MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER RESOURCES DIVISION
MAY 2011

STAFF REPORT

A BIOLOGICAL SURVEY OF THE ONTONAGON, PRESQUE ISLE, IRON, MONTREAL, AND UPPER WISCONSIN RIVERS WATERSHEDS AND OTHER SELECTED NONBASIN YEAR WATERSHEDS GOGEBIC, HOUGHTON, IRON, AND ONTONAGON COUNTIES, MICHIGAN JUNE 2008

INTRODUCTION

Staff from the Michigan Department of Environmental Quality (MDEQ), Surface Water Assessment Section (SWAS), assessed the biological, chemical, and physical habitat conditions of selected streams located in the Ontonagon (HUC 04020102), Presque Isle (HUC 04020101), Iron (HUC 04020101), Montreal (HUC 04010302), and Upper Wisconsin (HUC 07070001) Rivers watersheds (OPIMU), and other selected nonbasin year watersheds. The habitat and macroinvertebrate community were qualitatively evaluated using the SWAS Procedure 51 (MDEQ, 1990; Creal et al., 1996) at 28 wadeable sites and the draft SWAS Procedure 91 (MDEQ, 2011a) at 2 nonwadeable sites. Water chemistry samples were collected at 13 sites (Tables 1, 2, 3, and 4; Figure 1). *E. coli* samples were collected at 3 sites on Powder Mill Creek (Table 5).

The specific survey objective of these monitoring activities includes, but is not limited to, the following:

- Evaluate the current biological and physical conditions at targeted and randomly selected stations in the OPIMU watersheds for attainment of Michigan Water Quality Standards (WQS).
- Identify sources of sediment and other nonpoint source (NPS) pollution.
- Evaluate the effectiveness of specific NPS water quality improvement projects.
- Fulfill water quality monitoring recommendations submitted by the Upper Peninsula NPS water quality monitoring team, other agencies, and the public.

GENERAL WATERSHED HISTORY AND BACKGROUND INFORMATION

The OPIMU watersheds are located in the extreme west end of Michigan's Upper Peninsula. There are numerous dams in the watersheds, including the Bonds Falls system of the Ontonagon River watershed and several within the Montreal River watershed. This extensive watershed area drains parts of four Michigan counties and is also connected to the Mississippi River via Lac Vieux Desert on the Wisconsin-Michigan border. The OPIMU watersheds are sparsely populated, with a high percentage of the land within the boundaries of the Ottawa National Forest and Porcupine State Park. The primary towns include Ironwood, Bessemer, Watersmeet, and Ontonagon.

The OPIMU watersheds are located in the Northern Lakes and Forest ecoregion (Omernik and Gallant, 1988) and mostly flow through extensively forested landscape prior to entering Lake Superior or the Mississippi River drainage. Many of the rivers/streams in the OPIMU

watersheds are protected for cold water fish. Most of the warmwater streams and the agriculture land use in the OPIMU watersheds are located in central and northern Ontonagon County.

The OPIMU watersheds have been impacted by historic copper and iron mining and logging activities. In-stream habitat degradation and NPS pollution associated with historic copper and iron mining and logging practices continue to affect OPIMU water quality (Taft, 1990; 1992a; 1998b; and 1999, 2004b).

Logging of the old growth forest in the OPIMU watersheds took place primarily in the late 1800s. Large rivers were used to transport logs using methods that resulted in severe degradation of stream and riparian habitat. Land was largely abandoned after logging. Today, the Ottawa National Forest encompasses much of the upper Ontonagon and Presque Isle Rivers subwatersheds, while most of the land in the Montreal River subwatershed is privately owned.

Forestry, wood products, and tourism continue to be the dominant industries in the OPIMU watersheds. Major recreation/tourism activities include winter sports, fishing, hunting, camping, boating, fall color tours, and sightseeing.

In April 2002, the western end of the Upper Peninsula experienced a 50-year flood event that impacted many tributaries in the OPIMU watersheds. The county road system washed out at numerous points including at several previous biosurvey stations.

Several large National Pollutant Discharge Elimination System (NPDES) point source dischargers are located in the OPIMU watersheds, including: Stone Container (recently closed), Copper Range (closed in 1994), Wakefield Wastewater Sewage Lagoon (WWSL), and Ironwood Wastewater Treatment Plant (WWTP), plus an additional 17 small WWSLs with Certificates of Coverage.

Extensive biological and water chemistry monitoring of the OPIMU watersheds has been conducted by the Michigan Department of Natural Resources (MDNR) and MDEQ over the last 25 years (Taft, 1990; Taft, 1992a; Taft, 1992b; Taft, 1994; Taft, 1995; Taft, 1998a; Taft, 1998b; Taft, 1999; Taft, 2000; Taft, 2004a; and Taft, 2005). Fish population monitoring is also regularly conducted within the OPIMU watersheds by Ottawa National Forest and MDNR fisheries biologists.

Ontonagon River Watershed

At 1,348 square miles, the Ontonagon River watershed is larger than the state of Rhode Island (1,045 square miles) (United States Census) and makes up the majority of the OPIMU watershed. A large portion of the watershed is dominated by forest and is part of the Ottawa National Forest. One of the most prominent landmarks in the watershed is Lake Gogebic; a 14,807-acre lake that is the headwaters of the West Branch Ontonagon River. The villages of Ontonagon and Rockland are the only major urban areas in the watershed. Impervious clay soils that make up the middle and downstream sections of the watershed increase surface runoff to the river causing the main Ontonagon River and many of its downstream tributaries to be turbid and warm during summer (Taft, 2004a). Thirteen probabilistic sites were sampled in this watershed, including both wadable and nonwadeable sites. None of the sites were targeted.

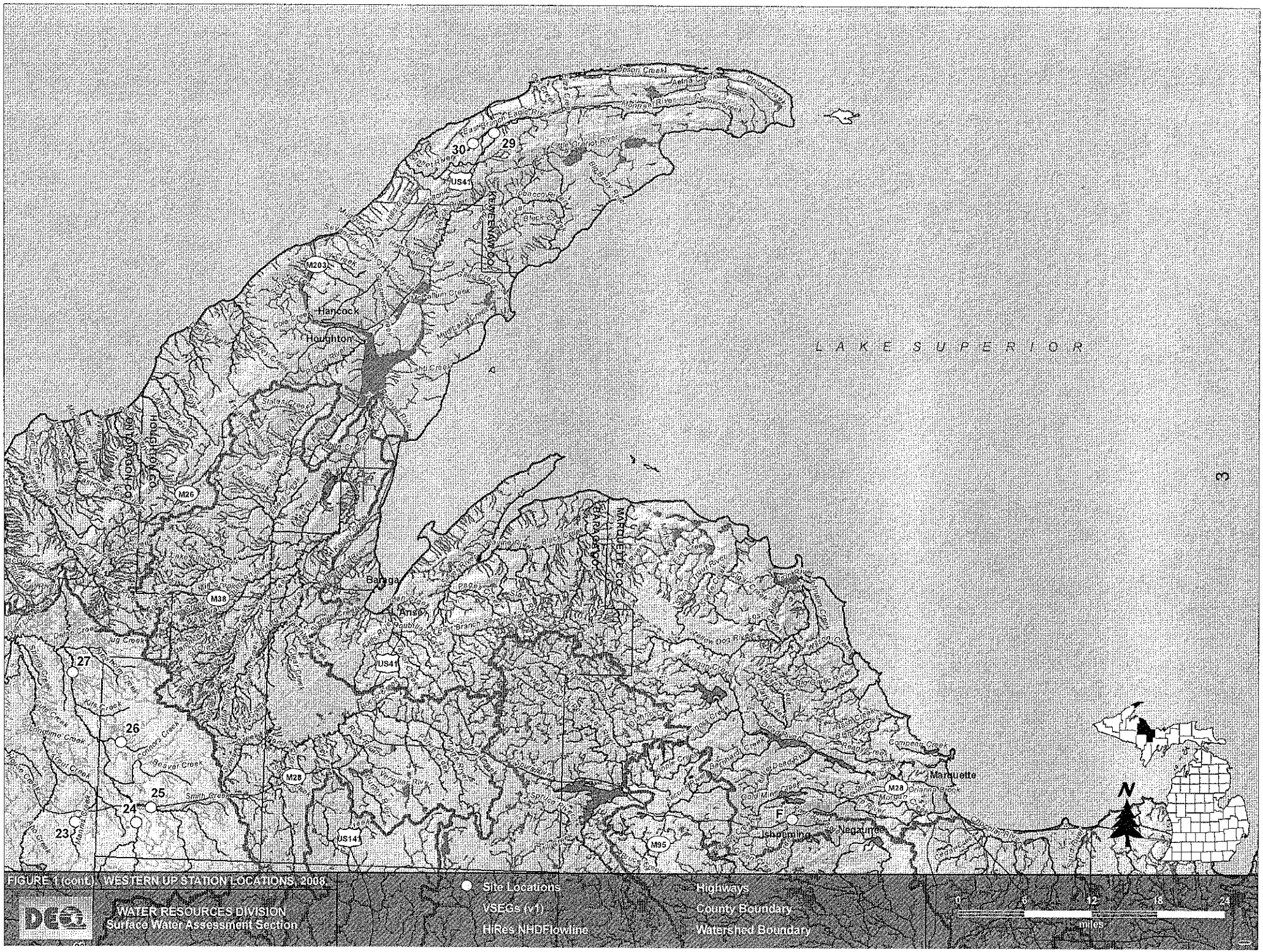

FIGURE 1 (cont.). WESTERN UP STATION LOCATIONS, 2008.

WATER RESOURCES DIVISION
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Site Locations
VSEGs (v1)
HiRes NHDFlowline
Highways
County Boundary
Watershed Boundary

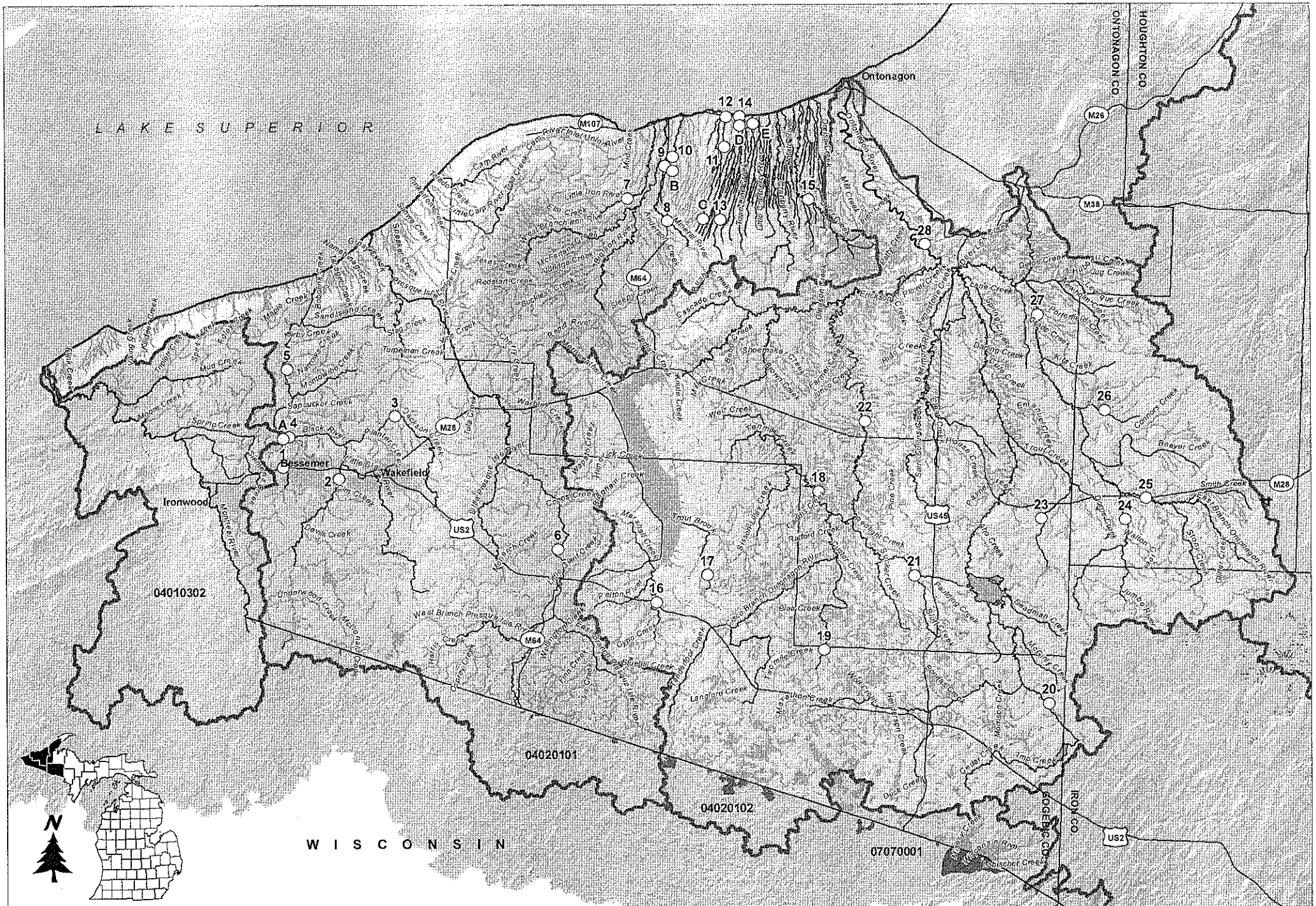

FIGURE 1. WESTERN UP STATION LOCATIONS, 2008.

