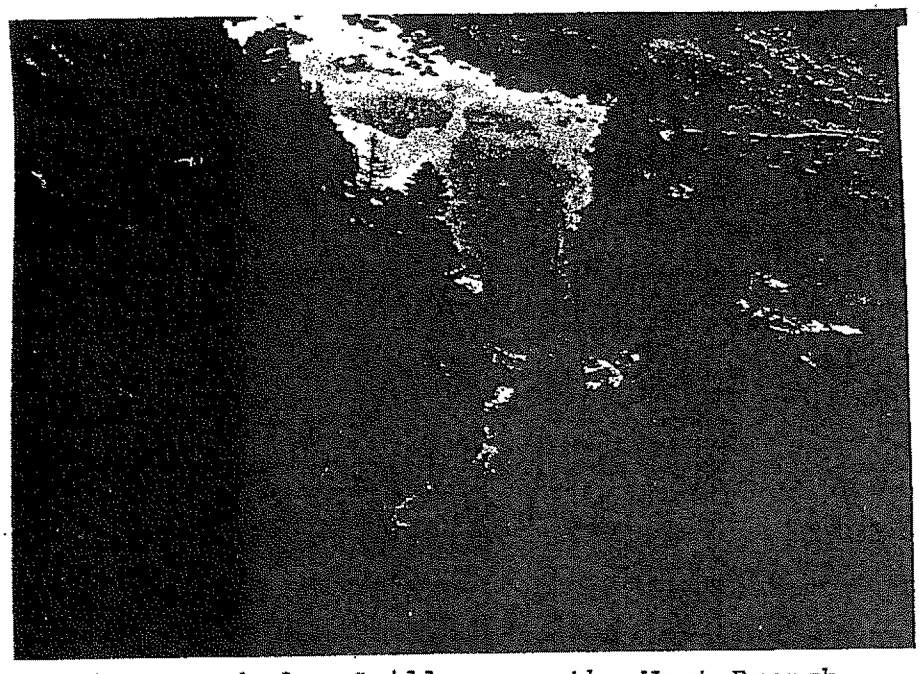
Photograph 6: Fork of the Sturgeon River and East Branch Sturgeon River, mile 27.2 (km 43.8).



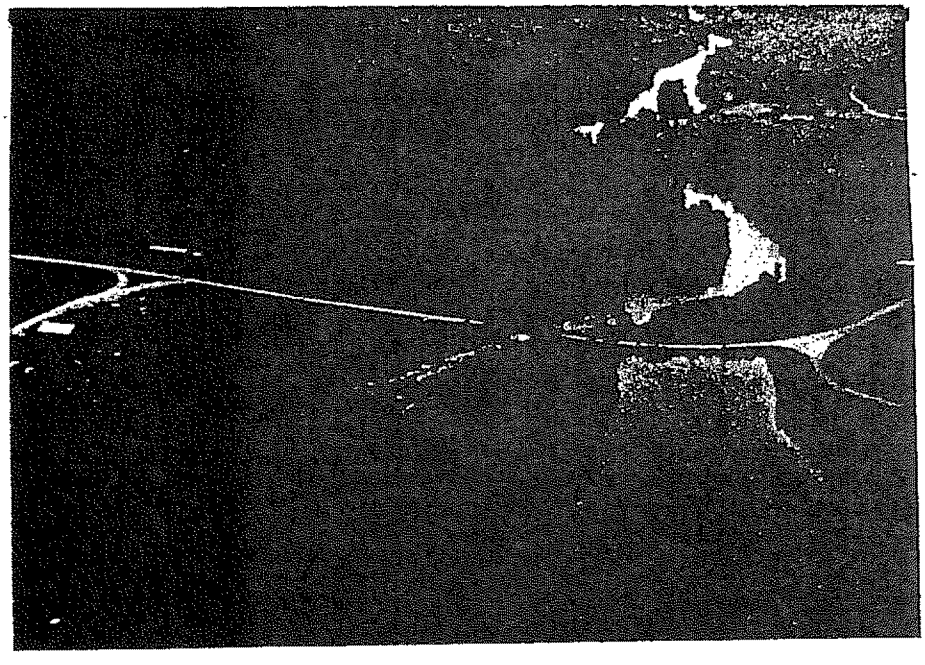
Photograph 7: East Branch Sturgeon River, mile 18.0 (km 29.0).



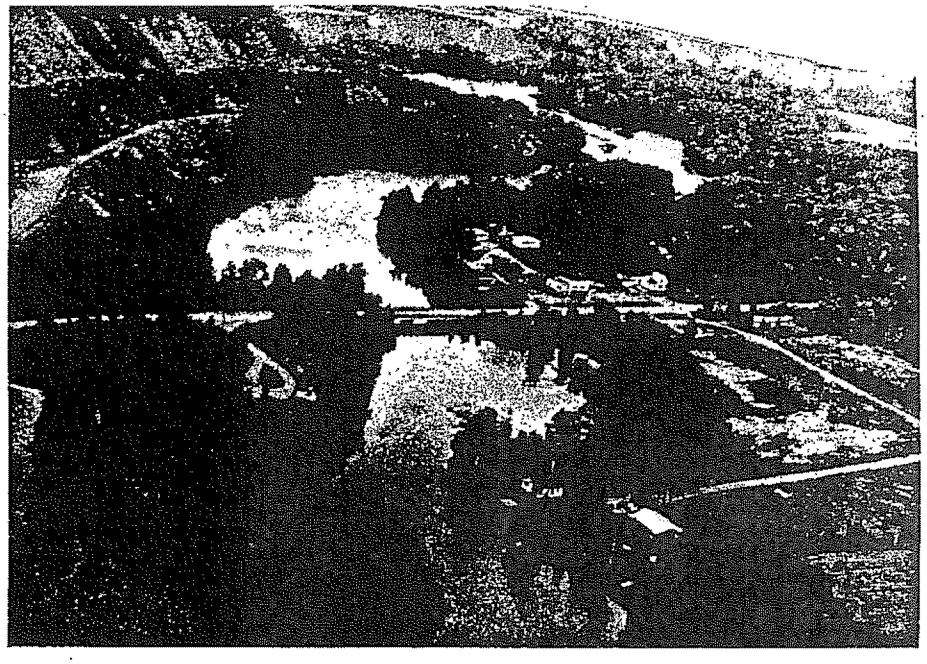
Photograph 8: Fork of Sturgeon River and West Branch Sturgeon River, mile 27.2 (km 43.8).



Photograph 9: Spillway on the West Branch Sturgeon River, mile 11.6 (km 18.7).

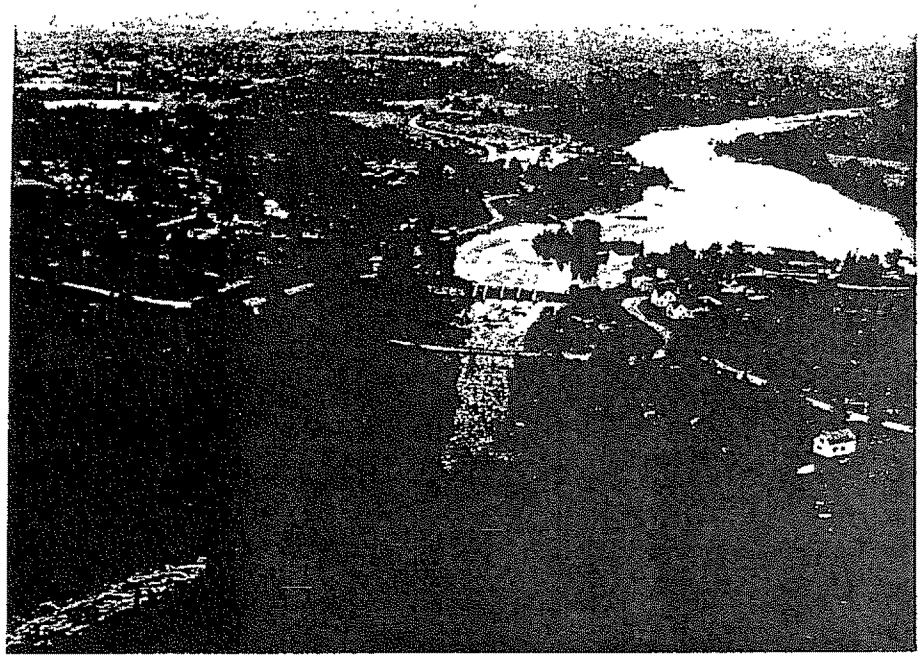


Photograph 10: Michigamme River, mile 15.3 (km 24.6).

