

GRANTEE NAME: Au Sable Institute of Environmental Studies

PROJECT NAME: Upper Manistee River Watershed Volunteer Stream Monitoring Project

PROJECT #: VSM2014-04

PERIOD COVERED: June 12, 2014 – June 11, 2016 **DATE SUBMITTED:** 6/30/16

Project Goals and Objectives (and degree to which they were met):

Au Sable established 4 primary goals for their volunteer stream monitoring project: 1.) Educate watershed residents on monitoring, quality, and protection of our water resources, 2.) Engage stakeholder groups and individuals through collaborative water monitoring projects and citizen science, 3.) Monitor stream and tributary conditions within the Upper Manistee River Watershed, and 4.) Identify or verify problem areas where degradation has occurred and remediation or best management practices can be implemented. The individual goals, and the degree to which they were met are provided with more detail below:

1. Educate watershed residents on monitoring, quality, and protection of our water resources.

Au Sable's volunteer stream monitoring program was created with the volunteer in mind. Through informational meetings, training sessions, school educational programs, and the production and dissemination of educational materials, Au Sable continues to educate watershed residents on how to care for our water resources. To date, Au Sable has engaged over 500 people in water quality based programs that incorporate educational elements of MiCorps.

2. Engage stakeholder groups and individuals through collaborative water monitoring projects and citizen science.

The project manager solicited assistance from local government officials, state government agencies, local residents, and local NGO's as to the location of potential sampling sites. The relationships developed during this process continued throughout the course of the project. As of June 2016, Au Sable volunteer stream monitoring program (VSMP) has engaged over 60 individuals in MiCorps monitoring trainings and events and partners with various key watershed groups including the Upper Manistee River Association, Conservation Resource Alliance, Grand Traverse Conservation District, Big Twin Lake Association, Blue Lake-Cold Springs Civic Association, Manistee Lake Association, Garfield Township, Anglers of the Au Sable, and Trout Unlimited (Miller Van-Winkle, Headwaters, and Adams Chapters).

3. Monitor stream and tributary conditions within the Upper Manistee River Watershed.

Au Sable identified eight monitoring sites within the Upper Manistee River as potential sampling locations for their stream monitoring program. Sites

were chosen with regard to specific criteria including prior sampling history, MiCorps site level concerns, proximity to recognized critical areas and areas of concern noted in the watershed management plan, proximity to prior restoration activities, and safety and accessibility. Of the eight, five sites were considered for immediate sampling with the remaining three to be added as volunteer recruitment allowed. Au Sable organized volunteer sampling events during the fall and spring each year of the grant contract resulting in four sampling events over that time period.

4. Identify or verify problem areas where degradation has occurred and remediation or best management practices can be implemented.

To date, all monitoring activities are in the process of establishing a baseline of water quality. Neither the habitat assessment or macroinvertebrate sampling has documented a need for corrective efforts.

Au Sable identified five objectives to ensure that program activities would achieve our stated goals. The following objectives were achieved and fulfill our work plan requirements submitted within our grant request:

Objective 1: Project Preparation

- Finalize study plan, site locations and sampling schedule
- Develop and submit QAPP to MiCorps Project Manager for approval
- Acquire necessary sampling equipment through purchase and donation
- Attend MiCorps training event
- Host training events for project volunteers

Objective 2: Sampling Events

- Host event for side by side sampling with MiCorps representative
- Collect samples and habitat information in the fall and spring of each project year
- Sort, record and store collected data

Objective 3: Data Management

- Analyze collected data during off- season sampling months using MiCorps preferred methods and Functional Feeding Group Assessment
- Enter compiled data into the MiCorps Data Exchange
- Update GIS and Institute website as data is compiled

Objective 4: Outreach and Education

- Recruit project volunteers through newspaper articles, Institute and partner mailings and meetings, at public meetings, and through the Institute website, newsletters, and Facebook pages
- Report project findings regularly through newspaper articles, at public meetings, Institute and partner mailings and meetings, and through the Institute website, newsletters, and Facebook pages
- Attend MiCorps Annual Conferences and give presentation at 2015 conference

Objective 5: Project Management

- Prepare and submit quarterly status and financial status reports
- Submit the final project report, fact sheet, release of claims letter,

financial status report, and all project electronic deliverables including GIS maps and website link

Project Benefits

This project resulted in a host of benefits, both anticipated and unanticipated. In regards to anticipated outcomes, this project benefited the local watershed and its citizenry in a similar manner as did our previous MiCorps start-up grant by helping to cultivate informed and engaged citizens in matters of water quality and watershed health and aiding stakeholders in the collection of valuable data to be used to inform policy and policy makers in matters of land and water use planning. Our monitoring project also aids the Upper Manistee River Watershed Management Plan proposed by the DEQ in helping to address goals 3 & 5 of that plan. Additionally, the project helped strengthen Au Sable's reputation and connection with local residents and watershed groups.

