



LAKE MONITORING



STREAM MONITORING



BOTULISM MONITORING

Year after year, the Watershed Council keeps a watchful eye on Northern Michigan's waters through our water quality monitoring programs. Volunteers are at the core of these programs. Over the last 30 years, hundreds of volunteers have given their time and energy to assist with our volunteer lake and stream monitoring programs. With their help, we have gathered data at 91 sites on 55 different lakes and streams. This priceless information has been used by the Watershed Council and others to evaluate the health of our lakes and streams, identify trends, develop watershed management plans, and much, much more. We are endlessly impressed and thankful for the outpouring of community support and interest in our water quality monitoring programs.

The Tip of the Mitt Volunteer Lake Monitoring Program is our longest standing program with data on some lakes spanning nearly three decades. The Watershed Council provides training, equipment, and technical support to volunteers and in return, volunteers provide a wealth of data to the Watershed Council. Trainings are held each spring and afterward, volunteers are deployed into the field to collect water quality data from early June through late August. Each week, volunteers head out onto the lake and record water transparency and water temperature. Every other week, they collect water samples for chlorophyll-a measurements. In addition, volunteers on a handful of lakes monitor dissolved oxygen concentrations on a biweekly basis. The data collected by lake volunteers is very useful because it provides the means to assess lake water quality and biological productivity.

In contrast, we have coordinated the Tip of the Mitt Volunteer Stream Monitoring Program for less than ten years, but in that short time the program has grown considerably and generated an extraordinary amount of important data. Similar to the lake monitoring program, the Watershed Council supplies training and equipment to the volunteers who monitor water quality at sites on streams throughout Northern Michigan. Trainings are provided every spring and fall, followed by monitoring in the field, and sample processing in the laboratory. Teams of three to six volunteers work together to monitor two sites per season, collecting some physical water quality data, but focusing primarily on biological monitoring of the aquatic macroinvertebrate communities. The aquatic insects and other macroinvertebrates collected by volunteers are identified to the family level, which provides a surprisingly clear picture of water quality and stream ecosystem conditions.

Together, these volunteer water quality monitoring programs generate more data on an annual basis than all other Watershed Council programs and projects combined. However, in a sense, these programs serve an even greater purpose: they connect people with water. Through a combination of aquatic ecosystem education and immersion, i.e., simply getting their feet and hands wet in these ecosystems on a regular basis, these programs build a connection that instills a strong sense of stewardship. As they become better informed and in touch with our lakes and streams, volunteer monitors often transition into ambassadors, devoted to and sharing their passion for protecting Northern Michigan's waters.

Stream Monitoring

Streams are the freshwater circulation system of Northern Michigan, carrying rainwater, snowmelt, and groundwater into and out of the region's lakes. Our streams provide recreational opportunities to anglers, paddlers, and others, and habitat to a wide variety of wildlife. Fortunately, many Northern Michigan residents recognize the value of these streams. In 2012, nearly 100 local volunteers helped monitor 37 sites on 15 different rivers and creeks!

Volunteers sample the aquatic macroinvertebrate community to assess stream ecosystem health. Community diversity and species sensitivity are key factors in determining water quality. A variety of pollution-sensitive stoneflies, mayflies, and caddisflies portrays a healthy ecosystem and high water quality while a sample with only pollution-tolerant aquatic worms and midges reveals a stream ecosystem that is likely suffering. We usually find excellent water quality in Northern Michigan streams because of limited agricultural and urban land cover in the watershed. However, there are a few sites in or near urban areas where diversity is low.

STREAM REPORTS

We assess stream ecosystem health using three different measurements of diversity: 1) Total Taxa = the total number of macroinvertebrate families found at a site; 2) EPT taxa = the number of families in the most pollution-sensitive insect orders (mayflies, stoneflies, and caddisflies); and 3) Sensitive Taxa = the number of extremely sensitive macroinvertebrate families (based on a system developed by William Hilsenhoff, Ph.D.). Scores for each sampling site are averaged using data from all monitoring events and presented using the following format: (Total, EPT, Sensitive). For example, a site with

Water Quality Grading System*

A = Excellent

B = Good

C = Moderate

*Grades based on a system that utilizes all three index scores.

a score of (20, 10, 5), indicates an average of 20 total families, 10 EPT families, and 5 sensitive families.



