Volunteer Stream Monitoring

2009 Report

Tip of the Mitt Watershed Council

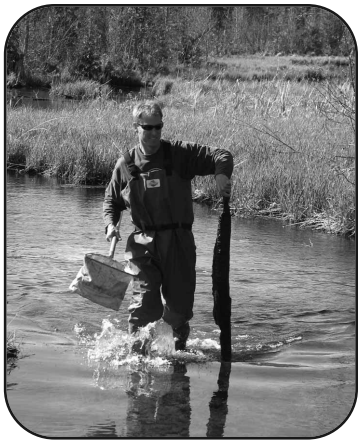
Streams are the freshwater circulation system of Northern Michigan, carrying rainwater, snowmelt, and groundwater into and out of a multitude of lakes. Often overlooked due to the region's grandiose lakes, there are literally thousands of miles of streams that dissect the landscape in the tip of the mitt. As a natural resource, these streams are invaluable. They provide clean, abundant water to lakes, they offer seemingly endless recreational opportunities to anglers, paddlers, and others, and they provide habitat to a wide variety of wildlife.

With so many stream miles, how can one or even multiple organizations monitor and safeguard the water quality of all these important streams? The simple answer is that they can't. However, with support from the volunteer community we can cover a lot more ground (water!). With this approach in mind, the Tip of the Mitt Watershed Council has enlisted the help of volunteers to help monitor, and thereby protect, the extensive network of magnificent streams in our backyard.

From humble beginnings in 2004 when four individuals monitored one stream, the Tip of the Mitt Watershed Council's Volunteer Stream Monitoring program has since burgeoned to well over 100 volunteers that are actively monitoring water quality at 27 locations on a dozen streams. Volunteers are trained by Watershed Council staff and then assigned to teams that monitor streams in Antrim, Charlevoix, Emmet and Cheboygan Counties. Teams collect a representative sample of aquatic macroinvertebrates (mayflies, stoneflies, etc) from the stream, which are later identified with the help of taxonomic experts.

The aquatic macroinvertebrate community paints a picture of stream ecosystem health. Community diversity and species sensitivity are key factors in determining water quality. A variety of pollution-s ensitive stoneflies, mayflies, and caddisflies portrays a healthy ecosystem with good diversity and high water quality. A sample with only pollution-tolerant aquatic worms and midges reveals a stream ecosystem that is likely suffering.

Each spring and fall, dedicated and adventurous volunteers head into the field to monitor stream water quality by collecting macroinvertebrates. Groups of volunteers have adopted streams while others mix it up, changing streams and teams with each sampling event. In either case, stream monitors have a great time mucking about in the stream and socializing with other engaged and concerned members of the community.



Results so far? Because our watersheds are in such great shape, with little agricultural landuse and even less urban development, we have found excellent water quality in most streams monitored by volunteers. Typically, volunteers find a diverse aquatic macroinvertebrate community that includes a number of pollution-sensitive families. However, there are a few sites where diversity has been low; usually those located in urban areas.

Stream Reports

Stream ecosystem health at a specific site is determined using three different measurements of diversity (i.e., indices): 1) total taxa = the total number of macroinvertebrate families found at the site; 2) EPT taxa = the number of families in the most sensitive insect orders (mayflies, stoneflies, and caddisflies); and 3) sensitive taxa = the number of families that are very sensitive to non-point source pollution as determined by PhD William Hilsenhoff. These indices are used in the following section to present findings from each stream monitored in our program. Scores for each stream are averaged using data from all monitoring events at that site and presented using the following format: (total, EPT, sensitive). For example, a site with a score of (20, 10, 5), means that it had an average of 20 total families, 10 EPT families, and 5 sensitive families.

Grading System:

A = Excellent water quality

B = Good water quality

C = Moderate water quality

D = Poor water quality

E = Very poor water quality

Bear River: Grade = B

Currently, four sites are monitored on the Bear River. The sites with greatest diversity are the east branch headwaters at Springbrook Road (19, 9, 4) and mid-river at Bear River Road (21, 9, 4). In contrast, the sites at Melrose Township Park by Walloon Lake (17, 4, 2) and at Mineral Well Park in Petoskey (13, 6, 3) show much less diversity. Lower diversity at Melrose Township Park may be natural due to warmer waters draining from the lake (cold water holds more dissolved oxygen) whereas the Mineral Well Park site is likely impaired from urban development in Petoskey.