WATER RESOURCES DIVISION
Surface Water Assessment Section

The Ontonagon River headwaters drain primarily sandy soils, which helps provide substantial base flows of cold groundwater to the streams. Groundwater input is reduced dramatically in the downstream sections of the watershed where clay soils are dominant. These impervious clay soils increase surface runoff to the river causing the main branch and many of its downstream tributaries to be turbid and warm during the summer months. Many of the Ontonagon River tributaries are classified as "cold water" streams; however, they can only support trout and other cold water species on a seasonal basis due to the geological characteristics of the watershed (Taft, 2004a).

Native copper deposits were discovered all along the "Keweenaw fault line," a mineralized zone that runs through the northern parts of the Ontonagon River watershed. In the 1850s, numerous copper mines were opened in the vicinity of Rockland, Mass City, Greenland, Victoria, and Bergland. Near the mining town of Victoria, a 2,000 pound piece of copper known as the "Ontonagon Boulder" was found along the Ontonagon River. All of the copper mines within the watershed have been shut down since the mid-1990s (Taft, 2004a).

The Ontonagon River watershed was also environmentally impacted during Michigan's logging era. Numerous tributaries were used extensively for log drives during the 1880s and 1890s. In 1928, the United States National Forest Reservation Commission made the first purchase of deforested stump land in the western Upper Peninsula. Within 7 years, the Commission had purchased over 1.7 million acres of stump land, which eventually became the Ottawa National Forest. The majority of the Ottawa National Forest is located within the Ontonagon River watershed. Today, wood products continue to be an important economic activity throughout the watershed. The Ontonagon River watershed also continues to support winter sports, fishing, hunting, sightseeing, camping, and hay farming (Taft, 2004a).

Lake Superior Tributaries

Located along the northern shoreline of Gogebic and Ontonagon Counties, the Lake Superior Tributaries watershed is approximately 249 square miles in size. The eastern half of these coastal tributaries drain the area called the Bergland Hills, which is covered in bright red alluvial clay. Thirteen sites were located on Lake Superior tributaries, 7 of which were targeted.

One of the most well known landmarks in this watershed is the Porcupine Mountains Wilderness State Park. Located west of Silver City along the Lake Superior shoreline, the Porcupine Mountains Wilderness State Park was established in 1945 and is the largest undeveloped tract of land (60,000 acres) in Michigan. This old-growth, virgin forest contains the largest stand of hardwood-hemlock in the United States. Streams found within the park are pristine (Taft, 1999).

Presque Isle/Black River Watershed

The Michigan portion of the Presque Isle and Black River watershed (Figure 2) covers approximately 542 square miles of the western end of Gogebic County and the southwest corner of Ontonagon County in the west end of the Upper Peninsula. A small portion of the watershed extends into Wisconsin. Seven sites were located in the Presque Isle and Black River watersheds,

Figure 2: Black River.

including 3 targeted sites on Powder Mill Creek, which were sampled for *E. coli*.

The Presque Isle and Black River headwaters drain primarily sandy soils, which provide substantial base flows of cold groundwater. Groundwater input is reduced dramatically in the downstream river sections where soil type changes to clays and bedrock. Clay soil and bedrock are generally impervious and increase surface runoff. Consequently, the lower portions of the Presque Isle and Black Rivers and many of their downstream tributaries are turbid and warm. Even though many of the Presque Isle and Black tributaries are classified by the MDNR as trout streams, they can only support trout on a seasonal basis due to the geological characteristics of the watershed. Water temperatures during summer low flow periods become elevated (i.e., 70 degrees F or higher) throughout the watersheds due to the limited quantity of groundwater entering many streams. This forces the native brook trout to migrate into small tributaries or spring seeps with more suitable summer temperatures. However, brown trout can still be found in the Presque Isle and Black River mainstream sections due to their ability to tolerate higher stream temperatures (Taft, 1999).

Iron River Watershed

The Iron River (named Big Iron River on some maps) watershed is located in northern Ontonagon County in the Ottawa National Forest. It covers an area approximately 99 square miles in size and is dominated by forest. There were no monitoring sites located in this watershed.

Montreal River Watershed

Twenty-four percent of the Montreal River watershed lies in Michigan's Gogebic County, the remaining portion in Wisconsin. The Montreal River proper makes up the northern section of Michigan's border with Wisconsin. The landscape is dominated by forest and is part of the Ottawa National Forest. The city of Ironwood, on the Wisconsin border, is one of the major landmarks in the watershed. There were no monitoring sites located in this watershed.

Upper Wisconsin River Watershed

Only a small portion of the Upper Wisconsin River watershed, approximately 42 square miles, is located in Michigan. The watershed is dominated by forest and contains many lakes including a portion of Lac Vieux Desert. The majority of the watershed is located in Gogebic County while the remaining portion is in Iron County. US-45 and the village of Land O' Lakes are the only prominent landmarks. There were no sites located in this watershed.

RESULTS

Current Status/Attainment of Standards

Probabilistic Sites

The MDEQ, Water Resources Division, has incorporated a stratified random sampling design component into the annual watershed assessments. The purpose of this probabilistic monitoring is to collect biological data for attainment status determination and temporal trend analysis. Probabilistic sampling allows us to extend the conclusions from a limited number of sampling stations to an entire watershed. The resulting data can be used to infer the condition of the state's waters at site-specific, watershed, or statewide scales.

The MDEQ's Macroinvertebrate Community Status and Trend Monitoring Procedure (MDEQ, 2011a) is used to estimate the number of river miles supporting the "other indigenous aquatic life and wildlife" designated use specified in Rule 323.1100(1)(e) of the Michigan WQS. The status and trend program utilizes river valley segments to provide the basic sampling unit. A river valley segment is defined as a stream reach that is relatively homogenous with respect to ecological segments of rivers and streams that share common geologic, flow, and temperature characteristics (MDNR, 1997). The smallest river units (e.g., valley segments) that can be interpreted from large-scale geologic maps are in reality relatively large with each segment having its own unique identification number coupled with a known specific length. As such, valley segments provide a randomly selectable sampling unit that can be stratified by size and/or thermal regime.

To develop a statistically-based estimate of attainment status in the OPIMU River watersheds, a total of 30 randomly selected stream/river sites were assessed using Procedure 51 (N = 28) and a draft nonwadable bioassesment procedure (N = 2) (MDEQ, 2011b). Sites were stratified based on size and water temperature. The strata included small cold, medium cold, large cold, small warm, medium warm, large warm, and very large warm. Very large cold river segments were not sampled in the OPIMU River watersheds as they are not represented. Two sites, 1 on the South Branch Ontonagon River (Station 22) and 1 on the Ontonagon River (Station 28) were sampled using the MDEQ draft nonwadable protocol. The site locations are summarized in Table 1.

All 23 probabilistic sites in the 2008 OPIMU River watersheds scored either acceptable or excellent (Table1). Based on these data and the probabilistic monitoring methodology, it can be concluded (based on a 95% confidence interval) that between 87 and 100 percent of the total river miles in these watersheds are attaining the "other indigenous aquatic life and wildlife" designated use specified in Rule 323.1100(1)(e) of the Michigan WQS.

The overall mean Procedure 51 score for benthic macroinvertebrates at the 28 wadable probabilistic sites was 3.7. In terms of metric scores, 14 wadable sites rated excellent (+5 or greater) and 14 rated acceptable (e.g., from -4 to +4). The lowest score (-3) occurred in Portal Creek (Station 10) where no Plecoptera were found. Trichoptera made up only 0.83% of all insects, and only 16 total taxa were present. The total number of taxa in the wadable probabilistic sites ranged from 13-35 (Table 2).

Two nonwadeable stations were assessed on the South Branch Ontonagon River and the Ontonagon River. Using this nonwadeable procedure, macroinvertebrate communities are scored with metrics that rate water bodies from excellent to poor. Macroinvertebrate ratings from 76-100 are considered excellent, 50-75 good, 25-49 fair, and 0-24 are considered poor. Both nonwadeable sites surveyed in 2008 scored good, 63 and 66, respectively.

Targeted Sites

Powder Mill Creek (Stations 1 and 4, and Water Chemistry Station A)

A 1-mile stretch of this small stream (from the Black River confluence upstream) was listed in the 2006 and 2008 Integrated Reports (Edly and Wuycheck, 2006; LeSage and Smith, 2008) as not supporting the total and partial body contact designated uses. It was impaired for total body contact due to sewage overflows caused by failing septic systems from ski resort facilities located along Powder Mill Creek north of Bessemer. Corrections were installed at the ski resort

complex using Clean Michigan Initiative bond monies to alleviate the septic overflows and any associated phosphorus and *E. coli* loading to Powder Mill Creek (Figures 3 and 4). Procedure 51 macroinvertebrate and habitat surveys, along with water chemistry and *E. coli* sample collections, were conducted by staff from the MDEQ, SWAS. The macroinvertebrate community rated acceptable (+4) at Station 1 and excellent (+5) at Station 4, just upstream of the Black River confluence. Habitat conditions at both stations monitored rated excellent. The *E.coli* samples (3 replicates per site) were taken upstream of US-2 (Station 1 headwaters section), adjacent to the abandoned septic fields and upstream of the confluence with the

Figure 3: Powder Mill Creek.

Figure 4: Powder Mill Creek.

Black River at the base of the hill (Station 4). The data indicate that WQS of 300 *E. coli* per 100 mL as a daily maximum were met (Table 5). Total and Partial Body Contact Recreation designated use support status was fully supporting on that day.

Portal Creek (Station 10 and Water Chemistry Station B)

Portal Creek is currently listed in the 2010 Integrated Report (LeSage and Smith, 2010) as a Category 4b water body due to copper WQS exceedance. This clay drainage way flows adjacent to the western side of the White Pine Mine copper tailing basins and has been historically influenced by a discarded equipment repository site that was heavily contaminated by copper dust in its headwaters (known as "the boneyard"). The Portal Creek headwaters (Figure 5) have undergone an extensive surface site cleanup and are beginning to revegetate. The copper mine and smelter complex have also been documented as the pollutant sources responsible for the observed WQS nonattainment. Lack of summer and winter base flow is a common characteristic of most streams found along the Lake Superior shoreline draining the bergland clay highlands between Silver City and Ontonagon. Water samples were collected at 2 Portal Creek monitoring stations (Station 10 [Figure 6] and Water Chemistry Station B), while a Procedure 51 macroinvertebrate and habitat survey was conducted at only Station 10.