Unanticipated benefits include the degree to which the MiCorps sampling and training events couple with our other educational programs. Au Sable's internship program benefited by helping expand and diversify intern trainings and the population which interns serve. Every Au Sable intern over the grant period participated in MiCorps training and collection events, helping to increase their knowledge and awareness of stream ecology and citizen science. Au Sable's K-12 environmental education program benefited through the creation of new curriculum that incorporates elements of the MiCorps procedures and provides direct experiences that help to give younger students a glimpse of the work duties of career professionals in environmental science. Furthermore, we were able to engage our college students in MiCorps through trainings and mock collection events. One of Au Sable's main objectives with any of our educational programs is to provide participants with experiences that increase their skills and knowledge in a given subject. Educational efforts that incorporate elements of the MiCorps program

Lessons Learned

We learned a lot about the nature of the rural volunteer. We found some advantages such as fewer competing interests and increased accessibility to and response by media agencies to promote and cover events. Additionally, the nature of our rural setting lends itself to a greater number of individuals who are passionate about the outdoors and are interested in helping to protect it. However, there were challenges as well. The rural setting of our geographic area is by nature, relatively sparsely populated, which meant our volunteer base was smaller to start with. Additionally, the distance to our sampling locations and thus the time commitment required of our volunteers to assist is greater. Furthermore many of our potential volunteers are seasonal residents who are not present during spring and fall sampling events. In response to these challenges we are attempting to create sampling events that are more conducive to the rural volunteer such as empowering volunteers to create

sampling groups with designated leaders that would self organize and carry out sampling events within a given two week window each spring and fall. This allows for groups to choose a sampling time that is most convenient for their group.

When training people to identify macroinvertebrates, a number of things became apparent rather quickly. It is difficult for beginners and laymen to distinguish subtleties in insect morphology. Cerci, antennae, and legs are very hard for volunteers to distinguish between with limited or intermittent identification practice. We also found that our volunteers had little interest in seeing identification events through to the end. This lead us to advertise the identification portion of the collection event as an optional add on activity after teams collected their samples. As a result, most identification was done by the project manager or trained interns. We are considering hosting more regular seasonal identification practice events to engage interested volunteers who may be skipping collection day identification events due to insufficient knowledge in hopes of generating more interest.

Finally, we have learned the value of listening to the needs of our volunteers. Not only has this lead to more efficient and effective ways to plan elements of our collection events, but also it helps us demonstrate to them our appreciation for their work. As a result of soliciting feedback, we have learned which supplies would help them be more successful during collection events. We found what information helps them to feel more confident and we found willingness by them to share their comforts, concerns, and limitations throughout the collection process.

Education and Outreach Activities:

Education and outreach activities focused on raising awareness and gathering support for our stream-monitoring program within the surrounding community. We have promoted the MiCorps program through every media outlet we have available (website, blog, quarterly e-publications, programing brochures, events, and conferences). Elements of MiCorps protocols and procedures have been incorporated into educational curriculum and activities used in our academic, internship, and K-12 Environmental Education Programs. In total, we have educated and informed over 500 participants about our volunteer efforts on the Manistee River and the MiCorps program.

Evaluation (if any):

Participants were questioned about their experience and volunteer stream leaders participated in a debrief sessions after each collection event. Feedback was used to improve training and collection events.