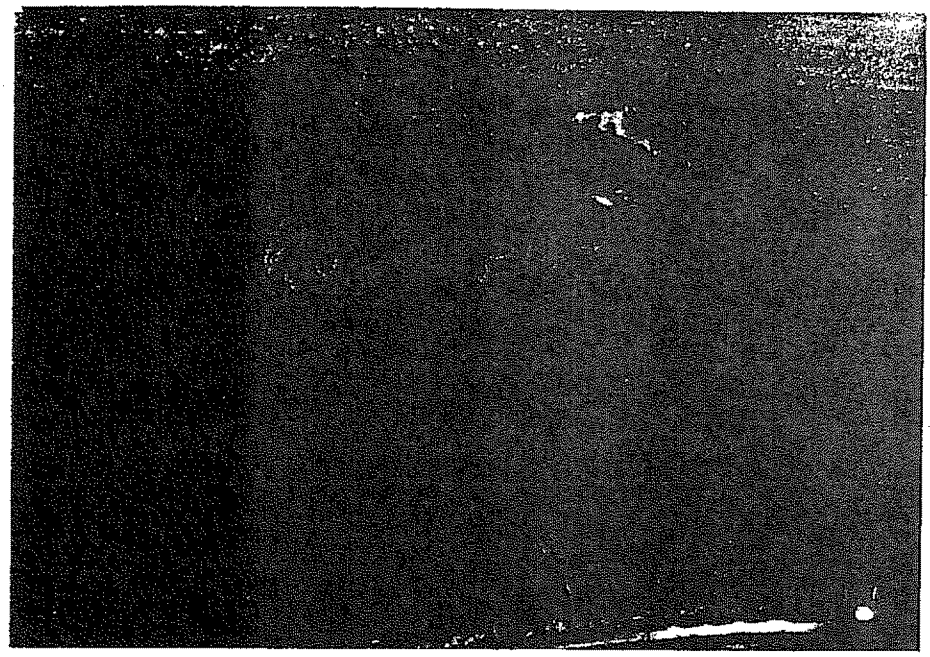


Photograph 11: Michigamme River, mile 51.3 (km 82.5).

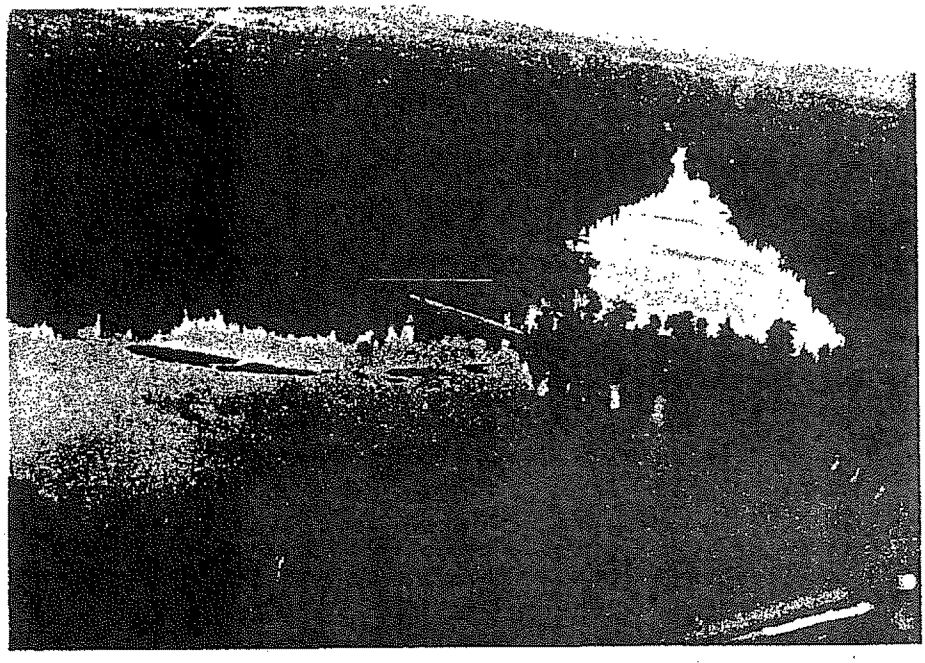
Photograph 12: Deer River, mile 4.3 (km 6.9).



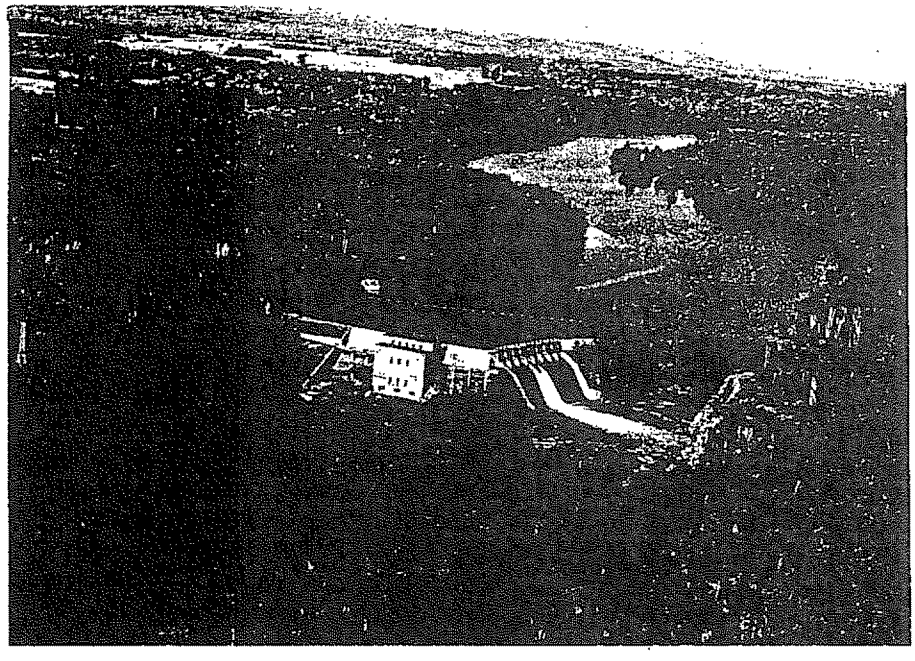
Photograph 13: Crystal Falls City Dam on the Paint River, mile 13.8 (km 22.2).



Photograph 14: Fork of the Paint River and the Net River, mile 36.6 (km 58.9).



Photograph 15: Net River, mile 4.2 (km 6.8).



Photograph 16: Brule Dam on the Brule River, mile 1.6 (km 2.6).

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Appendix II

INDEX LIST OF TRIBUTARY STREAMS
MENOMINEE RIVER BASIN

River Location		
Mile	Kilometer	Description
Menominee River		
3.7	6.0	Wright Slough (right bank)
4.6	7.4	Unnamed Stream (left bank)
5.7	9.2	Little River (left bank)
7.2	11.6	Unnamed Stream (left bank)
8.0	12.9	Chappee Creek (left bank)
11.1	17.9	Martin Creek (left bank)
13.9	22.4	Sobiesky Creek (left bank)
14.2	22.8	Unnamed Stream (right bank)
14.3	23.0	Unnamed Stream (right bank)
16.8	27.0	Unnamed Stream (right bank)
18.1	29.1	Pine Creek (left bank)
19.1	30.7	Unnamed Stream (right bank)
22.8	36.7	Unnamed Stream (right bank)
24.0	38.6	Little Cedar River (left bank)
24.7	39.7	Unnamed Stream (right bank)
25.2	40.5	Unnamed Stream (left bank)
25.6	41.2	Unnamed Stream (left bank)
26.9	43.3	Phillips Creek (left bank)
28.6	46.0	Koss Creek (left bank)
32.8	52.8	Unnamed Stream (left bank)
33.3	53.6	Unnamed Stream (left bank)
33.9	54.5	Unnamed Stream (right bank)
34.5	55.5	Unnamed Stream (right bank)
35.1	56.5	Burke Creek (left bank)
38.6	62.1	Unnamed Stream (left bank)
38.9	62.6	Unnamed Stream (right bank)
42.5	68.4	McCall Creek (right bank)
42.7	68.7	Wausaukee River (right bank)
44.2	71.1	Wolf Creek (right bank)
47.1	75.8	Long Lake Outlet (left bank)
47.6	76.6	Holmes Creek (right bank)
49.4	79.5	Pike River (right bank)
50.3	80.9	Squaw Creek (right bank)
53.2	85.6	Coldwater Creek (right bank)
55.0	88.5	Rosebush Creek (left bank)
55.3	89.0	Sawbridge Creek (left bank)
57.0	91.7	Unnamed Stream (right bank)
57.8	93.0	Goodman Brook (left bank)
59.8	96.2	Unnamed Stream (right bank)
60.4	97.2	Miscauna Creek (right bank)