Figure 5. Portal Creek Headwaters.

Figure 6. Portal Creek Confluence with Mineral River.

Macroinvertebrate density was expectantly low but still scored an acceptable rating (-3) and the community was comprised of invertebrates with short life cycles probably due to the stream's intermittent nature. Habitat conditions rated in the good category with scoring reductions due to some embeddedness and sediment deposition issues in the stream. The upper Portal watershed is now a series of warm, unwadable beaver ponds that contain minnows, frogs, and turtles and are lined with cattails, willow, and small alder. The water chemistry showed elevated total copper levels of 36 micrograms per liter (ug/l) and 54 ug/l from the creek mouth to the turbid beaver pond headwaters, respectively. Both locations also had high Total Organic Carbon (TOC) levels (11-14 milligrams per liter [mg/l]), which could help explain the biota that was observed as

copper ions prefer to bind to organics and clay particles, if present.

Brodie Creek (Station 29)

Brodie Creek (Figures 7 and 8) is a tributary to the West Branch Eagle River in Keweenaw County. This stream is the only large tributary that has not been assessed for total metals and macroinvertebrates in this watershed by the MDEQ. This control site needed assessment as part of the Eagle River watershed remediation from past copper mining activities. Macroinvertebrates scored an excellent (+7) rating at this site. Twenty-nine taxa were found at this station and approximately 45% of the individuals found were EPT taxa. Habitat metrics scored excellent. The ambient water chemistry sample indicated very low total copper levels (1.4 ug/l) along with low total phosphorus levels of 8 ug/l.

Figure 7: Brodie Creek downstream.

Figure 8: Brodie Creek upstream.

West Branch Eagle River (Station 30)

West Branch Eagle River is a small woodland stream that flows at the base of the Cliff Range near one of the oldest copper mines in Michigan. Joe Rathbun (MDEQ, NPS Unit) requested that this site be evaluated as a comparison with remediated locations within the Eagle River watershed. Macroinvertebrates scored an excellent (+6) rating at this site and habitat scored excellent as well. Ambient water chemistry samples were also taken at this station and showed total copper levels of 3.3 ug/l along with very low total phosphorus levels of 6 ug/l. Due to the proximity of this site to the Cliffs Copper Mine, it is not surprising that total copper was slightly elevated. No parameters measured exceed Michigan WQS.

Pine Creek (Stations 11 and 12, and Water Chemistry Station C) plus Duck Creek/Halfway Creek (Water Chemistry Control Stations D and E)

To investigate the possible relocation of one of Copper Range's storm water outfall to Pine Creek, biological and water chemistry samples were collected at 3 locations along Pine River adjacent to the closed Copper Range White Pine Copper Mine. In addition, background water monitoring was collected from Duck Creek and Halfway Creek that also drain the Bergland hills as our nearby control sites.

Pine Creek flows along the eastern sections of the White Pine Mine tailing basins and is a natural alluvial clay channel that drops approximately 250 feet to Lake Superior from its headwaters. This site was requested by Marquette District staff and 3 stations were planned for macroinvertebrates and water chemistry monitoring (Michigan 10 metals + Li + Sr +TOC + hardness). Stations 11 and 12 were sampled using Procedure 51 macroinvertebrate and habitat surveys, both rating acceptable for macroinvertebrates and good for habitat. Station C

along the LP Walsh Road was a water chemistry only site due to the lack of flow and impounded water due to beaver activity.

The two control sites for our Pine Creek survey were used in order to determine the background water chemistry (Michigan 10 metals + Li + Sr + TOC + hardness) of nearby small streams that drain the Bergland clay hills near the mine site. Both stations were approximately 5.5 miles down wind of the historic smelter so the watersheds have also been impacted by copper laden particulate from stack emissions. Only water chemistry samples were collected at these stations in order to determine ambient total metals, hardness, and TOC. Total copper, hardness, and TOC concentrations in Duck Creek were 6.2 ug/l, 56 mg/l, and 8 mg/l, respectively, and in Halfway Creek were 4.2 ug/l, 71 mg/l, and 7.2, respectively. These values indicate that Pine Creek is likely influenced by the White Pine Mine site as water hardness is approximately 2.5 times greater that the control sites. However, the total copper values were similar except along the LP Walsh Road where the levels measured 10 ug/l. The LP Walsh Road was used primarily by mining vehicles so this site would be expected to be influenced by the activity.

Carp Creek (Water Chemistry Station F)

Carp Creek from the Ishpeming WWTP to Deer lake is currently listed as not meeting WQS for low dissolved oxygen (Category 5) in the 2010 Integrated Report. Past Carp Creek dissolved oxygen studies were conducted and reported in Suppnick, 2001. Only water chemistry nutrient samples were collected at Station F in order to help assess our understanding regarding summer ambient phosphorus concentrations and the occurrence of instream aquatic plant beds that may help explain dissolved oxygen fluctuations. These data will be used to support NPDES permit development for the Ishpeming WWTP and possibility facilitate dissolved oxygen Total Maximum Daily Load work on the Carp Creek upstream of Deer Lake.

CONCLUSION

All 30 probabilistic sites in the 2008 OPIMU River watersheds were supporting the “other indigenous aquatic life and wildlife” component of the designated use specified in Rule 323.1100(1)(e) of the Michigan WQS. Based on these data and the probabilistic monitoring methodology, we are 95% confident that between 87 and 100% of the total river miles in these watersheds are attaining the “other indigenous aquatic life and wildlife” designated use. This is encouraging given the extensive historic logging and iron mining legacy issues documented by MDEQ staff (Taft, 1990; 1992a; 1992b, 1994; and 2000) in the OPIMU watershed.

Among 7 targeted sites assessed for benthic macroinvertebrates, 4 scored excellent and 3 rated acceptable (only 1 of 7 had a metric score less than 0). The habitat condition at 5 of these targeted sites rated excellent and 2 rated good. All targeted stations where benthos were monitored were meeting Michigan WQS.

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Table 1. 2008 site locations for selected streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

Station #	Stream Name	Location	Stream Width (ft)	Latitude	Longitude	STORET	Survey Type	Sample Type	Classification (Randomized only)	Macroinvertebrate Rating (Score)*	Habitat Rating (Score)**
1	Powder Mill Creek	US-2	19	46.48078	-90.07906	270193	Targeted	M, H, WC, E	Cold-small	Acceptable (4)	Excellent (168)
2	Black River	Mill Street (Ramsay Park)	4	46.47255	-90.00090	270192	Randomized	M, H	Cold-medium	Excellent (5)	Good (150)
3	Jackson Creek	Presque Isle Road	26.5	46.53515	-89.92826	270144	Randomized	M, H	Cold-small	Excellent (7)	Good (150)
4	Powder Mill Creek	upstream Black River confluence	19.5	46.51023	-90.07286	270194	Targeted	M, H, WC, E	Cold-small	Excellent (5)	Excellent (177)
5	Black River	upstream Reed Creek confluence	63	46.57500	-90.07970	270191	Randomized	M, H	Warm-large	Excellent (6)	Excellent (177)
6	Presque Isle River	off Copps Mine Road	65	46.41519	-89.69585	270197	Randomized	M, H	Warm-large	Excellent (7)	Excellent (175)
7	Little Iron River	Nonesuch Mine/Falls site	25	46.75346	-89.61977	660159	Randomized	M, H	Warm-small	Excellent (8)	Excellent (178)
8	Mineral River	M-64	15.5	46.73340	-89.56308	660158	Randomized	M, H	Warm-small	Acceptable (2)	Excellent (167)
9	Mineral River	two-track off M-64	25	46.78573	-89.57062	660170	Randomized	M, H	Warm-small	Acceptable (-1)	Excellent (161)
10	Portal Creek	mouth u/s	5.5	46.79500	-89.55960	660107	Targeted	M, H, WC	N/A	Acceptable (-3)	Good (154)
11	Pine Creek	NE of #2 tailing basin (Middle)	9.5	46.80650	-89.48937	660160	Targeted	M, H, WC	Warm-small	Acceptable (2)	Good (146)
12	Pine Creek	M-64, Geisen property (Lower)	17.5	46.83533	-89.48859	660161	Targeted	M, H, WC	Warm-small	Acceptable (1)	Good (122)
13	Duck Creek	LP Walsh Road	3	46.73700	-89.49100	660171	Randomized	M, H	Warm-small	Acceptable (0)	Good (147)
14	Duck Creek	M-64	40	46.83600	-89.47000	660168	Randomized	M, H	Warm-small	Acceptable (-1)	Excellent (157)
15	Deer Creek	Norwich Road	10	46.76000	-89.37000	660104	Randomized	M, H	Warm-small	Acceptable (3)	Excellent (144)
16	Slate River	US-2	18	46.36870	-89.55640	270147	Randomized	M, H	Cold-small	Excellent (6)	Excellent (181)
17	Trout Brook	two-track off East Shore Road	5	46.39700	-89.48800	270198	Randomized	M, H	Cold-small	Acceptable (3)	Excellent (189)
18	Ten Mile Creek	off Fair Oaks Road	35	46.48100	-89.34000	660169	Randomized	M, H	Warm-medium	Acceptable (1)	Good (110)
19	Two Mile Creek	Sucker Lake Road	15	46.33000	-89.32400	270199	Randomized	M, H	Cold-small	Acceptable (-1)	Excellent (163)
20	Tamarack River	Forest Highway 3340	25	46.28700	-89.01200	270196	Randomized	M, H	Cold-small	Excellent (5)	Excellent (188)
21	Roselawn Creek	Sleepy Hollow Road	45	46.40430	-89.20321	660172	Randomized	M, H	Cold-small	Acceptable (3)	Excellent (171)
22	S B Ontonagon River	Sironen Road	-	46.55000	-89.28000	660176	Randomized	M	Warm-large	Good (63)^	N/A
23	Trout Creek	Four Mile Square Road	10	46.46308	-89.03161	660166	Randomized	M, H	Cold-small	Excellent (5)	Excellent (173)
24	Jumbo River	Calder Road	30	46.46503	-88.91594	310470	Randomized	M, H	Cold-small	Excellent (7)	Excellent (188)
25	E B Ontonagon River	M-28 (downstream)	30	46.48600	-88.88900	310404	Randomized	M, H	Cold-medium	Excellent (6)	Excellent (160)
26	Onion Creek	Forest Highway 1100	8	46.56900	-88.95000	310471	Randomized	M, H	Cold-small	Acceptable (3)	Good (115)
27	E B Ontonagon River	Gardner Road	40	46.65800	-89.04700	660167	Randomized	M, H	Cold-large	Excellent (7)	Good (126)
28	Ontonagon River	Victoria Dam Road	-	46.72100	-89.20600	660036	Randomized	M	Warm-very large	Good (66)^	N/A
29	Brodie Creek	ORV crossing East of Phoenix	9	47.38141	-88.28236	420173	Targeted	M, H, WC	Cold-small	Excellent (7)	Excellent (184)
30	W B Eagle River	upstream Cliffs Mine Site	5	47.36680	-88.32210	420128	Targeted	M, H, WC	Cold-small	Excellent (6)	Excellent (161)
A	Powder Mill Creek	Falls	-	46.50837	-90.08057	270195	Targeted	WC, E	N/A	N/A	N/A
B	Portal Creek	Upper Crossing	-	46.78146	-89.55910	660162	Targeted	WC	N/A	N/A	N/A
C	Pine Creek	LP Walsh Road	-	46.73678	-89.51472	660163	Targeted	WC	N/A	N/A	N/A
D	Duck Creek	Control	-	46.82770	-89.46940	660164	Targeted	WC	N/A	N/A	N/A
E	Halfway Creek	Control	-	46.82980	-89.45090	660165	Targeted	WC	N/A	N/A	N/A
F	Carp Creek	Ishpeming WWTP	22	46.49620	-87.68150	520289	Targeted	WC	N/A	N/A	N/A

*Total P51 Score unless otherwise noted. Scores range from -9 to 9.