Bear River: Grade = B

Currently, five sites are monitored in the Bear River system. The sites with greatest diversity include Springbrook Road (20, 10, 5) and Bear River Road (20, 8, 3). In contrast, the sites at Melrose Township Park by Walloon Lake (16, 4, 2), the mouth of Russian Creek near North Central Michigan College (14, 4, 2) and Mineral Well Park in Petoskey (14, 6, 2) show much less diversity. Lower diversity at Melrose Township Park may be natural due to warmer waters draining from the lake and a lack of streambank vegetation,

whereas the Russian Creek and Mineral Well Park sites are probably affected by polluted stormwater runoff from adjacent agricultural and urban areas.

Boyne River: Grade = A

With help from the Friends of the Boyne River, four sites are monitored on the Boyne: on the South Branch at Dobleski Road (16, 10, 6), on the North Branch on Thumb Lake Road (18, 10, 5), mid-river at Dam Road (17, 9, 5), and near the mouth in Boyne City (16, 9, 5). Stressors to the Boyne River ecosystem include sediments from dirt roads and streambank erosion, dams that elevate water temperatures and prevent fish passage, and urban stormwater runoff. Although total diversity scores rarely surpass 20, consistently high EPT and sensitive family diversity at all sites show that the Boyne remains a healthy stream.

Eastport Creek: Grade = A-

Eastport Creek, which drains into the north end of Torch Lake, has been monitored at two sites since 2005. Biological data from the upper reaches at Farrell Road show a diverse and healthy macroinvertebrate community (24, 10, 4). The site in the lower section near M88 appears to be less healthy, though it still supports sensitive macroinvertebrates (18, 5, 2). Residential development is suspected of affecting the health of Eastport Creek in the lower section.

Horton Creek: Grade = B+

Horton Creek flows south from its headwaters near Little Traverse Bay into Lake Charlevoix at Horton Bay. The Church Road site (16, 5, 1) in the headwaters is a slow section of the stream flowing through wetland areas, which results in mucky substrate and warmer water temperatures. These natural circumstances contribute to the relatively low diversity scores. The picture is quite different downstream at Boyne City Road site (20, 11, 6), where stream flow is much faster and the stream bottom contains a wider variety of materials including gravel, rock, and wood.

Jordan River: Grade = A

Pristine conditions throughout most of the Jordan River Watershed and limited development along the river's edge result in a very healthy stream ecosystem, which is evident in our biological assessments. High diversity in the macroinvertebrate community has consistently been documented by volunteers from Friends of the Jordan River. Sample sites, from upstream to downstream, include Pinney Bridge (20, 15, 10), Webster Bridge Road (20, 12, 7), Rogers Road (20, 11, 6), and Fair Road (21, 11, 5). The Jordan River is currently tied with the Sturgeon River as record holder for the greatest number of sensitive families with 11 found at both Pinney Bridge and Webster Bridge Road!



Kimberly Creek: Grade = A

Kimberly Creek, which flows through the small community of Afton on M68 before converging with the Pigeon River just upstream of Mullett Lake, has been monitored at two sites since 2005. Upstream at Montgomery Road, the creek has little riparian vegetation due to residential development, but healthy macroinvertebrate diversity persists (21, 7, 3). Between upstream and downstream sites, the stream flows through agricultural lands and a mining quarry, but data show that the stream ecosystem continues to flourish (Quarry Road: 21, 8, 4).

Maple River: Grade = TBD

Drainage from the Pleasantview Swamp and Larks Lake form the West Branch of the Maple River while water flowing out of Douglas Lake forms the East Branch. The two branches converge at Lake Kathleen and the river flows southeast until emptying into Burt Lake. Four sites on the Maple River were added to the program in the fall of 2011: upstream at Pleasantview Road (15, 7, 1), midstream in Pellston at Robinson Road (22, 8, 4), just below the Lake Kathleen dam (28, 11, 4), and downstream at Brutus Road (27, 13, 6). We do not rate stream health until at least three years of data are available, but preliminary index scores suggest that the Maple River is doing well.

Milligan Creek: Grade = A-

Milligan Creek is an important tributary of the Black River near the village of Tower on M68. Two sites are currently monitored: upstream at M68 (21, 10, 6) and downstream at Waveland Road (18, 9, 6). EPT and sensitive families are generally found in abundance, indicating a healthy stream ecosystem. The Waveland Road site is unique among sites monitored in the program in that the stream bottom is composed nearly entirely of solid rock.