Appendix II
(Continued)

River Location Mile	Kilometer	Description
61.0	98.1	McAllister Creek (right bank)
62.8	101.0	Miscauna Creek (left bank)
64.3	103.5	Pemene Creek (left bank)
67.4	108.4	Kading Creek (left bank)
67.5	108.6	Pemebonwon River (right bank)
68.8	110.7	Seynor Creek (left bank)
70.5	113.4	Unnamed Stream (right bank)
71.5	115.0	Brandts Creek (left bank)
73.0	117.5	Faithorn Creek (left bank)
74.8	120.4	Unnamed Stream (right bank)
75.3	121.2	Harter Creek (left bank)
77.3	124.4	Bear Creek (right bank)
78.6	126.5	Unnamed Stream (left bank)
80.4	129.4	Sturgeon River (left bank)
83.7	134.7	Unnamed Stream (right bank)
84.0	135.2	Unnamed Stream (left bank)
89.4	143.8	Fumee Creek (left bank)
90.8	146.1	Unnamed Stream (left bank)
91.7	147.5	Unnamed Stream (left bank)
93.0	149.6	Unnamed Stream (right bank)
94.2	151.6	Unnamed Stream (right bank)
96.8	155.8	Little Popple River (right bank)
97.7	157.2	Cowboy Lake Outlet (left bank)
99.8	160.6	Pine River (right bank)
101.4	163.2	Antoine Creek (left bank)
103.5	166.5	Twin Falls Creek (left bank)
105.3	169.4	Spread Eagle Outlet (right bank)
108.1	173.9	Badwater Creek (left bank)
110.7	178.1	First Creek (left bank)
111.1	178.8	Unnamed Stream (right bank)
111.4	179.2	Unnamed Stream (right bank)
111.7	179.7	Unnamed Stream (left bank)
113.2	182.1	Unnamed Stream (left bank)
113.4	182.5	Unnamed Stream (left bank)
113.6	182.8	Unnamed Stream (left bank)
113.8	183.1	Baird Creek (right bank)
114.3	183.9	Unnamed Stream (left bank)
114.6	184.4	Michigamme River (left bank)
114.6	184.4	Brule River (right bank)
Pemene Creek		
2.0	3.2	Dehaas Creek (left bank)
4.7	7.6	Blom Creek (right bank)

Appendix II
(Continued)

River Location Mile	Kilometer	Description
5.6	9.0	Bird Creek (right bank)
7.6	12.2	Camp Creek (left bank)
Sturgeon River		
5.2	8.4	Unnamed Stream (right bank)
5.6	9.0	Black Creek (right bank)
8.9	14.3	Beaver Creek (left bank)
11.0	17.7	Lost Creek (left bank)
12.1	19.5	Cassidy Creek (right Bank)
16.6	26.7	Breen Creek (right bank)
21.2	34.1	Unnamed Stream (left bank)
27.2	43.8	East Branch Sturgeon River (left bank)
27.2	43.8	West Branch Sturgeon River (right bank)
East Branch Sturgeon River		
1.3	2.1	Hancock Creek (left bank)
3.6	5.7	Unnamed Stream (right bank)
3.8	6.1	Pocans Creek (left bank)
4.5	7.2	Unnamed Stream (right bank)
4.8	7.7	Unnamed Stream (right bank)
6.9	11.1	Brown Creek (right bank)
7.8	12.6	Schultz Creek (left bank)
10.1	16.3	Unnamed Stream (right bank)
20.9	33.6	Skunk Creek (left bank)
21.9	35.2	Sixmile Creek (right bank)
26.3	42.3	Unnamed Stream (left bank)
West Branch Sturgeon River		
0.6	1.0	Jansen Creek (right bank)
1.0	1.6	Unnamed Stream (left bank)
2.3	3.7	Unnamed Stream (left bank)
4.8	7.7	Mitchell Creek (right bank)
7.9	12.7	Unnamed Stream (left bank)
9.7	15.6	Unnamed Stream (left bank)
10.3	16.6	Unnamed Stream (left bank)
13.8	22.2	Unnamed Stream (right bank)
21.2	34.1	Tom Kings Creek (right bank)
22.3	35.9	North Branch (left bank)
24.5	39.4	Gestner Lake Outlet (right bank)

Appendix II
(Continued)

River Location Mile	Kilometer	Description
Michigamme River		
1.4	2.2	Unnamed Stream (right bank)
2.6	4.2	Gages Creek (left bank)
4.0	6.4	Unnamed Stream (left bank)
4.8	7.7	Little Bull Canal (right bank)
8.7	14.0	Larson Creek (right bank)
8.8	14.2	Camp Five Creek (left bank)
10.0	16.1	Davison Creek (right bank)
10.2	16.4	Camp Six Creek (left bank)
11.1	17.8	Unnamed Stream (left bank)
11.1	17.8	Parks Creek (left bank)
12.8	20.6	Unnamed Stream (right bank)
12.9	20.8	Kukura Creek (right bank)
13.9	22.4	Unnamed Stream (left bank)
14.3	23.0	Unnamed Stream (right bank)
14.6	23.5	Unnamed Stream (left bank)
14.7	23.6	Unnamed Stream (right bank)
18.1	29.1	Kelso River (right bank)
19.5	31.4	Michigamme Slough (right bank)
20.0	32.2	Clarks Creek (left bank)
21.0	33.8	Deer River (right bank)
22.4	36.0	Noyes Creek (right bank)
24.0	38.6	Fence River (right bank)
27.4	44.1	Unnamed Stream (left bank)
28.9	46.5	Crescent Pond Outlet (right bank)
34.2	55.0	Squaw Creek (right bank)
34.4	55.3	Floodwood Lakes Outlet (left bank)
35.5	57.1	Cameron Lake Outlet (right bank)
39.9	64.2	Wilson Creek (left bank)
42.8	68.9	Unnamed Stream (left bank)
45.5	73.2	Gambles Creek (left bank)
46.1	74.2	Unnamed Stream (left bank)
46.5	74.8	Caps Creek (right bank)
48.1	77.4	Unnamed Stream (right bank)
49.0	78.8	Unnamed Stream (right bank)
51.1	82.2	Trout Falls Creek (right bank)
55.0	88.5	Jacob Lake Outlet (left bank)
56.8	91.4	Unnamed Stream (left bank)
58.0	93.3	Unnamed Stream (right bank)
58.2	93.6	Perch Lake Outlet (left bank)
59.6	95.9	Spruce River (right bank)
60.0	96.5	Unnamed Stream (left bank)
61.5	99.0	Michigamme Lake (source)
68.1	109.6	Peshekee River (left bank)

Appendix II
(Continued)