**Total P51 Score. Scores range from 0 to 200.

^Non-wadeable river assessment procedure total score. Scores range from 0 to 100.

M - Macroinvertebrate, H - Habitat, WC - Water Chemistry, E - *E. coli*

Table 2A. Qualitative macroinvertebrate sampling results for selected streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

TAXA	Powder Mill Creek US-2 6/18/2008 STATION 1	Black River Mill St (ramsay Park) 6/18/2008 STATION 2	Jackson Creek Presque Isle Rd 6/18/2008 STATION 3	Powder Mill Creek u/s Black River conf. 6/12/2008 STATION 4
ANNELIDA (segmented worms)				
Oligochaeta (worms)	6	3	12	20
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	9		1	
Decapoda (crayfish)	3	25	5	12
Insecta				
Ephemeroptera (mayflies)				
Baetidae	12	38	20	35
Caenidae	31		2	
Ephemerellidae	3	3	35	31
Ephemeridae	56			
Heptageniidae	20	34	20	45
Isonychiidae		3		
Leptophlebiidae	9	8	35	37
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	1		1	1
Cordulegastridae	6		1	
Gomphidae		14	19	2
Zygoptera (damselflies)				
Calopterygidae	12		1	
Plecoptera (stoneflies)				
Chloroperlidae			1	
Leuctridae		1		2
Nemouridae				1
Perlidae		7	1	
Perlodidae				1
Hemiptera (true bugs)				
Gerridae	1	1	1	1
Saldidae	2			
Veliidae			2	2
Megaloptera				
Corydalidae (dobson flies)		1	1	1
Trichoptera (caddisflies)				
Glossosomatidae		1		
Hydropsychidae	3	7	4	9
Hydroptilidae	6		4	6
Leptoceridae	3		1	
Limnephilidae	2	1	1	3
Philopotamidae		4	5	2
Polycentropodidae	1			
Uenoidae	2			
Coleoptera (beetles)				
Dytiscidae (total)	6			
Haliplidae (adults)	1			2
Hydrophilidae (total)	3		2	1
Dryopidae			1	
Elmidae	11	6	13	12
Diptera (flies)				
Athericidae			2	
Ceratopogonidae	1		2	3
Chironomidae	63	37	24	47
Dixidae	1			
Simuliidae		3	16	
Tabanidae	2			
Tipulidae	3	1	16	3
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)	3		1	
Physidae	9			1
Planorbidae	1			
Pelecypoda (bivalves)				
Sphaeriidae (clams)	5		1	
TOTAL INDIVIDUALS	297	198	251	280

Table 2B. Macroinvertebrate metric evaluation of selected streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

	Powder Mill Creek US-2 6/18/2008 STATION 1		Black River Mill St (Ramsay Park) 6/18/2008 STATION 2		Jackson Creek Presque Isle Rd 6/18/2008 STATION 3		Powder Mill Creek u/s Black River conf. 6/12/2008 STATION 4	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	33	1	20	0	32	1	25	0
NUMBER OF MAYFLY TAXA	6	1	5	1	5	1	4	0
NUMBER OF CADDISFLY TAXA	6	1	4	0	5	0	4	0
NUMBER OF STONEFLY TAXA	0	-1	2	1	2	1	3	1
PERCENT MAYFLY COMP.	44.11	1	43.43	1	44.62	1	52.86	1
PERCENT CADDISFLY COMP.	5.72	0	6.57	0	5.98	0	7.14	0
PERCENT DOMINANT TAXON	21.21	0	19.19	0	13.94	1	16.79	1
PERCENT ISOPOD, SNAIL, LEECH	4.38	0	0.00	1	0.40	1	0.36	1
PERCENT SURF. AIR BREATHERS	4.38	1	0.51	1	1.99	1	2.14	1
TOTAL SCORE		4		5		7		5
MACROINV. COMMUNITY RATING		ACCEPT.		EXCELLENT		EXCELLENT		EXCELLENT

Table 2A (cont.). Qualitative macroinvertebrate sampling results for selected streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

TAXA	Black River u/s of Reed Creek conf. 6/19/2008 STATION 5	Presque Isle River off Copps Mine Rd 6/25/2008 STATION 6	Little Iron River Nonesuch Mine/Falls Site 6/20/2008 STATION 7	Mineral River M-64 6/19/2008 STATION 8
PLATYHELMINTHES (flatworms)				
Turbellaria		1		
BRYOZOA (moss animals)				1
ANNELIDA (segmented worms)				
Oligochaeta (worms)	11	4		3
ARTHROPODA				
Crustacea				
Amphipoda (scuds)		1		
Decapoda (crayfish)	11	25	1	4
Arachnoidea				
Hydracarina		2		
Insecta				
Ephemeroptera (mayflies)				
Baetidae	27	28	16	18
Caenidae	10	21	1	31
Ephemerellidae	29	5	55	8
Ephemeridae				1
Heptageniidae	47	18	10	42
Isonychiidae	16	1		
Leptophlebiidae	60		20	
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	1	2	2	
Cordulegastridae			1	
Gomphidae	1	5	15	3
Macromiidae		2		
Zygoptera (damselflies)				
Calopterygidae	2	2		
Plecoptera (stoneflies)				
Chloroperlidae			1	
Nemouridae	1	1		
Perlidae	10	1	7	
Perlodidae		1		
Hemiptera (true bugs)				
Gerridae	1		4	21
Veliidae	1		6	4
Megaloptera				
Corydalidae (dobson flies)		3		2
Sialidae (alder flies)		1		
Trichoptera (caddisflies)				
Brachycentridae		4		
Glossosomatidae			5	1
Helicopsychidae			5	
Hydropsychidae	20	5	33	
Hydroptilidae				23
Lepidostomatidae			2	
Leptoceridae	1	1	2	2
Limnephilidae	1	25		2
Odontoceridae			2	1
Philopotamidae	3		19	
Phryganeidae		6		
Polycentropodidae		1		
Rhyacophilidae			15	
Uenoidae	2			
Coleoptera (beetles)				
Hydrophilidae (total)			2	
Elmidae	23	17	10	27
Diptera (flies)				
Athericidae	3		4	1
Ceratopogonidae	3	2	1	6
Chironomidae	31	36	52	40
Empididae	1			
Simuliidae	1	2	32	3
Tabanidae	6		5	
Tipulidae	1		5	2
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)		1		
Hydrobiidae		1		
Pelecypoda (bivalves)				
Sphaeriidae (clams)		59		
TOTAL INDIVIDUALS	324	284	333	246

Table 2B (cont.). Macroinvertebrate metric evaluation of selected streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

METRIC	Black River u/s of Reed Creek conf. 6/19/2008 STATION 5		Presque Isle River off Copps Mine Rd 6/25/2008 STATION 6		Little Iron River Nonesuch Mine/Falls Site 6/20/2008 STATION 7		Mineral River M-64 6/19/2008 STATION 8	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	28	1	32	1	29	1	23	0
NUMBER OF MAYFLY TAXA	6	1	5	1	5	1	5	1
NUMBER OF CADDISFLY TAXA	5	0	6	1	8	1	5	0
NUMBER OF STONEFLY TAXA	2	1	3	1	2	1	0	-1
PERCENT MAYFLY COMP.	58.33	1	25.70	1	30.63	1	40.65	1
PERCENT CADDISFLY COMP.	8.33	0	14.79	0	24.92	0	11.79	0
PERCENT DOMINANT TAXON	18.52	0	20.77	0	16.52	1	17.07	0
PERCENT ISOPOD, SNAIL, LEECH	0.00	1	0.70	1	0.00	1	0.00	1
PERCENT SURF. AIR BREATHERS	0.62	1	0.00	1	3.60	1	10.16	0
TOTAL SCORE		6		7		8		2
MACROINV. COMMUNITY RATING		EXCELLENT		EXCELLENT		EXCELLENT		ACCEPT.

Table 2A (cont.). Qualitative macroinvertebrate sampling results for selected streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

TAXA	Mineral River two-trk off M-64 6/24/2008 STATION 9	Portal Creek mouth u/s 6/21/2008 STATION 10	Pine Creek NE of #2 Tailing Basin (Middle) 6/21/2008 STATION 11	Pine Creek M-64, Geisen property (Lower) 6/22/2008 STATION 12
BRYOZOA (moss animals)		1		
ANNELIDA (segmented worms)				
Oligochaeta (worms)	1	1		
ARTHROPODA				
Crustacea				
Amphipoda (scuds)				19
Decapoda (crayfish)				1
Isopoda (sowbugs)				78
Arachnoidea				
Hydracarina			1	
Insecta				
Ephemeroptera (mayflies)				
Baetidae		11	37	2
Caenidae			20	16
Ephemerellidae			2	3
Ephemeridae				1
Heptageniidae			89	35
Leptophlebiidae			15	
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	5			8
Cordulegastridae	1	2		
Macromiidae	2			
Zygoptera (damselflies)				
Lestidae		1		
Plecoptera (stoneflies)				
Chloroperlidae			1	
Perlidae	1		8	1
Hemiptera (true bugs)				
Belostomatidae		1		
Corixidae		1		4
Gerridae		3	2	7
Veliidae		1	2	2
Megaloptera				
Corydalidae (dobson flies)			7	
Sialidae (alder flies)				1
Trichoptera (caddisflies)				
Glossosomatidae				5
Helicopsychidae	2			
Hydropsychidae	21	2	3	
Hydroptilidae				2
Lepidostomatidae	1			
Leptoceridae				3
Limnephilidae			1	16
Coleoptera (beetles)				
Dytiscidae (total)				6
Gyrinidae (adults)				1
Hydrophilidae (total)		3	1	1
Dryopidae			1	3
Elmidae	1	1	34	6
Diptera (flies)				
Ceratopogonidae	3	1	12	1
Chironomidae	26	6	33	21
Simuliidae	22	213	6	
Stratiomyidae				1
Tabanidae		1		1
Tipulidae				1
MOLLUSCA				
Gastropoda (snails)				
Lymnaeidae				1
Planorbidae				1
Pelecypoda (bivalves)				
Sphaeriidae (clams)	4			1
Unionidae (mussels)				4
TOTAL INDIVIDUALS	90	249	275	253

Table 2B (cont.). Macroinvertebrate metric evaluation of selected streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

METRIC	Mineral River two-trk off M-64 6/24/2008 STATION 9		Portal Creek mouth u/s 6/21/2008 STATION 10		Pine Creek NE of #2 Tailing Basin (Middle) 6/21/2008 STATION 11		Pine Creek M-64, Geisen property (Lower) 6/22/2008 STATION 12	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	13	0	16	0	19	0	32	1
NUMBER OF MAYFLY TAXA	0	-1	1	-1	5	1	5	1
NUMBER OF CADDISFLY TAXA	3	0	1	-1	2	-1	4	0
NUMBER OF STONEFLY TAXA	1	0	0	-1	2	1	1	0
PERCENT MAYFLY COMP.	0.00	-1	4.42	0	59.27	1	22.53	1
PERCENT CADDISFLY COMP.	26.67	0	0.80	-1	1.45	-1	10.28	0
PERCENT DOMINANT TAXON	28.89	-1	85.54	-1	32.36	-1	30.83	-1
PERCENT ISOPOD, SNAIL, LEECH	0.00	1	0.00	1	0.00	1	31.62	-1
PERCENT SURF. AIR BREATHERS	0.00	1	3.61	1	1.82	1	8.70	0
TOTAL SCORE		-1		-3		2		1
MACROINV. COMMUNITY RATING		ACCEPT.		ACCEPT.		ACCEPT.		ACCEPT.