Mullett Creek: Grade = A-

Mullett Creek flows from its headwaters near Riggsville Road and the University of Michigan Biological Station into the northwest side of Mullett Lake. From upstream to downstream, volunteers monitor sites at Indian Trail (18, 8, 5), Crump Road (20, 10, 5), South Extension Road (24, 10, 4), and M-27 (22, 5, 1). Fast flow from high slopes, cool water temperatures from groundwater inputs and shading, high dissolved oxygen levels, and greater habitat variability result in higher sensitive species diversity at the upper sites. Sluggish flow, warmer water temperatures, and lower dissolved oxygen levels result in lower sensitive species diversity near the creek mouth. The Mullett Creek Watershed Management Plan (developed by University of Michigan Biological Station and Tip of the Mitt Watershed Council) identified problematic road-stream crossings and agricultural activity, particularly livestock rearing, as the most serious water quality threats in the watershed.



Pigeon River: Grade = A-

The Pigeon River begins just northeast of Gaylord, flows through the heart of Pigeon River Country, and eventually makes its way to Mullett Lake. Following an accidental release of large volumes of water and sediment from the impoundment at Song of the Morning Ranch in 2008, the Watershed Council added sites on the Pigeon River to the east of Vanderbilt at Sturgeon Valley Road (21, 8, 5) and to the east of Wolverine on Webb Road (18, 10, 6). Initial monitoring efforts produced few critters, but recent sampling shows strong EPT and sensitive species diversity.

Stover Creek: Grade = C

Monitored since 2004, Stover Creek holds the distinction of being the first stream to be included in our program. Volunteers currently monitor Stover at the Brookside Cemetery on M-66 (19, 7, 4) and downstream near the mouth at Irish Boat Shop (14, 2, 0). Despite lack of natural vegetation along the stream banks, data from the cemetery site show that the stream ecosystem is healthy. Although only a half mile downstream, diversity scores plummet near the mouth. This drop in diversity is probably a result of impacts from the surrounding urban area, but may also be related to several hundred feet of dry streambed and severe erosion that Watershed Council staff observed last summer downstream of M-66. We are planning to take a closer look at all factors in the lower reaches and throughout the watershed that may be contributing to the water quality impairment documented by our volunteers.

Sturgeon River: Grade = TBD

The Sturgeon River, with fast flow and a robust trout fishery, flows from headwaters at Huffman Lake (West Branch) and Gaylord through Wolverine and Indian River until emptying into Burt Lake. Four sites on the Sturgeon were added in the fall of 2011: upstream to the east of Vanderbilt at Sturgeon Valley Road (20, 11, 6), on the West Branch at a roadside park on M-27 (26, 14, 9), after the confluence of the two main branches in Wolverine (18, 9, 6), and near the mouth in Indian River (18, 9, 6). After volunteers collect three years of data, we will rate the river's health. Due to the pristine status of the upper watershed, preliminary index scores indicate that the Sturgeon River is in great shape. However, expanding residential development in the lower Sturgeon is a concern.



Tannery Creek: Grade = C

Tannery Creek flows into Little Traverse Bay to the southwest of Petoskey State Park. Volunteers have monitored the creek at two sites since 2007: upstream at Boyer Road (18, 8, 3) and downstream near the mouth behind the Glen's shopping plaza on US 31 (11, 3, 1). The low numbers at the site near the mouth show the negative impacts associated with urban development. A watershed plan is currently being developed by University of Michigan School of Natural Resource and Environment graduate students to help improve and protect the creek.

We cannot thank our volunteers enough for the critical roles they play in helping protect the lakes and streams of Northern Michigan, but we try: thank you, thank you, **THANK YOU!** If you would like to get involved or would like additional information, please contact the program coordinator, Kevin Cronk, at (231) 347-1181 ext. 109 or by e-mailing kevin@watershedcouncil.org.

Stream Name	Total Taxa Average	EPT Taxa Average	Sensitive Taxa Average
Bear River	17.4	7.2	2.7
Boyne River	16.3	9.2	5.0
Eastport Creek	20.7	7.3	3.0
Horton Creek	17.3	7.8	3.6
Jordan River	20.1	11.8	7.0
Kimberly Creek	20.9	7.7	3.8
Maple River	22.9	9.4	3.4
Milligan Creek	19.6	9.6	6.3
Mullett Creek	21.9	8.4	3.3
Pigeon River	19.4	9.2	5.6
Stover Creek	16.1	4.6	1.9
Sturgeon River	20.3	10.8	6.7
Tannery Creek	14.7	5.4	1.9

Averaged index scores for all sites on each river or creek

Volunteer Stream Monitoring Training Day
May 11, 2013 • 9:00 a.m. - 1:00 p.m.
For details visit www.watershedcouncil.org/events