River Location Mile	Kilometer	Description
Deer River		
0.7	1.1	Liver Lake Outlet (left bank)
0.8	1.3	Liver Lake Outlet (left bank)
0.9	1.4	Light Lake Outlet (right bank)
3.5	5.6	Unnamed Creek (right bank)
5.1	8.2	Otter Lake Outlet (right bank)
5.2	8.4	Johnson Creek (left bank)
6.6	10.6	Camp Eight Creek (right bank)
7.7	12.4	Camp 31 Creek (right bank)
9.1	14.6	Deer Lake Outlet (right bank)
Fence River		
0.9	1.4	McMillan Creek (right bank)
1.5	2.4	Unnamed Creek (right bank)
2.9	4.7	Threemile Creek (left bank)
6.8	10.9	Unnamed Creek (left bank)
8.5	13.7	Unnamed Creek (left bank)
8.6	13.8	Smith Creek (left bank)
9.1	14.6	Unnamed Creek (left bank)
11.4	18.3	Unnamed Creek (right bank)
12.0	19.3	Unnamed Creek (left bank)
13.6	21.9	Nolenchec Creek (right bank)
13.8	22.2	Camp Creek (left bank)
16.3	26.2	Jones Camp Creek (right bank)
16.3	26.2	East Branch Fence River (left bank)
16.3	26.2	West Branch Fence River (right bank)
East Branch Fence River		
2.7	4.3	Wilson Creek (right bank)
5.9	9.5	Unnamed Stream (left bank)
6.5	10.5	Unnamed Stream (right bank)
8.3	13.4	Unnamed Stream (left bank)
8.6	13.8	Unnamed Stream (left bank)
10.3	16.5	Unnamed Stream (left bank)
12.3	19.8	Unnamed Stream (right bank)
14.6	23.5	Unnamed Stream (right bank)
14.8	23.8	Unnamed Stream (right bank)

Appendix II
(Continued)

River Location Mile	Kilometer	Description
West Branch Fence River		
1.6	2.6	Unnamed Stream (right bank)
4.5	7.2	Flanigan Creek (left bank)
7.4	11.9	Beaver Creek (right bank)
7.9	12.7	La Fournier Creek (left bank)
9.0	14.5	Unnamed Stream (left bank)
Peshekee River		
3.0	4.8	West Branch Peshekee River (right bank)
5.0	8.0	Dishno Creek (left bank)
6.6	10.6	Unnamed Stream (left bank)
9.3	15.0	Unnamed Stream (left bank)
9.4	15.1	Unnamed Stream (right bank)
10.2	16.4	Baraga Creek (left bank)
11.9	19.2	Unnamed Stream (left bank)
14.3	23.0	Unnamed Stream (right bank)
15.0	24.1	Unnamed Stream (left bank)
16.8	27.0	Unnamed Stream (left bank)
18.5	29.8	Unnamed Stream (right bank)
19.1	30.7	Unnamed Stream (left bank)
19.4	31.2	Unnamed Stream (left bank)
21.5	34.6	Unnamed Stream (left bank)
24.5	39.4	Unnamed Stream (right bank)
24.6	39.8	Unnamed Stream (right bank)
West Branch Peshekee River		
0.5	0.8	Unnamed Stream (left bank)
1.4	2.2	Unnamed Stream (right bank)
4.4	7.1	Unnamed Stream (left bank)
5.9	9.5	Unnamed Stream (right bank)
6.0	9.7	Unnamed Stream (left bank)
7.8	12.6	Unnamed Stream (left bank)
8.2	13.2	Unnamed Stream (right bank)
9.8	15.8	Unnamed Stream (right bank)
10.4	16.7	Unnamed Stream (left bank)
11.4	18.3	Unnamed Stream (left bank)
13.3	21.4	Unnamed Stream (left bank)
15.4	24.8	Unnamed Stream (left bank)
16.4	26.4	Unnamed Stream (right bank)

Appendix II
(Continued)

River Location Mile	Kilometer	Description
16.8	27.0	Unnamed Stream (right bank)
Paint River		
0.9	1.4	Unnamed Stream (left bank)
1.4	2.2	Unnamed Stream (right bank)
2.0	3.2	Unnamed Stream (right bank)
2.5	4.0	Seven Springs Creek (right bank)
3.5	5.6	Unnamed Stream (left bank)
3.7	6.0	Lake Outlet (left bank)
6.9	11.1	Unnamed Stream (right bank)
7.0	11.3	Tim Bowers Creek (right bank)
7.6	12.2	Unnamed Stream (left bank)
7.7	12.4	Unnamed Stream (left bank)
8.8	14.2	Little Mud Lake Outlet (left bank)
9.8	15.8	Unnamed Stream (left bank)
11.8	19.0	Dunn Creek (right bank)
11.9	19.1	Blaney Creek (left bank)
13.9	22.4	Hill Creek (right bank)
14.9	24.0	Mud Lakes Outlet (right bank)
16.1	25.9	Lower Holmes Lake Outlet (left bank)
19.0	30.6	Swan Lake Outlet (left bank)
20.0	32.2	Unnamed Stream (right bank)
21.5	34.6	Unnamed Stream (right bank)
22.7	36.5	Fire Lake Creek (left bank)
23.4	37.7	Unnamed Stream (right bank)
26.8	43.1	Unnamed Stream (right bank)
27.2	43.7	Crystal Spring Creek (right bank)
27.5	44.2	Unnamed Stream (right bank)
27.8	44.7	Unnamed Stream (right bank)
28.0	45.1	Unnamed Stream (right bank)
29.9	48.1	Hemlock River (left bank)
30.2	48.6	Unnamed Stream (right bank)
31.7	51.0	Parks Creek (left bank)
32.6	52.5	Unnamed Stream (right bank)
32.7	52.6	Unnamed Stream (right bank)
33.4	53.7	Unnamed Stream (left bank)
33.6	54.1	Unnamed Stream (right bank)
35.0	56.3	Morrison Creek (right bank)
35.8	57.6	Unnamed Stream (left bank)
36.6	58.9	Net River (left bank)
40.7	65.5	Silver Creek (left bank)
40.8	65.6	Unnamed Stream (left bank)
42.1	67.7	McColman Creek (right bank)

Appendix II
(Continued)

River Location Mile	Kilometer	Description
43.4	69.8	South Branch Paint River (right bank)
43.4	69.8	North Branch Paint River (left bank)
Net River		
1.0	1.6	Unnamed Stream (right bank)
2.3	3.7	Unnamed Stream (right bank)
3.6	5.8	Porter Creek (right bank)
9.9	15.9	New York Creek (left bank)
9.9	15.9	Unnamed Stream (right bank)
13.0	20.9	Spring Lake Creek (right bank)
13.7	22.0	East Branch Net River (left bank)
13.7	22.0	West Branch Net River (right bank)
South Branch Paint River		
2.6	4.2	Lode Creek (left bank)
6.2	10.0	Fur Farm Pond Outlet (right bank)
9.2	14.8	Basswood Pond Outlet (right bank)
14.6	23.5	Unnamed Stream (right bank)
19.3	31.1	Unnamed Stream (right bank)
North Branch Paint River		
1.0	1.6	Bush Creek (right bank)
2.0	3.2	Golden Creek (left bank)
6.0	9.7	Stump Creek (left bank)
7.7	12.4	Winslow Creek (left bank)
8.8	14.2	Holmes Creek (left bank)
10.6	17.1	Lake Outlet (right bank)
11.1	17.9	Unnamed Stream (left bank)
13.2	21.2	Paint Creek (left bank)
14.6	23.5	Thirty-Three Creek (right bank)
Brule River		
1.0	1.6	Fisher Creek (right bank)
3.7	6.0	Paint River Pond (left bank)
5.0	8.0	Unnamed Stream (left bank)
5.2	8.4	Unnamed Stream (right bank)
6.9	11.1	Unnamed Stream (left bank)
8.9	14.3	Montague Creek (right bank)
9.2	14.8	Unnamed Stream (right bank)
10.6	17.1	Unnamed Stream (left bank)
12.4	20.0	McGoverns Creek (left bank)

Appendix II
(Continued)

River Location Mile	Kilometer	Description
15.3	24.6	Unnamed Stream (right bank)
16.2	26.1	Armstrong Creek (left bank)
16.3	26.2	Riley Creek (right bank)
19.7	31.7	Unnamed Stream (right bank)
20.7	33.3	LeRoy Creek (right bank)
21.8	35.1	Unnamed Stream (left bank)
23.8	38.3	Unnamed Stream (left bank)
25.5	41.0	Olson Creek (left bank)
26.5	42.6	Iron River (left bank)
26.9	43.3	Wisconsin Creek (right bank)
29.8	47.9	Wisconsin Slough (right bank)
32.5	52.3	Unnamed Stream (left bank)
33.2	53.4	Duck Creek (right bank)
33.4	53.7	Chucks Creek (right bank)
33.9	54.5	Huff Creek (right bank)
34.6	55.7	Unnamed Stream (left bank)
36.4	58.6	Unnamed Stream (left bank)
37.4	60.2	Allen Creek (right bank)
38.4	61.0	Unnamed Stream (left bank)
38.7	62.3	Camp Lake Creek (left bank)
38.8	62.4	Unnamed Stream (right bank)
41.2	66.3	Wilson Creek (right bank)
43.9	70.6	Unnamed Stream (left bank)
44.5	71.6	Bass Creek (left bank)
44.8	72.1	Hagerman Creek (left bank)
45.9	73.9	Unnamed Stream (left bank)
46.8	75.3	Unnamed Stream (right bank)
47.8	76.9	Unnamed Stream (right bank)
48.9	78.7	Elvoy Creek (right bank)
Iron River		
5.9	9.5	Unnamed Stream (left bank)
6.6	10.6	Holmes Creek (right bank)
7.0	11.3	Unnamed Stream (right bank)
8.6	13.8	Unnamed Stream (left bank)
10.2	16.5	Stanley Creek (right bank)
10.9	17.5	Sunset Creek (left bank)
13.3	21.4	Iron Lake Creek (left bank)
14.9	24.0	Unnamed Stream (left bank)
15.3	24.5	Nash Creek (right bank)
16.2	26.1	North Branch Iron River (left bank)
16.2	26.1	South Branch Iron River (right bank)

GAI CONSULTANTS, INC.