Table 2A (cont.). Qualitative macroinvertebrate sampling results for selected streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

TAXA	Duck Creek LP Walsh Rd 6/24/2008 STATION 13	Duck Creek M-64 6/24/2008 STATION 14	Deer Creek Norwich Rd 6/24/2008 STATION 15	Slate River At US-2 6/17/2008 STATION 16
PLATYHELMINTHES (flatworms)				
Turbellaria		1		
BRYOZOA (moss animals)			1	
ANNELIDA (segmented worms)				
Oligochaeta (worms)	15	8	2	1
ARTHROPODA				
Crustacea				
Amphipoda (scuds)		12		
Decapoda (crayfish)		1	1	
Isopoda (sowbugs)	1	89		
Arachnoidea				
Hydracarina	4	7		1
Insecta				
Ephemeroptera (mayflies)				
Baetidae	6	21	4	30
Caenidae		1	23	3
Ephemerellidae		2		2
Heptageniidae		39	14	17
Isonychiidae	1			
Leptophlebiidae				2
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	2	3	2	9
Cordulegastridae	2			
Gomphidae			9	25
Macromiidae			2	
Zygoptera (damselflies)				
Calopterygidae			7	
Plecoptera (stoneflies)				
Leuctridae				3
Perlidae			1	1
Perlodidae		1		
Hemiptera (true bugs)				
Gerridae	10	1	1	1
Nepidae		1		
Veliidae			4	1
Megaloptera				
Corydalidae (dobson flies)			1	2
Sialidae (alder flies)		1		1
Trichoptera (caddisflies)				
Brachycentridae		1		2
Glossosomatidae		1		8
Helicopsychidae		12	2	2
Hydropsychidae			1	14
Lepidostomatidae			1	2
Leptoceridae	1	3		
Limnephilidae	11		1	4
Molannidae				2
Philopotamidae				6
Polycentropodidae			1	1
Uenoidae				1
Coleoptera (beetles)				
Dytiscidae (total)	8	16		
Haliplidae (adults)		7		
Hydrophilidae (total)	1			
Dryopidae	2			
Elmidae	2	1	9	12
Diptera (flies)				
Athericidae				1
Ceratopogonidae	8	3	8	5
Chironomidae	100	36	17	74
Simuliidae				35
Tabanidae				8
Tipulidae			1	2
MOLLUSCA				
Gastropoda (snails)				
Hydrobiidae		7		
Physidae		2		
Planorbidae		1		1
Pelecypoda (bivalves)				
Sphaeriidae (clams)	2		1	12
TOTAL INDIVIDUALS	176	278	114	291

Table 2B (cont.). Macroinvertebrate metric evaluation of selected streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

METRIC	Duck Creek LP Walsh Road 6/24/2008 STATION 13		Duck Creek M-64 6/24/2008 STATION 14		Deer Creek Norwich Road 6/24/2008 STATION 15		Slate River At US-2 6/17/2008 STATION 16	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	17	1	27	0	24	0	34	1
NUMBER OF MAYFLY TAXA	2	1	4	0	3	0	5	1
NUMBER OF CADDISFLY TAXA	2	-1	4	0	5	0	10	1
NUMBER OF STONEFLY TAXA	0	-1	1	0	1	0	2	1
PERCENT MAYFLY COMP.	3.98	0	22.66	1	35.96	1	18.56	0
PERCENT CADDISFLY COMP.	6.82	0	6.12	0	5.26	0	14.43	0
PERCENT DOMINANT TAXON	56.82	-1	32.01	-1	20.18	0	25.43	0
PERCENT ISOPOD, SNAIL, LEECH	0.57	1	35.61	-1	0.00	1	0.34	1
PERCENT SURF. AIR BREATHERS	10.80	0	8.99	0	4.39	1	0.69	1
TOTAL SCORE		0		-1		3		6
MACROINV. COMMUNITY RATING		ACCEPT.		ACCEPT.		ACCEPT.		EXCELLENT

Table 2A (cont.). Qualitative macroinvertebrate sampling results for selected streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

TAXA	Trout Brook two-trk off East Shore Rd 6/25/2008 STATION 17	Ten Mile Creek off Fair Oaks Rd 6/25/2008 STATION 18	Two Mile Creek Sucker Lake Rd 6/27/2008 STATION 19	Tamarack River Forest Hwy 3340 6/27/2008 STATION 20
PORIFERA (sponges)	1		1	
BRYOZOA (moss animals)	1			
ANNELIDA (segmented worms)				
Hirudinea (leeches)			1	
Oligochaeta (worms)	14	1	3	21
ARTHROPODA				
Crustacea				
Amphipoda (scuds)			1	
Decapoda (crayfish)		3	8	6
Isopoda (sowbugs)			40	1
Arachnoidea				
Hydracarina		3	9	
Insecta				
Ephemeroptera (mayflies)				
Baetiscidae			1	
Baetidae	5	10	11	5
Caenidae	3	4	23	2
Ephemerellidae				1
Heptageniidae	2	41	3	21
Isonychiidae		1		
Leptophlebiidae	1			
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	1	2		1
Cordulegastridae			1	1
Gomphidae		10	5	8
Macromiidae	1		3	
Zygoptera (damselflies)				
Calopterygidae			1	6
Plecoptera (stoneflies)				
Perlidae	26	14	3	6
Perlodidae		1		1
Hemiptera (true bugs)				
Gerridae	1	1	1	1
Megaloptera				
Corydalidae (dobson flies)	5		1	2
Sialidae (alder flies)			2	
Neuroptera (spongilla flies)				
Sisyridae			1	
Trichoptera (caddisflies)				
Brachycentridae				23
Glossosomatidae				10
Hydropsychidae		4		71
Hydroptilidae	1			8
Leptoceridae				1
Limnephilidae	14	1	8	9
Philopotamidae				7
Sericostomatidae				1
Coleoptera (beetles)				
Haliplidae (adults)		2		
Elmidae	38	17	8	6
Diptera (flies)				
Athericidae				2
Ceratopogonidae	8	6		
Chironomidae	68	11	47	22
Simuliidae	34		2	4
Tipulidae	6		1	2
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)				1
Hydrobiidae		5		1
Physidae		1		1
Viviparidae		1		
Pelecypoda (bivalves)				
Sphaeriidae (clams)	5	9	28	6
Unionidae (mussels)		1		
TOTAL INDIVIDUALS	235	149	213	258

Table 2B (cont.). Macroinvertebrate metric evaluation of selected streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

METRIC	Trout Brook two-trk off East Shore Rd 6/25/2008 STATION 17		Ten Mile Creek off Fair Oaks Rd 6/25/2008 STATION 18		Two Mile Creek Sucker Lake Rd 6/27/2008 STATION 19		Tamarack River Forest Hwy 3340 6/27/2008 STATION 20	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	20	1	23	0	26	0	32	1
NUMBER OF MAYFLY TAXA	4	1	4	0	4	0	4	0
NUMBER OF CADDISFLY TAXA	2	-1	2	-1	1	-1	8	1
NUMBER OF STONEFLY TAXA	1	1	2	1	1	0	2	1
PERCENT MAYFLY COMP.	4.68	0	37.58	1	17.84	0	11.24	0
PERCENT CADDISFLY COMP.	6.38	0	3.36	0	3.76	0	50.39	1
PERCENT DOMINANT TAXON	28.94	-1	27.52	-1	22.07	0	27.52	-1
PERCENT ISOPOD, SNAIL, LEECH	0.00	1	4.70	0	19.25	-1	1.55	1
PERCENT SURF. AIR BREATHERS	0.43	1	2.01	1	0.47	1	0.39	1
TOTAL SCORE		3		1		-1		5
MACROINV. COMMUNITY RATING		ACCEPT.		ACCEPT.		ACCEPT.		EXCELLENT

Table 2A (cont.). Qualitative macroinvertebrate sampling results for selected streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

TAXA	Roselawn Creek Sleepy Hollow Rd 6/27/2008 STATION 21	Trout Creek Four Mile Square Rd 6/26/2008 STATION 23	Jumbo River Calder Rd 6/26/2008 STATION 24	E B Ontonagon River M-28 (downstream) 6/26/2008 STATION 25
PORIFERA (sponges)	1			
PLATYHELMINTHES (flatworms)				
Turbellaria		2		
NEMATOMORPHA (roundworms)		1		1
ANNELIDA (segmented worms)				
Hirudinea (leeches)		1	1	
Oligochaeta (worms)	4	1	2	
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	3			
Decapoda (crayfish)	4			
Isopoda (sowbugs)	10			
Arachnoidea				
Hydracarina	2		3	
Insecta				
Ephemeroptera (mayflies)				
Baetiscidae	2			
Baetidae	19	19	9	6
Caenidae	2		3	1
Ephemerellidae	11	16	37	22
Heptageniidae	4	1	10	14
Isonychiidae				1
Leptophlebiidae		8	5	6
Tricorythidae		1		
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	1	4		1
Cordulegastridae		12	1	
Gomphidae	14		1	5
Zygoptera (damselflies)				
Calopterygidae	3	2		2
Coenagrionidae	1			
Plecoptera (stoneflies)				
Leuctridae			1	
Perlidae	6	2	12	4
Pteronarcyidae	1			9
Hemiptera (true bugs)				
Corixidae	1			
Gerridae	1			1
Megaloptera				
Corydalidae (dobson flies)		1	2	1
Sialidae (alder flies)		1		
Trichoptera (caddisflies)				
Brachycentridae	8	1	27	78
Glossosomatidae	1	6	11	4
Helicopsychidae		3		14
Hydropsychidae	1	5	8	4
Hydroptilidae			1	
Lepidostomatidae		135		
Leptoceridae		4		
Limnephilidae	12	7	48	9
Molannidae		1		
Philopotamidae		3	1	1
Uenoidae		2		2
Coleoptera (beetles)				
Haliplidae (adults)	1			
Hydrophilidae (total)		1		
Elmidae	5	4	5	14
Diptera (flies)				
Athericidae		5	5	5
Ceratopogonidae	5	1	1	
Chironomidae	50	20	71	25
Empididae	2			
Simuliidae	106	3	4	5
Tabanidae	1	1		
Tipulidae	2	4	6	2
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)	3			6
Physidae	7	5	3	
Pelecypoda (bivalves)				
Sphaeriidae (clams)	1	4	1	4
TOTAL INDIVIDUALS	295	287	279	247

Table 2B (cont.). Macroinvertebrate metric evaluation of selected streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

METRIC	Roselawn Creek Sleepy Hollow Rd 6/27/2008 STATION 21		Trout Creek Four Mile Square Rd 6/26/2008 STATION 23		Jumbo River Calder Rd 6/26/2008 STATION 24		E B Ontonagon River M-28 (downstream) 6/26/2008 STATION 25	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	34	1	35	1	27	0	28	1
NUMBER OF MAYFLY TAXA	5	1	5	1	5	1	6	1
NUMBER OF CADDISFLY TAXA	4	0	10	1	6	1	7	1
NUMBER OF STONEFLY TAXA	2	1	1	0	2	1	2	1
PERCENT MAYFLY COMP.	12.88	0	15.68	0	22.94	1	20.24	0
PERCENT CADDISFLY COMP.	7.46	0	58.19	1	34.41	1	45.34	1
PERCENT DOMINANT TAXON	35.93	-1	47.04	-1	25.45	0	31.58	-1
PERCENT ISOPOD, SNAIL, LEECH	6.78	0	2.09	1	1.43	1	2.43	1
PERCENT SURF. AIR BREATHERS	1.02	1	0.35	1	0.00	1	0.40	1
TOTAL SCORE		3		5		7		6
MACROINV. COMMUNITY RATING		ACCEPT.		EXCELLENT		EXCELLENT		EXCELLENT