All Partners (and contributions):

Our partners for this project include (contributions in parenthesis):

- **Upper Manistee River Association** (project advisement, logistical support, data usage, program promotion, and volunteer cultivation)
- **Conservation Resource Alliance** (project advisement, data usage, and volunteer cultivation)
- **Garfield Township** – Environmental Committee (Data usage, project promotion, and volunteer cultivation)
- **Blue Lake – Cold Spring Civic Association** (project promotion and volunteer cultivation)
- **Big Twin Lake Association** (project promotion and volunteer cultivation)
- **Manistee Lake Association** (volunteer cultivation)
- **Anglers of the Au Sable** (project coordination, volunteer cultivation)
- **Trout Unlimited** (volunteer cultivation)

All Products:

- Training events (Fall 2014, Spring 2015, Fall 2015, Spring 2016)
- Collection events (Fall 2014, Spring 2015, Fall 2015, Spring 2016)
- Stream habitat assessments – done for each site every fall collection event
- Macroinvertebrate assessment done to family for each site (Fall 2014, Spring 2015, Fall 2015, Spring 2016)
- QAPP
- Webpage devoted to stream monitoring on Au Sable’s website and updated after each seasonal collection event.

Discussion of Sustainability (including plans for future funding and monitoring):

Au Sable is committed to continuing MiCorps monitoring efforts in the future. We anticipate the financial burden of sustaining this program to be relatively low as previous grants have covered most equipment costs. Efforts associated with implementation align well with our organizational mission and thus expenses, of which we anticipate labor to be the largest, are justified. As relationships with our partners strengthen and our interest in expanding the number of sampling sites grows, we may look to them for in-kind or financial assistance.

Furthermore, our intent with regards to the MiCorps program is not to simply sustain our current level of involvement but to expand upon it. Our grant proposal identifies eight sites as potential monitoring locations of which we are currently monitoring five. Our hope is to cultivate enough volunteer interest to increase our monitoring capacity to include these 3 additional sites. Additionally, Au Sable is aware of other opportunities through MiCorps to work within the Upper Manistee River watershed. We will be assessing these options and look forward to the possibility of expanding the focus of our work within the watershed in the future.

Photos, Flyers, Announcements, etc:*

Attached.

**Photo captions:*

MiCorps 1.jpg – Members of our volunteer stream team sort through their collection of macroinvertebrates on the banks of Big Devil Creek, located in Kalkaska County.

MiCorps 2.jpg – College students participating in Au Sable’s summer research program attend a MiCorps training presentation. Students are seen practicing macroinvertebrate identification.

MiCorps 3.jpg – Members of Au Sable’s stream brush up on collection and sorting methods during a spring training event.

MiCorps 4.jpg – Au Sable has utilized elements of the MiCorps program in a variety of programs we offer local youth. Here an Au Sable intern (left) trained in the MiCorps procedures helps a student and teacher participating in one of our day programs learn about macroinvertebrates.



Signed:

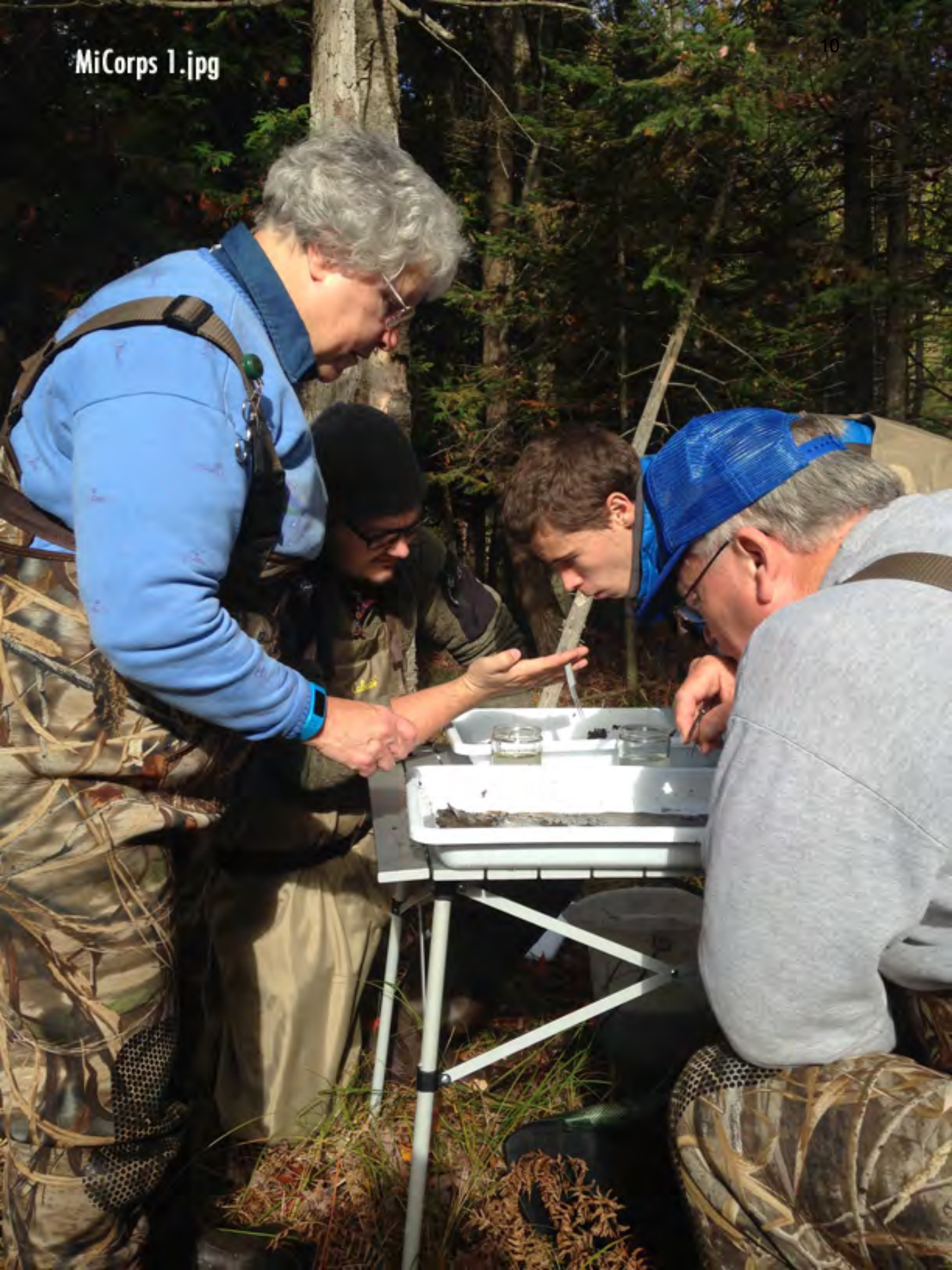
Grantee=s Representative

Date: 6/30/16







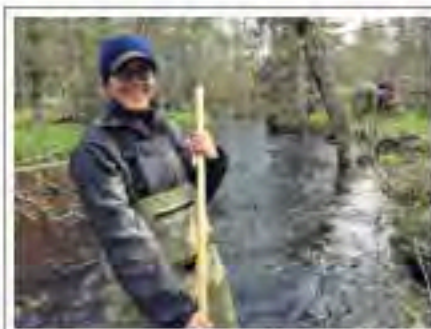


NEWS

Au Sable Launches the Manistee River Stream Team with MDEQ Grant

Jun 18, 2014

Au Sable Institute of Environmental Studies has received a two-year grant from the Michigan Department of Environmental Quality (MDEQ) for its new citizen science initiative to empower local citizens to collect information on water quality to monitor and protect the Upper Manistee River. The Upper Manistee River Stream Team will comprise local citizens passionate about protecting the Upper Manistee River Watershed and not afraid to get a little wet doing it.



Au Sable Environmental Education Coordinator, Paul Wiemerslage says, "This new program is an exciting way to bring people together to care for our local stream and watershed.

Northwest Michigan streams are beautiful and unique and the Manistee is no exception. Au Sable has been taking nearby students to the Manistee River to learn about our local streams and stream science for decades. We're pleased to coordinate a program that teaches people the skills to collect data that can inform how we protect the Manistee River going forward."

The Institute has already held its first Volunteer Stream Monitoring Day this past spring. Groups of participants ventured out to collect aquatic insects at five locations in the Upper Manistee. The presence of these aquatic insects, called macroinvertebrates, serves an indicator of the stream's water quality. By monitoring these stream locations over time, the data collected can be used by decision-makers to gauge stream quality and make improvements if stream conditions become compromised.



"This is a way for people to make a real difference," says Wiemerslage.

The program is part of a larger movement spearheaded by the Michigan Clean Water Corps (MiCorps) to empower local citizens to collect important data on Michigan rivers, streams, and lakes for local decision-makers to use to protect our watersheds.

All ages are welcome to join in monitoring efforts when the Manistee Stream Team will sample in the fall. For anyone interested in participating, or wish to have more information, please contact Paul Wiemerslage at 231-587-8686 or paul.w@ausable.org.

