

Survey the Maple River 2015

You know the Joni Mitchell song, Big Yellow Taxi? Its refrain says “Don’t it always seem to go, that you don’t know what you’ve got ‘til it’s gone.” The truth of that statement was behind a broad effort at the Biological Station this past summer to record “what we’ve got” in the Maple River, especially with talk of removing the dam at Woodland Road. An important part of this effort were three students, funded by a UMBS alumni contingent, who did much of the documentation. They canoed, waded and snorkeled along the Maple River to take measurements and collect samples. One of those students, Emma Tardiff, describes below some of the relationships and connections among the organisms living in and along the river. Her account gives insight into the kind of information scientists collect, why they collect it, and what it allows us to predict about the future. –Alicia Farmer, UMBS Communications Coordinator

Over the past summer there was a collective effort at the University of Michigan Biological Station to survey the Maple River in preparation for a possible dam removal at Woodland Road in Emmett County. Through the CLEAR Aquatic Research Fellowship I, along with two other researchers, conducted habitat assessments and surveys of algae, macroinvertebrate, and fish populations.

We assessed the river in terms of changes in water flow, depth, riverbank vegetation, electrical conductivity and temperature according to a model developed by the Tip of the Mitt Watershed Council. We found the Maple River to be variable in river flow, riparian vegetation, and average depth and consistent in temperature and conductivity.

Each of the three organism groups we surveyed represents an important aspect of the river ecosystem that will be affected by the dam removal. Think back to the food chain that you

learned about in middle school science. In the Maple River, algae are at the bottom. They provide the food that cycles through the entire ecosystem. Macroinvertebrates (e.g. caddisflies, mayflies, stoneflies) are the next level up in the web. They depend on algae and plants from the surrounding river bank for food. Fish are another level up. They eat the algae, the macroinvertebrates, and other fish.

Diatoms are microscopic, oil-bearing algae with glass cell walls. They can be an indicator of ecosystem health. The Maple River has many different diatom species, which indicates a relatively healthy river ecosystem. If the dam is removed, two short term changes affecting diatoms are likely: an increase in sediment load downstream from the dam reservoir (a.k.a. Lake Kathleen) as built-up silt washes downstream, and erosion along the river banks. The sediment load will most likely change the diatom community we see downriver, close to the Maple River delta at Burt Lake.

Macroinvertebrates are often used as a basis for determining the health of a river system because they are sensitive to changes in the surrounding habitat—especially water quality. Macroinvertebrate populations will undergo a period of decline if the Maple River dam is removed as erosion and sediment loading disrupt their habitats. However, due to the short life cycles of macroinvertebrates, populations will recover and adapt to the changes in the Maple River post-dam removal. The types of macroinvertebrates that may suffer the most are those that feed off of algae. These insect populations will not recover until the river bottom stabilizes enough to support algae growth.

The impact of the dam removal on fish populations is a little harder to predict. It is probable that many fish habitats will be disturbed by the increased sediment load from the dam removal. However, with the dam gone, fish populations will have more flexibility to migrate. If

the environment in the Main Maple River downstream from the dam is too stressful, the fish have the ability to swim upstream to the east and west branches of the Maple River to find new habitats.

The main determinant of how successful the fish population will be after the dam removal will be how their food sources fare: algae and macroinvertebrates. Brown trout was the dominant species we found. It can be predicted that, although this species will experience some environmental stress as its food sources decline downstream from the removal, brown trout will be able to swim upstream until the dust settles.

When the Maple River Dam is removed, we expect more sediment, fewer plants along the banks, a resulting increase in algae, and decrease in macroinvertebrate and fish populations. Fortunately, we expect these changes to be temporary. The water should clear and riverbank plants will reestablish themselves. The algal balance will return to its current levels and macroinvertebrate numbers will return. With these populations back, we expect to see brown trout returning to current levels in the river.

The University of Michigan Biological Station hopes that research conducted this past summer and in the future will provide a comprehensive look at the Maple River through the entire dam removal process. From this research, we can study the short and long term effects of dam removal projects on rivers similar to the Maple River and we can provide information on how restoration projects can be improved in the future.

By Emma Tardiff. Emma is a student at Kalamazoo College who attended the UMBS summer of 2015. She took the Biology & Ecology of Fishes class.