Table 2A (cont.). Qualitative macroinvertebrate sampling results for selected streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

TAXA	Onion Creek Forest Hwy 1100 6/26/2008 STATION 26	E B Ontonagon River Gardner Rd 6/27/2008 STATION 27	Brodie Creek ORV Crossing East of Phoenix 6/22/2008 STATION 29	W B Eagle River u/s Cliffs Mine Site 6/22/2008 STATION 30
PORIFERA (sponges)		1		
ANNELIDA (segmented worms)				
Hirudinea (leeches)	1		2	
Oligochaeta (worms)	1	2	4	4
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	5			
Decapoda (crayfish)	1			
Arachnoidea				
Hydracarina	5			1
Insecta				
Ephemeroptera (mayflies)				
Baetidae	11	30	34	44
Caenidae	2	1		
Ephemerellidae	1	15	26	
Ephemeridae	1			
Heptageniidae	1	32	13	
Leptophlebiidae		5	3	
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	10	2	4	
Cordulegastridae	9	1	11	1
Gomphidae	1	21		
Macromiidae	3			
Zygoptera (damselflies)				
Calopterygidae	4	5		
Plecoptera (stoneflies)				
Leuctridae			23	18
Nemouridae				5
Perlidae		2	1	
Perlodidae		1	2	
Pteronarcyidae		53		
Hemiptera (true bugs)				
Corixidae	1			
Gerridae	6		5	1
Veliidae			1	
Megaloptera				
Sialidae (alder flies)			3	
Trichoptera (caddisflies)				
Brachycentridae	3	29		
Glossosomatidae			20	
Hydropsychidae			2	1
Hydroptilidae	6	25		1
Lepidostomatidae			2	13
Leptoceridae		2		
Limnephilidae	28	4	90	35
Molannidae	2		1	
Philopotamidae	1		17	63
Phryganeidae		1		
Polycentropodidae		1		2
Rhyacophilidae				1
Sericostomatidae	1			
Uenoidae				1
Coleoptera (beetles)				
Hydrophilidae (total)			1	1
Dryopidae	2			
Elmidae	45	3	8	8
Diptera (flies)				
Athericidae			6	
Ceratopogonidae	1	3	1	5
Chironomidae	65	12	14	19
Simuliidae	2	1	2	34
Tabanidae	1	1	1	
Tipulidae		2	1	2
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)		1		
Physidae	3	2	1	
Pelecypoda (bivalves)				
Sphaeriidae (clams)	1			
TOTAL INDIVIDUALS	224	258	299	260

Table 2B (cont.). Macroinvertebrate metric evaluation of selected streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

METRIC	Onion Creek Forest Hwy 1100 6/26/2008 STATION 26		E B Ontonagon River Gardner Rd 6/27/2008 STATION 27		Brodie Creek ORV Crossing East of Phoenix 6/22/2008 STATION 29		W B Eagle River u/s Cliffs Mine Site 6/22/2008 STATION 30	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	31	1	28	1	29	1	21	1
NUMBER OF MAYFLY TAXA	5	1	5	1	4	1	1	0
NUMBER OF CADDISFLY TAXA	6	1	6	1	6	1	8	1
NUMBER OF STONEFLY TAXA	0	-1	3	1	3	1	2	1
PERCENT MAYFLY COMP.	7.14	0	32.17	1	25.42	1	16.92	0
PERCENT CADDISFLY COMP.	18.30	0	24.03	0	44.15	1	45.00	1
PERCENT DOMINANT TAXON	29.02	-1	20.54	0	30.10	-1	24.23	0
PERCENT ISOPOD, SNAIL, LEECH	1.79	1	1.16	1	1.00	1	0.00	1
PERCENT SURF. AIR BREATHERS	3.13	1	0.00	1	2.34	1	0.77	1
TOTAL SCORE		3		7		7		6
MACROINV. COMMUNITY RATING		ACCEPT.		EXCELLENT		EXCELLENT		EXCELLENT

Table 3. Habitat evaluation for select streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

HABITAT METRIC	Powder Mill Creek US-2 GLIDE/POOL STATION 1	Black River Mill St (Ramsay Park) RIFFLE/RUN STATION 2	Jackson Creek Presque Isle Rd RIFFLE/RUN STATION 3	Powder Mill Creek u/s Black River conf. RIFFLE/RUN STATION 4	Black River u/s of Reed Creek conf. RIFFLE/RUN STATION 5
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	16	15	16	17	18
Embeddedness (20)*		20	19	19	19
Velocity/Depth Regime (20)*		15	15	14	13
Pool Substrate Characterization (20)**	17				
Pool Variability (20)**	13				
Channel Morphology					
Sediment Deposition (20)	19	20	6	19	17
Flow Status - Maint. Flow Volume (10)	10	9	7	9	8
Flow Status - Flashiness (10)	10	8	5	9	8
Channel Alteration (20)	20	17	19	19	20
Frequency of Riffles/Bends (20)*		14	13	17	18
Channel Sinuosity (20)**	9				
Riparian and Bank Structure					
Bank Stability (L) (10)	9	10	6	10	8
Bank Stability (R) (10)	9	10	6	10	8
Vegetative Protection (L) (10)	8	4	9	9	10
Vegetative Protection (R) (10)	10	4	9	9	10
Riparian Veg. Zone Width (L) (10)	8	2	10	6	10
Riparian Veg. Zone Width (R) (10)	10	2	10	10	10
TOTAL SCORE (200):	168	150	150	177	177
HABITAT RATING:	EXCELLENT (NON-IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	EXCELLENT (NON-IMPAIRED)	EXCELLENT (NON-IMPAIRED)

Note: Individual metrics may better describe conditions directly affecting the biological community while the Habitat Ratin describes the general riverine environment at the site(s)

Date:	6/18/2008	6/18/2008	6/18/2008	6/12/2008	6/19/2008
Weather:	Sunny	Sunny	Sunny	Sunny	Sunny
Air Temperature:	70 Deg. F.	68 Deg. F.	60 Deg. F.	68 Deg. F.	60 Deg. F.
Water Temperature:	65 Deg. F.	71 Deg. F.	55 Deg. F.	65 Deg. F.	61 Deg. F.
Ave. Stream Width:	19 Feet	4 Feet	26.5 Feet	19.5 Feet	63 Feet
Ave. Stream Depth:	1.2 Feet	1.2 Feet	0.7 Feet	0.6 Feet	1.1 Feet
Surface Velocity:	0.5 Ft./Sec.	1.4 Ft./Sec.	1.0 Ft./Sec.	1.3 Ft./Sec.	3.3 Ft./Sec.
Estimated Flow:	10.3 CFS	6.7 CFS	17.8 CFS	14.6 CFS	228.7 CFS
Stream Modifications:	Canopy Removal	Bank Stabilization	None	Relocated at road	None
Nuisance Plants (Y/N):	N	N	N	N	N
Report Number:					
STORET No.:	270193	270192	270144	270194	270191
Stream Name:	Powder Mill Creek	Black River	Jackson Creek	Powder Mill Creek	Black River
Road Crossing/Location:	US-2	Mill St (Ramsay Park)	Presque Isle Rd	u/s Black River conf.	u/s of Reed Creek conf.
County Code:	27	27	27	27	27
TRS:	47N46W08	47N46W13	48N45W21	48N46W33	48N46W08
Latitude (dd):	46.48078	46.47255	46.53499	46.51023	46.575
Longitude (dd):	-90.07906	-90.0009	-89.92896	-90.07286	-90.0797
Ecoregion:	NLAF	NLAF	NLAF	NLAF	NLAF
Stream Type:	Coldwater	Coldwater	Coldwater	Coldwater	Coldwater
USGS Basin Code:	4020101	4020101	4020101	4020101	4020101

* Applies only to Riffle/Run stream Survey:
** Applies only to Glide/Pool stream Survey:

COMMENTS:

Table 3 (cont.). Habitat evaluation for select streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

HABITAT METRIC	Presque Isle River off Copps Mine Rd GLIDE/POOL STATION 6	Little Iron River Nonesuch Mine/Falls Site RIFFLE/RUN STATION 7	Mineral River M-64 RIFFLE/RUN STATION 8	Mineral River two-track off M-64 RIFFLE/RUN STATION 9	Portal Creek mouth u/s RIFFLE/RUN STATION 10
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	18	16	14	15	14
Embeddedness (20)*		19	18	17	13
Velocity/Depth Regime (20)*		11	15	13	10
Pool Substrate Characterization (20)**	12				
Pool Variability (20)**	15				
Channel Morphology					
Sediment Deposition (20)	15	20	18	13	10
Flow Status - Maint. Flow Volume (10)	9	5	4	5	6
Flow Status - Flashiness (10)	9	9	6	5	8
Channel Alteration (20)	20	20	20	20	20
Frequency of Riffles/Bends (20)*		18	18	15	17
Channel Sinuosity (20)**	18				
Riparian and Bank Structure					
Bank Stability (L) (10)	10	10	8	10	9
Bank Stability (R) (10)	10	10	8	8	9
Vegetative Protection (L) (10)	10	10	9	10	9
Vegetative Protection (R) (10)	10	10	9	10	9
Riparian Veg. Zone Width (L) (10)	9	10	10	10	10
Riparian Veg. Zone Width (R) (10)	10	10	10	10	10
TOTAL SCORE (200):	175	178	167	161	154
HABITAT RATING:	EXCELLENT (NON-IMPAIRED)	EXCELLENT (NON-IMPAIRED)	EXCELLENT (NON-IMPAIRED)	EXCELLENT (NON-IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)

Note: Individual metrics may better describe conditions directly affecting the biological community while the Habitat Rating describes the general riverine environment at the site(s)

Date:	6/25/2008	6/20/2008	6/19/2008	6/24/2008	6/21/2008
Weather:	Cloudy	Sunny	Sunny	Sunny	Sunny
Air Temperature:	65 Deg. F.	65 Deg. F.	64 Deg. F.	75 Deg. F.	60 Deg. F.
Water Temperature:	66 Deg. F.	59 Deg. F.	65 Deg. F.	63 Deg. F.	60 Deg. F.
Ave. Stream Width:	65 Feet	25 Feet	15.5 Feet	25 Feet	5.5 Feet
Ave. Stream Depth:	2.5 Feet	0.5 Feet	0.4 Feet	0.3 Feet	0.3 Feet
Surface Velocity:	1.0 Ft./Sec.	0.7 Ft./Sec.	0.2 Ft./Sec.	0.2 Ft./Sec.	0.1 Ft./Sec.
Estimated Flow:	162.5 CFS	7.9 CFS	1.1 CFS	1.3 CFS	0.1 CFS
Stream Modifications:	None	None	None	None	None
Nuisance Plants (Y/N):	N	N	N	N	N
Report Number:					
STORET No.:	270197	660159	660158	660170	660107
Stream Name:	Presque Isle River	Little Iron River	Mineral River	Mineral River	Portal Creek
Road Crossing/Location:	off Copps Mine Rd	Nonesuch Mine/Falls Site	M-64	two-track off M-64	mouth u/s
County Code:	27	66	66	66	66
TRS:	47N43W33	50N43W01	50N42W16	51N41W30	51N41W19
Latitude (dd):	46.41519	46.75346	46.7334	46.78573	46.79568
Longitude (dd):	-89.69585	-89.61977	-89.56308	-89.57062	-89.55576
Ecoregion:	NLAF	NLAF	NLAF	NLAF	NLAF
Stream Type:	Coldwater	Coldwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4020101	4020101	4020101	4020101	4020101

* Applies only to Riffle/Run stream Surveys
** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 3 (cont.). Habitat evaluation for select streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