Appendix III

OBSTRUCTIONS TO NAVIGATION
MENOMINEE RIVER BASIN

Mile	Kilometer	Obstruction	OHWM Elevation Feet	OHWM Elevation Meters	Vertical Clearance Feet	Vertical Clearance Meters
Menominee River						
0.4	0.6	Road Bridge	581.76	177.44		
1.9	3.1	69 kV Transmission Line			58.0	17.7
1.9	3.1	U. S. - 41 Bridge	582.07	177.53	6.5	2.0
2.1	3.4	Railroad Bridge				
2.3	3.7	69 kV Transmission Line			30.0	9.2
2.4	3.9	Road Bridge (foot of Hattie Street Dam)	581.94	177.49	9.0	2.7
2.5	4.0	Hattie Street Dam (crest)	594.20	181.23		
3.0	4.8	69 kV Transmission Line			48.0	14.6
3.7	6.0	Scott Paper Company Dam (foot)	596.55	181.94		
3.7	6.0	Scott Paper Company Dam (crest)	611.39	186.47		
6.1	9.8	69 kV Transmission Line			48.0	14.6
7.0	11.3	Chappee Rapids (foot)	611.06	186.37		
8.0	12.9	Chappee Rapids (crest)	611.20	186.47		
21.8	35.1	Wallace McAlister Bridge			14.9	4.5
24.5	39.4	Dam				
24.5	39.4	69 kV Transmission Line			39.0	11.9
25.2	40.5	Grand Rapids Dam (foot)	647.11	197.36		
25.2	40.5	Grand Rapids Dam (crest)	665.22	202.89		

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Appendix III
(Continued)

Mile	Kilometer	Obstruction	OHWM Elevation Feet	OHWM Elevation Meters	Vertical Clearance Feet	Vertical Clearance Meters
25.2	40.5	Road Bridge				
28.6	46.0	Road Bridge	666.27	203.21	15.1	4.6
53.3	85.8	69 kV Transmission Line			33.0	10.1
53.6	86.2	White Rapids Dam (foot)	688.24	209.96		
53.6	86.2	White Rapids Dam (crest)	716.74	218.61		
56.0	90.1	Road Bridge (foot Chalk Hill Dam)	717.36	218.79		
56.0	90.1	Chalk Hill Dam (crest)	744.36	227.02		
60.4	97.2	Road Bridge	744.86	227.18	7.0	2.1
60.4	97.2	Road Bridge (east channel)			8.6	2.6
64.6	103.9	Pemene Falls				
65.0	104.7	Rapids				
70.0	112.6	Quiver Falls (foot)	775.38	236.49		
70.0	112.6	Quiver Falls (crest)	784.68	239.32		
72.9	117.3	Railroad Bridge	790.35	241.05	19.7	6.0
79.6	128.1	Sturgeon Falls Dam (foot)	807.37	246.24		
79.6	128.1	Sturgeon Falls Dam (crest)	831.91	253.73		
83.4	134.2	Mordsini Bridge	831.02	253.46	13.2	4.0
85.6	137.7	138 kV Transmission Line			25.0(min)	7.6(min)
86.0	139.3	(2)138 kV Transmission Lines			25.0(min)	7.6(min)
86.6	139.3	69 kV Transmission Line			23.0(min)	7.0(min)
87.5	140.8	Railroad Bridge			4.7	1.4
87.5	140.8	Little Quinesec Falls	877.98	267.78		

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Appendix III
(Continued)

Mile	Kilometer	Obstruction	OHWM Elevation Feet	OHWM Elevation Meters	Vertical Clearance Feet	Vertical Clearance Meters
87.5	140.8	Little Quinesec Falls Dam (crest)	945.60	288.40		
90.3	145.3	U. S. - 141 Bridge	941.75	287.23	16.0	4.9
92.1	148.2	Big Quinnesec Dam (foot)	943.68	287.82		
92.1	148.2	Big Quinnesec Dam (crest)	1035.26	315.75		
93.2	150.0	Railroad Bridge	1035.41	315.80	49.0	14.9
94.6	152.2	M-95 Bridge	1035.79	315.92	13.4	4.1
97.6	157.0	Henry Ford Dam				
102.6	165.1	C & NW Railroad Bridge	1067.01	325.43	26.6	8.1
103.3	166.2	U.S. - 141 and U.S. - 2 Bridge	1068.36	325.84	14.8	4.5
103.6	166.7	(2)69 kV Transmission Lines			23.0(min)	7.0(min)
103.8	167.0	Twin Falls Dam (foot)	1067.73	325.65		
103.8	167.0	Twin Falls Dam (crest)	1113.68	339.67		
104.4	168.0	Road Bridge				
Pemene Creek						
0.1	0.2	Road Culverts			3.1	0.9
3.5	5.6	Road Bridge				
5.2	8.4	Road Culvert	800.24	244.07	2.5	0.8
5.8	9.3	Road Culvert				
7.8	12.6	Road Culvert			0.5	0.2
8.8	14.2	Road Bridge				

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Appendix III
(continued)

Mile	Kilometer	Obstruction	OHWM Elevation Feet	OHWM Elevation Meters	Vertical Clearance Feet	Vertical Clearance Meters
Sturgeon River						
0.0	0.0	Road Bridge				
0.4	0.6	Road Bridge				
3.2	5.2	Railroad Bridge				
4.1	6.6	U.S. - 2 Bridge	842.85	257.07	22.4	6.8
4.5	7.2	Railroad Bridge				
5.6	9.0	Road Bridge			7.3	2.2
7.4	11.9	Sturgeon Dam				
12.5	20.1	Road Bridge	931.98	284.25	4.3	1.3
13.9	22.3	Road Bridge				
15.2	24.5	Road Bridge				
16.3	26.2	Road Bridge				
22.1	35.6	Road Bridge				
25.0	40.1	Road Bridge	971.77	296.39	7.2	2.2
East Branch Sturgeon River						
5.0	8.1	Road Bridge				
5.0	8.1	Railroad Bridge				
5.2	8.4	Road Bridge	1012.78	308.90	8.2	2.5
6.2	10.0	Road Bridge			7.5	2.3
7.9	12.7	M-69 Road Bridge	1026.32	313.03	4.9	1.5
8.5	13.7	69 kV Transmission Line			23.0 (min)	7.0 (min)
11.8	19.0	Goose Management Dam				
12.1	19.5	Road Bridge	1060.23	323.37	0.2	0.1
21.0	33.9	Road Bridge	1072.24	327.03	4.4	1.3

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Appendix III
(continued)