Boyne River: Grade = A

Initially, the Boyne River was monitored on the South Branch, to the south of Boyne Falls, and near the mouth in Boyne City. In late 2007, two more sites were added; in the North Branch along Thumb Lake Road and mid-river at Dam Road. In terms of total diversity, the North Branch (22, 12, 5) and Dam Rd (20, 11, 6) sites are the leaders. Although total diversity scores are lower, the South Branch site at Dobleski Road (15, 10, 5) and Boyne City site at Park Street (15, 9, 4) still boast high EPT and sensitive family diversity. There are localized conditions that may be contributing to the lower scores at these sites, namely urbanization in the Boyne City area and runoff laden with sediments from the road at the South Branch site.

Eastport Creek: Grade = A

Eastport Creek, which drains into the north end of Torch Lake has been monitored at two sites since 2005. The site in the upper reaches at Farrell Road is in excellent condition (25, 11, 5), while the site in the lower section across from the Eastport Market on US31 (19, 5, 2) is less diverse, but still contains a number of sensitive macroinvertebrate families. Factors affecting the health of Eastport Creek include agricultural activity in the upper watershed and residential development in the lower.

Horton Creek: Grade = A

Horton Creek flows into the north side of Lake Charlevoix and has been monitored consistently since the program's inception. The Church Road site (17, 6, 1) in the headwaters is a slow section of the stream flowing through wetland areas, which results in the accumulation of decomposing organic matter (a.k.a, muck!) and warmer water temperatures. These natural circumstances contribute to the relatively low diversity scores. Several families found at this site, such as beetles from the family Haliplidae or scuds from the family Hyalellidae, are indicative of slow-flowing waters and generally not found at other sites that we monitor. The picture is quite different downstream at Boyne City Road site (20, 15, 7), where stream flow is much faster and the stream bottom contains a wider variety of materials including gravel, rocks and wood. Record numbers of sensitive families have been found at the Boyne-City Road site, which was a pleasant surprise as we did not expect so much diversity from such a small stream.

Jordan River: Grade = A

The Jordan River has now been monitored for two full seasons at two sites. As expected, diversity has been high at both the mid-stream site at the boat launch off of Webster Road (21, 11, 6) and downstream approaching the spreads and mouth at Fair Road (22, 12, 7). The pristine nature of the Jordan River watershed and the fact that there is little development or human activity along the river help preserve and protect stream water quality. The high quality waters of the Jordan are evident in our biological assessment, which shows great diversity in the macroinvertebrate community and impressively high numbers of sensitive families.

Kimberly Creek: Grade = A

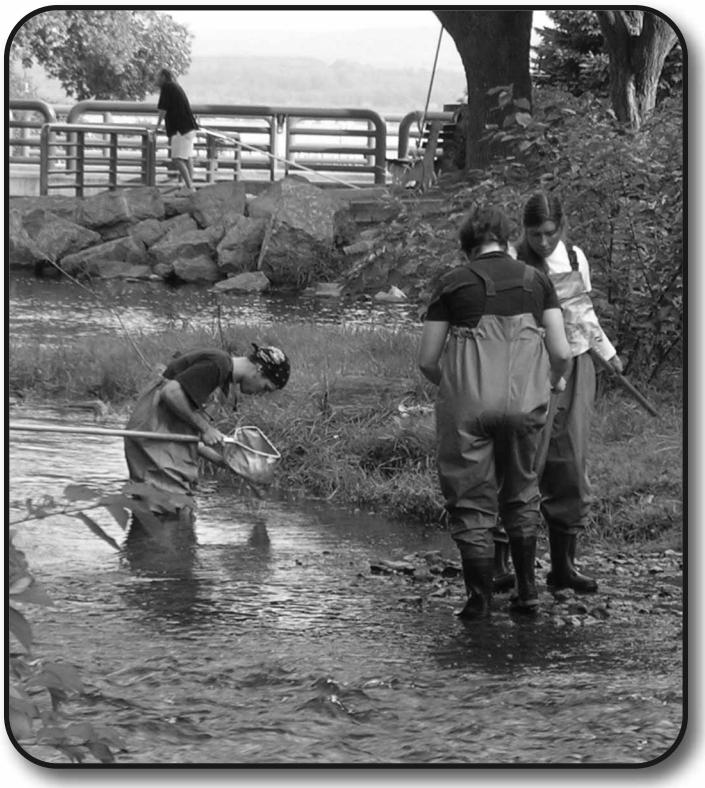
Kimberly Creek is located to the east of Indian River, flowing through the small community of Afton before merging with the Little Pigeon River. Two sites have been monitored on Kimberly Creek since the program began in 2005 to gauge any impacts from residential, agricultural, and mining activity. Upstream at Montgomery Road (23, 9, 4), the channel is only a few feet across and exposed due to residential development, but high diversity persists. Between upstream and downstream sites, the stream flows through agricultural lands and a mining operation, but macroinvertebrate populations at Quarry Road (22, 9, 5) remain quite diverse.