HABITAT METRIC	Pine Creek NE of #2 Tailing Basin (Middle) RIFFLE/RUN STATION 11	Pine Creek M-64, Geisen property (Lower) GLIDE/POOL STATION 12	Duck Creek LP Walsh Rd GLIDE/POOL STATION 13	Duck Creek M-64 GLIDE/POOL STATION 14	Deer Creek Norwich Rd RIFFLE/RUN STATION 15
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	16	8	12	16	12
Embeddedness (20)*	17				19
Velocity/Depth Regime (20)*	8				8
Pool Substrate Characterization (20)**		9	12	5	
Pool Variability (20)**		13	5	13	
Channel Morphology					
Sediment Deposition (20)	15	11	13	18	13
Flow Status - Maint. Flow Volume (10)	5	7	5	8	5
Flow Status - Flashiness (10)	5	5	5	9	4
Channel Alteration (20)	18	20	20	20	15
Frequency of Riffles/Bends (20)*	18				16
Channel Sinuosity (20)**		7	19	12	
Riparian and Bank Structure					
Bank Stability (L) (10)	8	5	8	9	8
Bank Stability (R) (10)	8	5	8	7	7
Vegetative Protection (L) (10)	7	6	10	10	10
Vegetative Protection (R) (10)	7	6	10	10	8
Riparian Veg. Zone Width (L) (10)	7	10	10	10	10
Riparian Veg. Zone Width (R) (10)	7	10	10	10	9
TOTAL SCORE (200):	146	122	147	157	144
HABITAT RATING:	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	EXCELLENT (NON-IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)

Note: Individual metrics may better describe conditions directly affecting the biological community while the Habitat Rati describes the general riverine environment at the site(s)

Date:	6/21/2008	6/22/2008	6/24/2008	6/24/2008	6/24/2008
Weather:	Sunny	Sunny	Partly Cloudy	Partly Cloudy	Cloudy
Air Temperature:	60 Deg. F.	63 Deg. F.	70 Deg. F.	65 Deg. F.	70 Deg. F.
Water Temperature:	62 Deg. F.	62 Deg. F.	58 Deg. F.	60 Deg. F.	72 Deg. F.
Ave. Stream Width:	9.5 Feet	17.5 Feet	3 Feet	40 Feet	10 Feet
Ave. Stream Depth:	0.5 Feet	0.8 Feet	0.3 Feet	1.0 Feet	0.3 Feet
Surface Velocity:	0.1 Ft./Sec.	0.1 Ft./Sec.	0.1 Ft./Sec.	0.1 Ft./Sec.	0.5 Ft./Sec.
Estimated Flow:	0.4 CFS	1.1 CFS	0.1 CFS	4.0 CFS	1.5 CFS
Stream Modifications:	None	None	None	None	Canopy Removal
Nuisance Plants (Y/N):	N	N	N	N	N
Report Number:					
STORET No.:	660160	660161	660171	660168	660104
Stream Name:	Pine Creek	Pine Creek	Duck Creek	Duck Creek	Deer Creek
Road Crossing/Location:	NE of #2 Tailing Basin (Middle)	M-64, Geisen property (Lower)	LP Walsh Rd	M-64	Norwich Rd
County Code:	66	66	66	66	66
TRS:	51N41W22	51N41W10	50N42W13	51N41W11	50N41W01
Latitude (dd):	46.8065	46.83533	46.737	46.836	46.76
Longitude (dd):	-89.48937	-89.48859	-89.491	-89.47	-89.37
Ecoregion:	NLAF	NLAF	NLAF	NLAF	NLAF
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater	Coldwater
USGS Basin Code:	4020101	4020101	4020101	4020101	4020101

* Applies only to Riffle/Run stream Survey
** Applies only to Glide/Pool stream Survey

COMMENTS:

Table 3 (cont.). Habitat evaluation for select streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

HABITAT METRIC	Slate River US-2 RIFFLE/RUN STATION 16	Trout Brook two-track off East Shore Rd RIFFLE/RUN STATION 17	Ten Mile Creek off Fair Oaks Rd RIFFLE/RUN STATION 18	Two Mile Creek Sucker Lake Rd RIFFLE/RUN STATION 19	Tamarack River Forest Hwy 3340 RIFFLE/RUN STATION 20
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	19	18	10	17	17
Embeddedness (20)*	20	20	10	18	20
Velocity/Depth Regime (20)*	16	15	11	12	15
Pool Substrate Characterization (20)**					
Pool Variability (20)**					
Channel Morphology					
Sediment Deposition (20)	19	20	6	15	20
Flow Status - Maint. Flow Volume (10)	9	9	6	8	9
Flow Status - Flashiness (10)	10	9	3	5	8
Channel Alteration (20)	19	20	20	20	20
Frequency of Riffles/Bends (20)*	11	18	6	8	20
Channel Sinuosity (20)**					
Riparian and Bank Structure					
Bank Stability (L) (10)	9	10	4	10	10
Bank Stability (R) (10)	9	10	4	10	10
Vegetative Protection (L) (10)	10	10	5	10	10
Vegetative Protection (R) (10)	10	10	5	10	10
Riparian Veg. Zone Width (L) (10)	10	10	10	10	9
Riparian Veg. Zone Width (R) (10)	10	10	10	10	10
TOTAL SCORE (200):	181	189	110	163	188
HABITAT RATING:	EXCELLENT (NON-IMPAIRED)	EXCELLENT (NON-IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	EXCELLENT (NON-IMPAIRED)	EXCELLENT (NON-IMPAIRED)

Note: Individual metrics may better describe conditions directly affecting the biological community while the Habitat Rating describes the general riverine environment at the site(s)

Date:	6/17/2008	6/25/2008	6/25/2008	6/27/2008	6/27/2008
Weather:	Partly Cloudy	Partly Cloudy	Sunny	Cloudy	Rainy
Air Temperature:	65 Deg. F.	75 Deg. F.	80 Deg. F.	75 Deg. F.	75 Deg. F.
Water Temperature:	63 Deg. F.	64 Deg. F.	74 Deg. F.	68 Deg. F.	63 Deg. F.
Ave. Stream Width:	18 Feet	5 Feet	35 Feet	15 Feet	25 Feet
Ave. Stream Depth:	1.0 Feet	0.3 Feet	0.3 Feet	1.0 Feet	1.0 Feet
Surface Velocity:	0.8 Ft./Sec.	1.0 Ft./Sec.	0.7 Ft./Sec.	0.3 Ft./Sec.	1.5 Ft./Sec.
Estimated Flow:	14.4 CFS	1.5 CFS	6.1 CFS	3.8 CFS	37.5 CFS
Stream Modifications:	None	None	None	None	None
Nuisance Plants (Y/N):	N	N	N	N	N
Report Number:					
STORET No.:	270147	270198	660169	270199	270196
Stream Name:	Slate River	Trout Brook	Ten Mile Creek	Two Mile Creek	Tamarack River
Road Crossing/Location:	US-2	two-track off East Shore Rd	off Fair Oaks Rd	Sucker Lake Rd	Forest Hwy 3340
County Code:	27	27	66	27	27
TRS:	46N42W21	46N41W07	47N40W08	45N40W04	45N38W24
Latitude (dd):	46.3687	46.397	46.481	46.33	46.287
Longitude (dd):	-89.5564	-89.488	-89.34	-89.324	-89.012
Ecoregion:	NLAF	NLAF	NLAF	NLAF	NLAF
Stream Type:	Coldwater	Coldwater	Warmwater	Coldwater	Coldwater
USGS Basin Code:	4020102	4020101	4020101	4020101	4020101

* Applies only to Riffle/Run stream Surveys
** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 3 (cont.). Habitat evaluation for select streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

HABITAT METRIC	Roselawn Creek Sleepy Hollow Rd GLIDE/POOL STATION 21	Trout Creek Four Mile Square Rd RIFFLE/RUN STATION 23	Jumbo River Calder Rd RIFFLE/RUN STATION 24	E B Ontonagon River M-28 (d/s) RIFFLE/RUN STATION 25	Onion Creek Forest Hwy 1100 GLIDE/POOL STATION 26
Substrate and Instream Cover					
Epifaunal Substrate/ Avail Cover (20)	15	14	19	14	5
Embeddedness (20)*		18	19	18	
Velocity/Depth Regime (20)*		14	18	16	
Pool Substrate Characterization (20)**	16				6
Pool Variability (20)**	13				11
Channel Morphology					
Sediment Deposition (20)	15	11	16	11	5
Flow Status - Maint. Flow Volume (10)	10	9	10	10	9
Flow Status - Flashiness (10)	10	9	10	6	2
Channel Alteration (20)	20	20	20	15	20
Frequency of Riffles/Bends (20)*		18	19	16	
Channel Sinuosity (20)**	13				18
Riparian and Bank Structure					
Bank Stability (L) (10)	10	10	9	8	4
Bank Stability (R) (10)	9	10	8	8	4
Vegetative Protection (L) (10)	10	10	10	10	5
Vegetative Protection (R) (10)	10	10	10	10	6
Riparian Veg. Zone Width (L) (10)	10	10	10	9	10
Riparian Veg. Zone Width (R) (10)	10	10	10	9	10
TOTAL SCORE (200):	171	173	188	160	115
HABITAT RATING:	EXCELLENT (NON-IMPAIRED)	EXCELLENT (NON-IMPAIRED)	EXCELLENT (NON-IMPAIRED)	EXCELLENT (NON-IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)

Note: Individual metrics may better describe conditions directly affecting the biological community while the Habitat Rating describes the general riverine environment at the site(s)

Date:	6/27/2008	6/26/2008	6/26/2008	6/26/2008	6/26/2008
Weather:	Partly Cloudy	Sunny	Sunny	Sunny	Partly Cloudy
Air Temperature:	80 Deg. F.	65 Deg. F.	70 Deg. F.	80 Deg. F.	80 Deg. F.
Water Temperature:	66 Deg. F.	58 Deg. F.	57 Deg. F.	63 Deg. F.	66 Deg. F.
Ave. Stream Width:	45 Feet	10 Feet	30 Feet	30 Feet	8 Feet
Ave. Stream Depth:	2.5 Feet	0.8 Feet	0.4 Feet	1.2 Feet	2.0 Feet
Surface Velocity:	1.2 Ft./Sec.	0.8 Ft./Sec.	1.2 Ft./Sec.	1.2 Ft./Sec.	0.3 Ft./Sec.
Estimated Flow:	135.0 CFS	5.6 CFS	14.4 CFS	43.2 CFS	4.8 CFS
Stream Modifications:	None	None	None	Dredged	None
Nuisance Plants (Y/N):	N	N	N	N	N
Report Number:					
STORET No.:	660172	660166	310470	310404	310471
Stream Name:	Roselawn Creek	Trout Creek	Jumbo River	E B Ontonagon River	Onion Creek
Road Crossing/Location:	Sleepy Hollow Rd	Four Mile Square Rd	Calder Rd	M-28 (d/s)	Forest Hwy 1100
County Code:	66	66	31	31	31
TRS:	46N39W08	47N38W23	47N37W15	47N37W11	48N37W09
Latitude (dd):	46.4043	46.46308	46.46503	46.48693	46.569
Longitude (dd):	-89.20321	-89.03161	-88.91594	-88.88902	-88.95
Ecoregion:	NLAF	NLAF	NLAF	NLAF	NLAF
Stream Type:	Coldwater	Coldwater	Coldwater	Coldwater	Coldwater
USGS Basin Code:	4020101	4020101	4020101	4020102	4020101

* Applies only to Riffle/Run stream Surveys
** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 3 (cont.). Habitat evaluation for select streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