Mile	Kilometer	Obstruction	OHWM Elevation Feet	OHWM Elevation Meters	Vertical Clearance Feet	Vertical Clearance Meters
West Branch Sturgeon River						
8.0	12.9	Road Bridge	1021.53	311.57	5.1	1.6
11.6	18.7	Spillway				
12.9	20.8	Road Bridge				
13.4	21.6	Road Bridge				
13.9	22.4	Road Bridge				
13.9	22.4	69 kV Transmission Line			23.0 (min)	7.0 (min)
14.4	23.2	M-69 Road Bridge				
14.7	23.7	Road Bridge				
17.7	28.5	Road Bridge				
18.8	30.3	Road Bridge				
23.7	38.1	Road Bridge	1222.30	372.80	15.9	4.8
23.7	38.1	Chicago Milwaukee St. Paul and Pacific Railroad Bridge				
Michigamme River						
0.2	0.3	Michigamme Falls Dam (foot)	1130.16	344.70		
0.2	0.3	Michigamme Falls Dam (crest)	1190.91	363.23		
3.5	5.6	69 kV Transmission Line			23.0 (min)	7.0 (min)
3.8	6.1	Peavy Falls Dam (foot)	1190.76	363.18		
3.8	6.1	Peavy Falls Dam (crest)	1284.65	391.81		

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Appendix III
(continued)

Mile	Kilometer	Obstruction	OHWM Elevation Feet	OHWM Elevation Meters	Vertical Clearance Feet	Vertical Clearance Meters
12.9	20.8	M-69 Bridge	1283.94	391.60	5.9	1.8
15.3	24.6	Road Bridge			15.5	4.7
16.9	27.2	Hemlock Falls Dam (foot)	1303.40	397.54		
16.9	27.2	Hemlock Falls Dam (crest)	1337.27	407.87		
18.3	29.4	69 kV Transmission Line			23.0(min)	7.0(min)
18.6	29.9	Railroad Bridge			10.2	3.1
20.1	32.3	Way Dam (foot)	1337.31	407.88		
20.1	32.3	Way Dam (crest)	1374.87	419.33		
31.4	50.5	Road Bridge				
36.3	58.4	Railroad Bridge	1388.50	423.49	11.3	3.4
36.4	58.6	Road Bridge				
36.6	58.9	M-95 Bridge				
48.8	78.5	Road Bridge				
51.3	82.5	Road Bridge				
51.9	83.5	Michigamme Basin Dam (foot)	1470.22	448.41		
51.9	83.5	Michigamme Basin Dam (crest)	1492.28	455.14		
53.0	85.3	Railroad Bridge				
53.2	85.6	Road Bridge				
54.0	86.9	M-95 Bridge	1492.67	455.26	20.6	6.3
55.4	89.1	Road Bridge				
55.9	89.6	Road Bridge				
Deer River						
0.3	0.5	Road Culvert	1373.87	419.03	4.8	1.5
2.3	3.7	Road Bridge				
10.9	17.5	Road Culvert	1573.38	479.88	2.0	0.6

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Appendix III
(continued)

Mile	Kilometer	Obstruction	OHWM Elevation Feet	OHWM Elevation Meters	Vertical Clearance Feet	Vertical Clearance Meters
Fence River						
7.4	11.9	Road Bridge	1425.67	434.83	4.0	1.2
13.8	22.2	Road Bridge			5.1	1.6
East Branch Fence River						
3.9	6.3	Road Bridge				
9.2	14.5	Nilegan Dam				
West Branch Fence River						
2.9	4.7	Road Bridge				
4.9	7.9	Road Bridge				
6.4	10.3	Road Culverts	1621.07	494.43	0.9	0.3
10.0	16.1	Road Bridge				
Peshekee River						
0.1	0.2	Railroad Bridge			5.5	1.7
0.1	0.2	Road Bridge			8.1	2.5
0.2	0.3	U.S. - 41 Bridge	1551.68	473.26	5.5	1.7
1.2	1.9	Road Bridge			7.3	2.2
2.4	3.9	Road Bridge	1560.08	475.82	7.8	2.4
4.8	7.7	Road Bridge	1604.05	489.24	6.4	2.0
5.4	8.9	Road Bridge			9.2	2.8
7.3	11.8	Road Bridge	1628.32	496.64	9.8	3.0
9.5	15.2	Road Bridge				

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Appendix III
(continued)

Mile	Kilometer	Obstruction	OHWM Elevation Feet	OHWM Elevation Meters	Vertical Clearance Feet	Vertical Clearance Meters
10.2	16.4	Road Bridge			7.7	2.3
10.7	17.2	Road Bridge	1672.86	510.22	6.0	1.8
14.9	24.0	Road Bridge	1723.78	525.75	6.2	1.9
16.9	27.2	Road Bridge			3.3	1.0
17.3	27.8	Road Bridge			3.2	1.0
18.1	29.1	Road Bridge				
19.3	31.1	Road Bridge				
19.4	31.2	Road Bridge				
19.5	31.4	Road Bridge				
23.1	37.2	Road Bridge				
West Branch Peshekee River Basin						
6.2	10.0	Road Bridge				
9.9	15.9	Road Culvert			1.3	0.4
10.3	16.6	Road Bridge			0.0	0.0
15.0	24.1	Road Bridge				
16.8	27.0	Road Culvert	1857.25	566.46	0.4	0.2
Paint River						
5.4	8.7	Paint Canal Dam				
12.8	20.6	M-69 Bridge	1294.57	394.84	18.6	5.7
13.7	22.0	Road Bridge			16.4	5.0
13.8	22.2	Crystal Falls City Dam (foot)	1308.91	399.21		
13.8	22.2	Crystal Falls City Dam (crest)	1333.29	406.65		

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Appendix III
(continued)

Mile	Kilometer	Obstruction	OHWM Elevation Feet	OHWM Elevation Meters	Vertical Clearance Feet	Vertical Clearance Meters
14.2	22.8	69 kV Transmission Line			23.0(min)	7.0(min)
14.2	22.8	Chicago, Milwaukee, St. Paul, and Pacific Railroad Bridge				
17.1	27.5	U. S. - 141 Bridge			11.1	3.4
26.6	42.8	Road Bridge	1350.61	411.93	14.2	4.3
42.6	68.5	Road Bridge	1454.00	443.47	12.5	3.8
Net River						
3.1	4.9	Rapids				
4.2	6.8	Road Bridge	1437.16	438.33	4.5	1.4
5.5	8.8	Chipmunk Falls				
11.8	18.9	Railroad Bridge				
South Branch Paint River						
0.0	0.0	Road Bridge	1457.15	444.43	6.9	2.1
1.2	1.9	Road Bridge				
4.2	6.8	Road Bridge				
6.6	10.6	Road Bridge				
7.4	11.9	Road Bridge				
8.2	13.2	Road Bridge				
12.4	20.0	Road Bridge				
14.5	23.3	Road Bridge	1599.57	487.87	5.2	1.6
17.0	27.4	Railroad Bridge				
18.1	29.1	Forest Highway 16 Bridge	1620.76	494.33	4.9	1.5
21.7	34.9	Road Bridge				
23.8	38.3	U. S. - 2 Bridge				

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Appendix III
(continued)

Mile	Kilometer	Obstruction	OHWM Elevation Feet	OHWM Elevation Meters	Vertical Clearance Feet	Vertical Clearance Meters
2.0	3.1	Road Bridge				
3.0	4.8	Road Bridge				
5.3	8.5	Road Bridge				
6.1	9.7	Road Bridge				
7.6	12.2	Road Bridge				
7.8	12.5	Road Bridge	1531.60	467.13	4.6	1.4
8.8	14.2	Road Bridge				
9.8	15.7	Road Culverts			6.0	1.8
13.0	20.9	Road Bridge (foot of Spaulding Dam)	1565.94	477.61	6.9	2.1
13.2	21.2	Spaulding Dam (crest)	1567.67	478.14		
15.4	24.7	Road Culvert			6.0	1.8
15.7	25.2	Bear Trap Dam				
Brule River						
1.6	2.6	(2)69 kV Transmission Lines			23.0(min)	7.0(min)
1.6	2.6	Brule Dam (Foot)	1136.61	346.67		
1.6	2.6	Brule Dam (Crest)	1200.42	366.13		
1.7	2.7	69 kV Transmission Line			23.0(min)	7.0(min)
4.8	7.7	Road Bridge	1200.71	366.22	8.0	2.5
5.2	8.4	69 kV Transmission Line			23.0(min)	7.0(min)
7.6	12.2	U. S.-2 and -141 Bridge	1234.04	376.38	11.1	3.4
8.5	13.2	(2)69 kV Transmission Lines			23.0(min)	7.0(min)
8.5	13.7	C&NW Railroad Bridge				
17.6	28.3	Road Bridge				
21.4	34.4	Road Bridge	1356.40	413.70	3.9	1.2
26.5	42.6	Abandoned R. R. Bridge				
32.8	52.8	M-189 Bridge	1436.06	438.00	5.0	1.5

