

## Monitoring Benthic Macroinvertebrates in the Grass River Watershed

The Grass River Natural Area (GRNA) set a priority to establish a long term, sustainable volunteer based stream monitoring program for Grass River and its three main tributaries. The focus for the two year duration of the grant was to establish the process by which we organize, educate, train and deploy the volunteer stream monitoring teams.

Grass River Natural Area in Antrim County is known as the heart of the greater Elk River Chain of Lakes watershed. The length of the river, which is primarily property of Antrim County, is managed by Grass River Natural Area, Inc., a non-profit conservation organization. Antrim County holds title to about 87 % of both shorelines along the length of Grass River which connects Lake Bellaire to Clam Lake. Maintaining superior water quality for both social and environmental reasons is and has been a priority for the residents of the Antrim county and the five county region covered by The Grand Traverse Bay Watershed Protection Plan and The Grand Vision.

Although it does not encompass a large geographical area, Grass River Natural Area's streams and wetlands are critical to maintaining the ecological health of the lower chain of lakes and ultimately of Grand Traverse Bay. The Elk River Chain of Lakes watershed contributes more than half of the annual surface water input into Grand Traverse Bay. Long term monitoring of the water quality and stream health of the Grass River and it feeder streams could act as an early warning for of any water quality issues in the larger watershed area.

The goal of this project was to create a scientifically sound macroinvertebrate monitoring system which is ultimately to be the corner stone of a larger water quality monitoring system. We also intended to establish an administrative strategy to make the GRNA Inc. water quality monitoring system sustainable over a long period of time.

The primary objectives were: 1. Establish an educated corps of volunteers from our community, teach them about the importance of water quality in the Grass River watershed, and train them to do proper sampling of macroinvertebrates through our Citizens Science program. 2. Establish the first reliable baseline for the macroinvertebrate populations in the river and three major tributaries at multiple sites in each stream. 3. Collect sufficient data and properly analyze it in order to draw informed conclusions which will assist in making decisions about our conservation management strategies. 4. Determine deterioration or improvement over time and identify any specific problems or problem areas. 5. Research documented successful methods to address any identified problems.

By all accounts, the immediate goal of establishing a water monitoring program was achieved and over the course of the past two years, objectives 1-3 were met, but it is still too soon to determine the long range impact of our work. Similarly, long term sustainability of this water monitoring program remains to be seen. With new GRNA management, and strong support of the GRNA Board of Directors, all indicators are that the program will continue and, in fact, grow to include additional variables to be monitored in the target streams and Grass River. Without question, the biggest challenge will be to maintain quality leadership at the project level over a long period of time. To do this effectively, we either have to develop an efficient

succession plan for the volunteer leadership of this specific project, or we need to incorporate the responsibilities of stream monitoring into a staff level job description.

In the course of doing the actual sampling events, we conducted a training session one week prior to all but the last sampling event. By then we had experienced team leaders to collect the field samples. Under the framework of the grant we conducted 5 sampling events by the fall of 2015. At each sampling date we had 2-3 person teams go to each of 3 locations on each of three streams and/or mouth of the stream at Grass River, for a total of nine sampling sites at each event. The collected sample was transported back to the Grass River Natural Area Center, where volunteers pick the macroinvertebrates, and experts did the final identifications and confirm the accuracy of the quantifications by species. At each event we had nine volunteers as the stream sampling teams, and anywhere from 10-25 volunteers come to the center throughout the day to pick and identify the bugs.

The biggest challenge was to maximize the logistics of correctly staging the collecting and picking teams so that there were never any of the volunteer 'pickers' standing around waiting for a sample to come in from the field. Also, we did find that feeding lunch to the volunteers resulted better retention of volunteers into the afternoons of picking. One significant lesson learned is that sampling three streams in a one-day event is too much. With the information that we have gathered so far it is plausible to plan for future sampling of one stream a year, plus a one or two of sites in Grass River itself. Going to four or five sites per sampling event will make the process more doable, and according to the experts and the literature, sampling the streams once every third year will be adequate to monitor the health of the watershed.

In the course of conducting the macroinvertebrate sampling, it became evident that we need to strategically expand our monitoring activities to include physical and chemical evaluations of each site to provide data that will complement the sampling of the biota. This aspect was not included in the original proposal and was, in fact, take out of the QAPP because we were not that far along. In 2015 however, with the support of other outside funding we have initiated the expanded program and are integrating it in to our overall Citizen Science Stream Monitoring Program. Again, the challenge will be to efficiently and effectively capture and load the acquired data into a usable data-base.

Our two main partners in this effort were the Northwestern Michigan College, Great Lakes Water Studies Institute, which provided the two students who started as interns and ultimately served as Project Managers over the course of the grant. Also, Three Lakes Association provided good collaboration in the aspects of providing volunteers on the sampling days. Other collaborators and participants were the Antrim County Board of Commissioners, Bellaire and Elk Rapids High Schools, and Friends of Clam Lake.