HABITAT METRIC	E B Ontonagon River Gardner Rd GLIDE/POOL STATION 27	Brodie Creek ORV crossing East of Phoenix RIFFLE/RUN STATION 29	W B Eagle River u/s Cliffs Mine Site RIFFLE/RUN STATION 30
Substrate and Instream Cover			
Epifaunal Substrate/ Avail Cover (20)	8	19	12
Embeddedness (20)*		20	12
Velocity/Depth Regime (20)*		15	10
Pool Substrate Characterization (20)**	11		
Pool Variability (20)**	13		
Channel Morphology			
Sediment Deposition (20)	7	17	15
Flow Status - Maint. Flow Volume (10)	10	8	8
Flow Status - Flashiness (10)	3	8	9
Channel Alteration (20)	20	20	20
Frequency of Riffles/Bends (20)*		19	17
Channel Sinuosity (20)**	18		
Riparian and Bank Structure			
Bank Stability (L) (10)	4	9	9
Bank Stability (R) (10)	4	9	9
Vegetative Protection (L) (10)	4	10	10
Vegetative Protection (R) (10)	4	10	10
Riparian Veg. Zone Width (L) (10)	10	10	10
Riparian Veg. Zone Width (R) (10)	10	10	10
TOTAL SCORE (200):	126	184	161
HABITAT RATING:	GOOD (SLIGHTLY IMPAIRED)	EXCELLENT (NON-IMPAIRED)	EXCELLENT (NON-IMPAIRED)

Note: Individual metrics may better describe conditions directly affecting the biological community while the Habitat Ratir describes the general riverine environment at the site(s)

Date:	6/27/2008	6/22/2008	6/22/2008
Weather:	Partly Cloudy	Cloudy	Sunny
Air Temperature:	65 Deg. F.	59 Deg. F.	59 Deg. F.
Water Temperature:	64 Deg. F.	56 Deg. F.	50 Deg. F.
Ave. Stream Width:	40 Feet	9 Feet	5 Feet
Ave. Stream Depth:	2.0 Feet	0.3 Feet	0.3 Feet
Surface Velocity:	1.0 Ft./Sec.	0.3 Ft./Sec.	0.6 Ft./Sec.
Estimated Flow:	80.0 CFS	0.7 CFS	0.9 CFS
Stream Modifications:	None	None	None
Nuisance Plants (Y/N):	N	N	N
Report Number:			
STORET No.:	660167	420173	420128
Stream Name:	E B Ontonagon River	Brodie Creek	W B Eagle River
Road Crossing/Location:	Gardner Rd	ORV crossing East of Phoenix	u/s Cliffs Mine Site
County Code:	66	42	42
TRS:	49N38W10	58N31W31	57N32W02
Latitude (dd):	46.658	47.38141	47.3668
Longitude (dd):	-89.047	-88.28236	-88.3221
Ecoregion:	NLAF	NLAF	NLAF
Stream Type:	Coldwater	Coldwater	Coldwater
USGS Basin Code:	4020101	4020103	4020103

* Applies only to Riffle/Run stream Surveys
** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 4. Analytical results for water samples from selected streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

STREAM NAME		Powder Mill Creek	Powder Mill Creek	Powder Mill Creek	Portal Creek	Portal Creek
LOCATION		US-2	u/s Black River conf.	Falls	Mouth/Mineral River conf.	Upper Crossing
STATION		1	4	A	10	B
DATE		6/18/2008	6/18/2008	6/18/2008	6/21/2008	6/21/2008
STORET		270193	270194	270195	660107	660162
Parameter	Units					
Alkalinity (as CaCO3)	mg/L	-	-	-	-	-
Ammonia	mg N/L	0.016	0.015	0.013	-	-
Boron	ug/L	-	-	-	-	-
Calcium	mg/L	-	-	-	52.3	52.8
Chloride	mg/L	-	-	-	-	-
Chromium	ug/L	-	-	-	ND	ND
Conductivity	umho/cm	-	-	-	-	-
Hardness	mg/L	-	-	-	165	165
Iron	ug/L	-	-	-	-	-
Lithium	ug/L	-	-	-	ND	ND
Magnesium	mg/L	-	-	-	8.3	8.1
Mercury	ug/L	-	-	-	ND	ND
Nitrate + Nitrite	mg N/L	0.018	0.007 (T)	.004 (T)	-	-
Nitrogen - Kjeldahl	mg N/L	0.81	0.74	0.77	-	-
Total Phosphorus	mg P/L	0.022	0.019	0.019	-	-
Potassium	mg/L	-	-	-	-	-
Selenium	ug/L	-	-	-	ND	ND
Sodium	mg/L	-	-	-	-	-
Sulfate	mg/L	-	-	-	-	-
TOC	mg/L	23	21	22	11	14
COD	mg/L	-	-	-	-	-
Aluminum	ug/L	-	-	-	-	-
Antimony	ug/L	-	-	-	-	-
Arsenic	ug/L	-	-	-	ND	ND
Barium	ug/L	-	-	-	ND	49
Beryllium	ug/L	-	-	-	-	-
Cadmium	ug/L	-	-	-	ND	ND
Cobalt	ug/L	-	-	-	-	-
Copper	ug/L	-	-	-	36	54
Lead	ug/L	-	-	-	ND	ND
Manganese	ug/L	-	-	-	-	-
Molybdenum	ug/L	-	-	-	-	-
Nickel	ug/L	-	-	-	-	-
Silver	ug/L	-	-	-	ND	ND
Strontium	ug/L	-	-	-	140	130
Thallium	ug/L	-	-	-	-	-
Titanium	ug/L	-	-	-	-	-
Vanadium	ug/L	-	-	-	-	-
Zinc	ug/L	-	-	-	ND	15

ND - Not Detected

T - Reported value is less than the reporting limit (RL). Result is estimated.

Table 4 (cont.). Analytical results for water samples from selected streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

STREAM NAME		Pine Creek	Pine Creek	Pine Creek	Pine Creek
LOCATION		LP Walsh Road	NE of #2 tailing basin (Middle)	M-64, Geisen property (Lower)	M-64, Geisen property (Lower, Dup)
STATION		C	11	12	12
DATE		6/20/2008	6/20/2008	6/20/2008	6/20/2008
STORET		660163	660160	660161	660161
Parameter	**Units**				
Alkalinity (as CaCO3)	mg/L	-	-	-	-
Ammonia	mg N/L	-	-	-	-
Boron	ug/L	-	-	-	-
Calcium	mg/L	18.1	51.2	45.8	44.7
Chloride	mg/L	-	-	-	-
Chromium	ug/L	ND	ND	ND	ND
Conductivity	umho/cm	-	-	-	-
Hardness	mg/L	60	169	148	145
Iron	ug/L	-	-	-	-
Lithium	ug/L	ND	ND	ND	ND
Magnesium	mg/L	3.5	10	8.1	8
Mercury	ug/L	ND	ND	ND	ND
Nitrate + Nitrite	mg N/L	-	-	-	-
Nitrogen - Kjeldahl	mg N/L	-	-	-	-
Total Phosphorus	mg P/L	-	0.016	0.013	-
Potassium	mg/L	-	-	-	-
Selenium	ug/L	ND	ND	ND	ND
Sodium	mg/L	-	-	-	-
Sulfate	mg/L	-	-	-	-
TOC	mg/L	9.2	10	8.1	-
COD	mg/L	-	-	-	-
Aluminum	ug/L	-	-	-	-
Antimony	ug/L	-	-	-	-
Arsenic	ug/L	ND	ND	ND	ND
Barium	ug/L	23	77	69	68
Beryllium	ug/L	-	-	-	-
Cadmium	ug/L	ND	ND	ND	ND
Cobalt	ug/L	-	-	-	-
Copper	ug/L	10	6.6	5.8	6.2
Lead	ug/L	ND	ND	ND	ND
Manganese	ug/L	-	-	-	-
Molybdenum	ug/L	-	-	-	-
Nickel	ug/L	-	-	-	-
Silver	ug/L	ND	ND	ND	ND
Strontium	ug/L	40	300	360	360
Thallium	ug/L	-	-	-	-
Titanium	ug/L	-	-	-	-
Vanadium	ug/L	-	-	-	-
Zinc	ug/L	ND	ND	ND	ND

ND - Not Detected

Table 4 (cont.). Analytical results for water samples from selected streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

STREAM NAME		Duck Creek	Halfway Creek	Brodie Creek	W B Eagle River	Carp Creek
LOCATION		Control	Control	ORV xing East of Phoenix	u/s Cliffs Mine Site	Ishpeming WWTP
STATION		D	E	29	30	F
DATE		6/20/2008	6/20/2008	6/22/2008	6/22/2008	6/23/2008
STORET		660164	660165	420173	420128	520289
Parameter	**Units**					
Alkalinity (as CaCO3)	mg/L	-	-	-	-	-
Ammonia	mg N/L	-	-	-	-	0.075
Boron	ug/L	-	-	-	-	-
Calcium	mg/L	15.8	20.8	17.3	20.5	-
Chloride	mg/L	-	-	-	-	-
Chromium	ug/L	ND	ND	ND	1	-
Conductivity	umho/cm	-	-	-	-	-
Hardness	mg/L	56	71	60	70	-
Iron	ug/L	-	-	-	-	-
Lithium	ug/L	ND	-	-	-	-
Magnesium	mg/L	4	4.5	4	4.5	-
Mercury	ug/L	ND	ND	ND	ND	-
Nitrate + Nitrite	mg N/L	-	-	-	-	1.63
Nitrogen - Kjeldahl	mg N/L	-	-	-	-	0.72
Total Phosphorus	mg P/L	0.013	0.016	0.008	0.006	0.058
Potassium	mg/L	-	-	-	-	-
Selenium	ug/L	ND	ND	ND	ND	-
Sodium	mg/L	-	-	-	-	-
Sulfate	mg/L	-	-	-	-	-
TOC	mg/L	8	7.2	6.3	4	10
COD	mg/L	-	-	-	-	-
Aluminum	ug/L	-	-	-	-	-
Antimony	ug/L	-	-	-	-	-
Arsenic	ug/L	ND	ND	ND	ND	-
Barium	ug/L	38	57	5.3	5.8	-
Beryllium	ug/L	-	-	-	-	-
Cadmium	ug/L	ND	ND	ND	ND	-
Cobalt	ug/L	-	-	-	-	-
Copper	ug/L	6.2	4.2	1.4	3.3	-
Lead	ug/L	ND	ND	ND	ND	-
Manganese	ug/L	-	-	-	-	-
Molybdenum	ug/L	-	-	-	-	-
Nickel	ug/L	-	-	-	-	-
Silver	ug/L	ND	ND	ND	ND	-
Strontium	ug/L	85	140	-	-	-
Thallium	ug/L	-	-	-	-	-
Titanium	ug/L	-	-	-	-	-
Vanadium	ug/L	-	-	-	-	-
Zinc	ug/L	ND	ND	ND	ND	-

ND - Not Detected

Table 5. Analytical results for *E. coli* samples from selected streams in the Ontonagon, Presque Isle, Iron, Montreal, and Upper Wisconsin River Watersheds (OPIMU) and Other Selected Non-basin Year Watersheds, June 2008.

STREAM NAME		Powder Mill Creek	Powder Mill Creek	Powder Mill Creek
LOCATION		US-2 (1)	US-2 (2)	US-2 (3)
STATION		1	1	1
DATE		6/18/2008	6/18/2008	6/18/2008
STORET		270193	270193	270193
Parameter	**Units**			
E. coli	MPN/100mL	48	56	41

STREAM NAME		Powder Mill Creek	Powder Mill Creek	Powder Mill Creek
LOCATION		Black River conf. (1)	Black River conf. (2)	Black River conf. (3)
STATION		4	4	4
DATE		6/18/2008	6/18/2008	6/18/2008
STORET		270194	270194	270194
Parameter	**Units**			
E. coli	MPN/100mL	23	36	32

STREAM NAME		Powder Mill Creek	Powder Mill Creek	Powder Mill Creek
LOCATION		Falls (1)	Falls (2)	Falls (3)
STATION		A	A	A
DATE		6/18/2008	6/18/2008	6/18/2008
STORET		270195	270195	270195
Parameter	**Units**			
E. coli	MPN/100mL	17	13	20