Milligan Creek: Grade = TBD

Milligan Creek is a tributary of the Black River near the village of Tower on M68. Two sites are currently monitored: upstream at M68 (25, 12, 7) and downstream at Waveland Road (13, 6, 4). While we only have one year of data, it appears that diversity is exceptional at the M68 site and that there is a good deal of sensitive family diversity at Waveland Road. Assigning a grade has been postponed until we have sufficient data (ideally three years of data).

Mullett Creek: Grade = A

Mullett Creek flows into the northwest side of Mullett Lake and has been monitored consistently since 2005. Similar to Horton Creek, the two sites monitored are very different in terms of flow velocity. Volunteers monitor upstream at Crump Road (20, 10, 5), where the narrow channel winds through dense woods, water flow is fast, and substrate is variable with a mix of sand, gravel, rock and wood. At the downstream site near the creek mouth on M27 (21, 6, 1), Mullet Creek is much wider, exposed to the sun, and flows slowly through silt-bottom, riparian wetland areas before flowing into the lake. In spite of the physical and ecological differences between sites, the total diversity is approximately the same. However, sensitive family diversity is much higher at the upstream site where flow is faster, waters cooler from shade, and where there is more variability in habitat.



Russian Creek: Grade = TBD

Russian Creek is a small feeder tributary of the Bear River that flows through the North Central Michigan College Natural Area. Last year, staff and students from the college began monitoring the creek at one site near the mouth (12, 3, 1). Similar to Milligan Creek, no grade has been assigned because of limited data. It does appear, however, that diversity is low compared to other streams we monitor, though whether this is due to natural causes or human impacts is unclear.

Spencer Creek: Grade = B

Spencer Creek is located in Antrim County and flows into the south end of Torch Lake near the village of Alden. Two sites have been monitored by volunteers since 2005, upstream at McPherson Road (17, 8, 5) and downstream near the mouth at Coy Street (16, 6, 4). Total diversity scores at these sites have been slightly lower than most of the streams monitored over the long-term, but both EPT and sensitive family diversity scores have been high and more in line with what we see in other streams. Diversity at the downstream site may be impacted by the surrounding residential development in Alden.

Stover Creek: Grade = C

Stover Creek holds two distinctions: it was the first stream monitored and is the only stream where three sites are monitored. Volunteers monitor the creek upstream at Ferry Road (12, 3, 1), lower mid-stream at the City of Charlevoix Cemetery on M66 (20, 7, 4), and downstream near the mouth at Irish Boat Shop (14, 2, 0). Interestingly, the cemetery site has the greatest diversity. Although natural vegetation along the streambank has been removed in much of the cemetery

area, there are many trees that shade the creek and drop branches, leaves, and other debris in the stream that provides habitat and food. Additionally, the flow is fast and the creek bottom contains a good amount of rock and gravel. The upstream site at Ferry Road is at times but a trickle, which can make sampling difficult and limit the diversity. The downstream site at the mouth has higher total diversity than the Ferry Road site, but fewer sensitive families. This site at the mouth is impacted by urban development emanating from Charlevoix.

Tannery Creek: Grade = C

Tannery Creek is located just to the east of Petoskey and flows into Lake Michigan at Little Traverse Bay. Volunteer monitoring of Tannery Creek began in late 2007 at two sites. Upstream, the creek is monitored at Boyer Road (20, 8, 3), and downstream near the mouth behind the Glens shopping plaza (9, 3, 1). The lower section of the stream is impacted by urban development. Stormwater, laden with pollutants from parking lots and roads and warmed by pavement, flushes directly into the stream instead of gradually filtering through soils into groundwater. After a rainstorm or snowmelt, unnaturally high volumes of polluted water flow into the creek in the lower section, eroding the stream channel, dislodging aquatic macroinvertebrates and carrying them downstream, suffocating fish and macroinvertebrates by clogging gills with sediments, raising water temperatures that leads to lower dissolved oxygen concentrations, and poisoning aquatic organisms with toxic substances.