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Appendix III
(continued)

Mile	Kilometer	Obstruction	OHWM Elevation Feet	OHWM Elevation Meters	Vertical Clearance Feet	Vertical Clearance Meters
35.6	57.3	Road Bridge				
45.7	73.5	M-73 Bridge	1540.41	469.83	4.6	1.4
47.9	77.1	69 kV Transmission Line			23.0(min)	7.0(min)
Iron River						
5.1	8.2	69 kV Transmission Line			23.0(min)	7.0(min)
5.1	8.2	C & N.W. Railroad Bridge	1443.18	440.17	9.9	3.0
5.2	8.4	Road Bridge				
5.3	8.5	Road Bridge				
5.4	8.6	Road Bridge				
6.0	9.7	Road Bridge				
6.2	10.0	Road Bridge				
6.9	11.1	Road Bridge				
6.9	11.1	Railroad Bridge				
6.9	11.1	69 kV Transmission Line			23.0(min)	7.0(min)
7.4	11.9	69 kV Transmission Line			23.0(min)	7.0(min)
7.4	11.9	Railroad Bridge				
7.6	12.2	Road Bridge				
7.7	12.4	Railroad Bridge				
8.0	12.9	69 kV Transmission Line			23.0(min)	7.0(min)
8.3	13.4	U. S. - 2 Bridge				
8.4	13.5	Road Bridge				
8.9	14.3	Road Bridge				
9.0	14.5	Road Bridge				
9.1	14.6	Road Bridge				
9.4	15.1	C & N.W. Railroad Bridge	1477.56	450.66	3.7	1.1
9.5	15.3	Road Bridge				
9.8	15.8	Road Bridge				

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Appendix III
(continued)

Mile	Kilometer	Obstruction	OHWM Elevation Feet	OHWM Elevation Meters	Vertical Clearance Feet	Vertical Clearance Meters
9.8	15.8	69 KV Transmission Line			23.0 (min)	7.0 (min)
12.6	20.3	Railroad Bridge				
13.3	21.4	Pipeline				
14.2	22.8	Road Bridge				
14.8	23.8	Road Bridge				
15.0	24.1	Railroad Bridge				
16.0	25.7	Dam (foot)	1507.43	459.77		
16.0	25.7	Road Culvert (crest of dam)	1509.62	460.43	6.4	2.0

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Appendix IIIA

OBSTRUCTIONS TO NAVIGATION
MENOMINEE RIVER BASIN

Mile	Kilometers	Bridge	Span	Horizontal Clearance Feet	Horizontal Clearance Meters
Menominee River					
0.4	0.6	Road Bridge	1	40	12.2
			2	66	20.1
			3	99	30.2
			4	115	35.1
			5	98	29.9
			6	31	9.5
1.9	3.1	U.S.-41 Bridge	1	38	11.6
			2	74	22.6
			3	74	22.6
			4	74	22.6
			5	74	22.6
			6	74	22.6
			7	74	22.6
			8	74	22.6
			9	74	22.6
			10	74	22.6
			11	38	11.6
2.4	3.9	Road Bridge	1	104	31.7
			2	111	33.9
			3	111	33.9
			4	111	33.9
			5	104	31.7

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Appendix IIIA
(Continued)

Mile	Kilometer	Bridge	Span	Horizontal Clearance Feet	Horizontal Clearance Meters
21.8	35.1	Wallace McAllister Bridge	1	48	14.6
			2	72	22.0
			3	73	22.3
			4	73	22.3
			5	73	22.3
			6	37	11.3
28.6	46.0	Road Bridge	1	157	47.9
			2	135	41.2
56.0	90.1	Road Bridge	1	50	15.3
			2	50	15.3
			3	50	15.3
			4	50	15.3
			5	50	15.3
			6	50	15.3
60.4	97.2	Road Bridge	1	156	47.6
60.4	97.2	Road Bridge (East Channel)	1	88	26.8
72.9	117.3	Railroad Bridge	1	90	27.4
			2	109	33.2
			3	82	25.0
83.4	134.2	Mordsini Bridge	1	54	16.5
			2	118	36.0
			3	58	17.7

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Appendix IIIA
(Continued)

Mile	Kilometer	Bridge	Span	Horizontal Clearance Feet	Horizontal Clearance Meters
90.3	145.3	U.S.-141 Bridge	1	50	15.3
			2	76	23.2
			3	76	23.2
			4	77	23.5
			5	76	23.2
			6	33	10.1
94.6	152.2	M-95 Bridge	1	82	25.0
			2	89	27.1
			3	85	25.9
102.6	165.1	C & N.W. Railroad Bridge	1	117	35.7
			2	120	36.6
103.3	166.2	U.S.-141 and U.S.-2 Bridge	1	134	40.9
			2	88	26.8
			3	88	26.8
			4	55	16.8
Pemene Creek					
0.1	0.2	Road Culverts	1	10	3.0
			2	10	3.0
5.2	8.4	Road Culvert	1	4	1.2
5.8	9.3	Road Culvert	1	6	1.8

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Appendix IIIA
(Continued)

Mile	Kilometer	Bridge	Span	Horizontal Clearance Feet	Horizontal Clearance Meters
7.8	12.6	Road Culvert	1	6	1.8
Michigamme River					
12.9	20.8	M-69 Bridge	1	48	14.6
			2	48	14.6
			3	48	14.6
15.3	24.6	Road Bridge	1	88	26.8
18.6	29.9	Railroad Bridge	1	12	3.7
			2	65	19.8
			3	21	6.4
36.3	58.4	Railroad Bridge	1	86	26.2
54.0	86.9	M-95 Bridge	1	16	4.9
			2	62	18.9
			3	62	18.9
			4	29	8.8
Paint River					
12.8	20.6	M-69 Bridge	1	98	29.9
			2	110	33.6
13.7	22.0	Road Bridge	1	52	15.9
			2	51	15.6

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Appendix IIIA
(Continued)

Mile	Kilometer	Bridge	Span	Horizontal Clearance Feet	Horizontal Clearance Meters
17.1	27.5	U.S.-141 Bridge	1	41	12.5
			2	65	19.8
			3	40	12.2
26.6	42.8	Road Bridge	1	57	17.4
			2	58	17.7
			3	57	17.4
42.6	68.5	Road Bridge	1	34	10.4
			2	34	10.4
North Branch Paint River					
7.8	12.5	Road Bridge	1	46	14.0
9.8	15.7	Road Culverts	1	12	3.7
			2	12	3.7
13.0	20.9	Road Bridge	1	17	5.2
			2	22	6.7
			3	17	5.2
15.4	24.7	Road Culvert	1	12	3.7
South Branch Paint River					
14.5	23.3	Road Bridge	1	48	14.6

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Appendix IIIA
(Continued)

Mile	Kilometer	Bridge	Span	Horizontal Clearance Feet	Horizontal Clearance Meters
18.1	29.1	Forest Highway 16 Bridge	1	17	5.2
			2	22	6.7
			3	17	5.2
Sturgeon River					
4.1	6.6	U.S.-2 Bridge	1	20	6.1
			2	61	18.6
			3	23	7.0
5.6	9.0	Road Bridge	1	53	16.2
12.5	20.1	Road Bridge	1	26	7.9
			2	26	7.9
25.0	40.1	Road Bridge	1	35	10.7
			2	33	10.0
East Branch Sturgeon River					
5.2	8.4	Road Bridge	1	33	10.0
6.2	10.0	Road Bridge	1	31	9.5
7.9	12.7	M-69 Road Bridge	1	37	11.3
12.1	19.5	Road Bridge	1	35	10.7
21.0	33.9	Road Bridge	1	31	9.5

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Appendix IIIA
(Continued)

Mile	Kilometer	Bridge	Span	Horizontal Clearance Feet	Horizontal Clearance Meters
West Branch Sturgeon River					
8.0	12.9	Road Bridge	1	39	11.9
23.7	38.1	M-65, M-95 Bridge	1	30	9.2
Brule River					
4.8	7.7	Road Bridge	1	91	27.8
7.6	12.2	U.S.-2 & 141 Bridge	1	46	14.0
			2	52	15.9
			3	23	7.0
17.6	28.3	Road Bridge	1	29	8.8
32.8	52.8	M-189 Bridge	1	41	12.5
			2	39	11.9
45.7	73.5	M-73 Bridge	1	34	10.4
			2	34	10.4
Iron River					
5.1	8.2	C & NW Railroad Bridge	1	27	8.2
9.4	15.1	C & NW Railroad Bridge	1	17	5.2
			2	47	14.3

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Appendix IIIA
(Continued)

Mile	Kilometer	Bridge	Span	Horizontal Clearance Feet	Horizontal Clearance Meters
16.0	25.7	Road Culvert	1	16	4.9
Net River					
4.2	6.8	Road Bridge	1	24	7.3
			2	23	7.0
Peshekee River					
0.1	0.2	Railroad Bridge	1	75	22.9
			2	75	22.9
0.2	0.3	U.S.- 41 Bridge	1	55	16.8
			2	55	16.8
			3	54	16.5
1.2	1.9	Road Bridge	1	14	4.3
			2	47	14.3
			3	17	5.2
2.4	3.9	Road Bridge	1	45	13.7
4.8	7.7	Road Bridge	1	45	13.7
5.4	8.9	Road Bridge	1	47	14.3
7.3	11.8	Road Bridge	1	52	15.9

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Appendix IIIA
(Continued)

Mile	Kilometer	Bridge	Span	Horizontal Clearance Feet	Horizontal Clearance Meters
10.2	16.4	Road Bridge	1	15	4.6
			2	47	14.3
10.7	17.2	Road Bridge	1	25	7.6
14.9	24.0	Road Bridge	1	33	10.0
16.9	27.2	Road Bridge	1	23	7.0
17.3	27.8	Road Bridge	1	27	8.2
West Branch Peshekee River					
6.2	10.0	Road Bridge	1	26	7.9
16.8	27.0	Road Culvert	1	1	0.3
Fence River					
7.4	11.9	Road Bridge	1	20	6.1
			2	20	6.1
13.8	22.2	Road Bridge	1	20	6.1
			2	18	5.5

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Appendix IIIA
(Continued)

Mile	Kilometer	Bridge	Span	Horizontal Clearance Feet	Horizontal Clearance Meters
West Branch Fence River					
6.4	10.3	Road Culverts	1	4	1.2
			2	4	1.2
			3	4	1.2
			4	4	1.2
Deer River					
0.3	0.5	Road Culvert	1	12	3.7
10.9	17.5	Road Culvert	1	2	3.7

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Appendix IV: Bibliography

1. Bowman, James Cloyd, "Life in the Michigan Woods," Michigan History, Vol. 21 (1937), pp. 270-283.

2. Burke, Fred C., Logs on the Menominee, Menasha, Wisconsin: George Banta Publishing Co., 1946.

3. Campbell, J. M. Rivers of Michigan, 1966.

4. Hill, Jack, A History of Iron County Michigan, Iron River, Michigan: The Reporter Publishing Co., 1955.

5. Hybels, Robert James, "The Lake Superior Copper Fever, 1841-1847," Michigan History, Vol. 34 (1950), pp. 97-119, 224-244, 309-326.

6. Maybee, Rolland H., Michigan's White Pine Era, 1840-1900, Lansing: Michigan Historical Commission, 1960.

7. Michigan Historical Collections, Bentley Historical Library, University of Michigan (Ann Arbor, Mich.), Ames, Floyd V., "Farewell Wilderness," (unpublished manuscript transcribed by O. M. Clark), circa. 1938.

8. Michigan Historical Collections, Bentley Historical Library, University of Michigan (Ann Arbor, Mich.), Landlooker in the Upper Peninsula of Michigan, (From the Reminiscences of John Munro Longyear), Marquette, Michigan: Marquette County Historical Society of Michigan, 1960.

9. Michigan Historical Collections, Bentley Historical Library, University of Michigan (Ann Arbor, Mich.), Nevue, Wilfred, Logging in the Huron Mountains, Richmond, Indiana, March 19, 1959.

10. Rector, William G., Log Transportation in the Lake States Lumber Industry, Glendale, California, 1953.

11. Reimann, Lewis C., Between the Iron and the Pine, Ann Arbor: Edwards Brothers, Inc., 1951.

12. Sawyer, Alvah H., "Forests of the Upper Peninsula and Their Place in History," Michigan History, Vol. 3 (1919), pp. 367-383.

13. United States Congress, 72d Congress, 1st Session, House of Representatives Document No. 141, 1932.

Appendix IV: Bibliography
(Continued)

14. United States Congress, 84th Congress, 1st Session, House of Representatives Document No. 71, 1955.

15. United States Congress, 86th Congress, 1st Session, House of Representatives Document No. 113, 1959.

16. United States Department of Defense, Army Corps of Engineers, Waterborne Commerce of the United States, Vicksburg, Mississippi, 1974.

17. United States Department of Defense, Army Corps of Engineers, Water Resources Development, North Central Division, Chicago, Illinois, 1977.

18. United States Department of the Interior, Geological Survey, Catalog of Information on Water Data, Water Resources Region 04 (Great Lakes), Reston, Vieginia, 1975.

19. United States Department of the Interior, Geological Survey, Water Resources Data for Michigan - Water Year 1977, Lansing, Michigan, 1978.

APPENDIX V

GLOSSARY

Average annual stream discharge - the arithmetic mean of a yearly compilation of individual daily mean discharges.

Extent of lake influence - For streams discharging to one of the Great Lakes, the upstream limit at which the water surface elevation is subject to seasonal or barometric changes of the lake level.

Fall per mile - The ratio of the change in elevation to the length of a stream or reach of stream, expressed as feet per mile or meters per kilometer.

Falls - A steep fall of water from a height; cascade.

Horizontal clearance - The lateral width of an opening of a river obstruction measured from face of abutment (or pier) to face of abutment (or pier).

Major tributary - A significant branch of the mainstem of a river or stream.

Navigable waters of the United States (Section 10) - A term used to define the scope and extent of the regulatory powers of the Corps of Engineers, for waters which are presently, or have been in the past, or may be in the future susceptible for use for purposes of interstate or foreign commerce. Precise definitions of "navigable waters" or "navigability" are ultimately dependent on judicial interpretation, and cannot be made conclusively by administrative

APPENDIX V
(Continued)

agencies.

Obstruction - An impediment to navigation on a river or stream including, but not limited to, bridges, dams, waterfalls, rapids, transmission lines and pipelines.

Ordinary High Water Mark (OHWM) - The line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank; shoaling; changes in character of soil; destruction of terrestrial vegetation; the presence of litter and debris; or other appropriate means that consider the characteristics of the surrounding area.

Rapids - A turbulent reach of a river or stream, usually created by an abrupt change in stream gradient.

Span - A designation to identify sections of multi-span structures, presented in numerical order from left to right, when viewing the structure in the direction of streamflow.

United States Coast and Geodetic Survey Datum of 1929 (USC&GS 1929) - The standard datum of elevations throughout the United States determined through a least-squares adjustment in 1929 of all first-order leveling in the United States and Canada. In this adjustment, mean sea level was held at zero for 26 tidal stations along the Atlantic and Pacific Oceans and the Gulf of Mexico.

Vertical Clearance - The difference between the elevation of the lowest structural member of a bridge super-

APPENDIX V
(Continued)

structure, or lowest elevation of a transmission wire, and the elevation of the ordinary high water mark. Where no ordinary high water determination is available, the vertical clearance is designated as the distance to the mean water surface elevation available on the latest USGS topographic map.

Waters of the United States (Section 404) - The territorial seas; coastal and inland waters, lakes, rivers, and streams that are navigable waters of the United States, including adjacent wetlands; tributaries to navigable waters of the United States, including adjacent wetlands. Manmade nontidal drainage and irrigation ditches excavated on dry land are not considered to be tributaries; interstate waters and their tributaries, including adjacent wetlands; all other waters of the United States such as isolated wetlands and lakes, intermittent streams, prairie potholes, and other waters that are not part of a tributary system to interstate waters or to navigable waters of the United States, the degradation or destruction of which could effect interstate commerce.

33 CFR 329 - Refers to Title 33 of the U. S. Code of Federal Regulations, Part 329.

USEPA Region 5
AUG 23 2017
Office of the Regional Administrator