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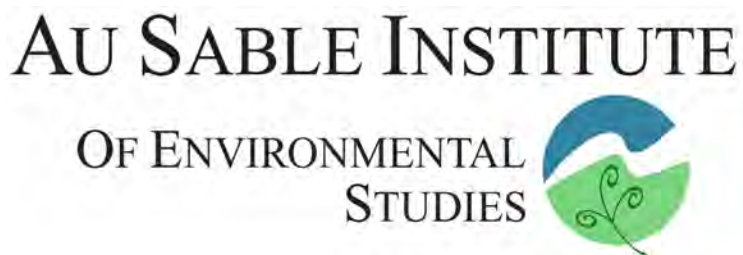
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Manistee River Stream Team Training Day

When: April 30th, 2016. 9am – 3:00pm

Where to meet: The Lodge at Au Sable Institute

What to bring: Sack lunch, waders (Au Sable can provide waders if needed), rain coat, warm clothes, extra layers, and anything else to keep you happy outdoors.

What is provided: Snacks, coffee, all collection materials, training packet, and transportation to the field collection.

Agenda:

9:00 – Welcome, Arrival, Introductions

9:15 – The MiCorps Program - Overview and Collection Day Event Responsibilities

9:30 – Monitoring Techniques and Macroinvertebrate Identification Training

10:15 – Indoor Practice with Insect Identification

11:00 – Lunch

11:30 – Visit Sampling Sites

1:00 - Field Sampling Practice: Insect Collection and Habitat Assessment on the stream

2:30 – Return to Au Sable – Concluding Remarks

3:00 – Adjourn

Please call Paul at 231-587-8686 or email paul.w@ausable.org with any questions.



Possibilities Abound with Stream Monitoring

March 21, 2016, [Guest Contributor](#)

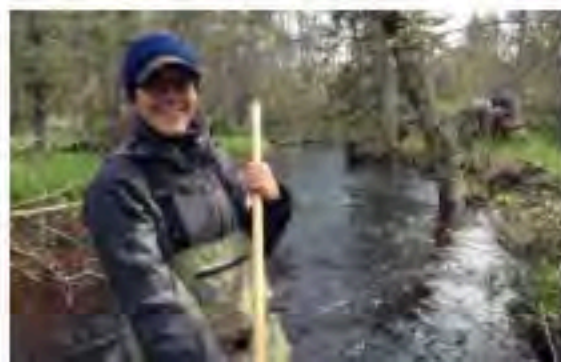
When I was little, my neighborhood friends and I would sneak away from our houses just after lunch, traverse down the wooded bluffs and spend the afternoon exploring the nooks and crannies of the nearby Willow River. Barefooted and sunburned, we would wade up the stream in search of wildlife. In all of our rumpus and commotion we didn't usually see much and as the sun's angle neared the tree tops, we would let the current deliver us back to our starting point and rush to be home before dinner. It wasn't until years later, during a stream ecology class in college that I realized how much life our bare feet and toes were coming into contact with below the water's surface. The diversity and abundance of macro-invertebrate life is astonishing, as is the number that has crawled across my toes unknowingly.

When training new volunteers to join the ranks of our stream monitoring team, I often steal a page out of Dr. Paul Steen's playbook and ask participants to recall their fondest water memories. The story above is one of mine and as I near the end of the story I will show the audience a large dragonfly nymph or maybe, a hellgrammite. The initial reaction from the audience is usually one of minor repulsion with several laughs from commiserating fellows. These are the critters that were crawling across my feet. With that the intrigue, whether positively or negatively associated, is fixed. Participants want to learn more and we dive into the work of identifying insects.

In 2013, my organization, the Au Sable Institute of Environmental Studies, was awarded a MiCorps start-up grant and began monitoring portions of the upper Manistee River. A year later we received a full project grant. We've enjoyed engaging new volunteers and audiences through the program and contributing to new knowledge about the health of portions of the upper Manistee River and its tributaries. What we couldn't have predicted were the ways in which the MiCorps program and protocol would be applicable in our other outreach and educational programs.



A giant stonefly (*Pteronarcys* sp.)



Our K-12 environmental education program uses MiCorps training presentations to teach aquatic insect identification and diversity to middle school students. College students in our Aquatic Biology class participated in our MiCorps training to practice collection methods and learn about broad scope citizen science efforts. And just last year, one of our undergraduate research teams conducted a study of the slimy and mottled sculpin as

Upcoming events

[12th Annual MiCorps Conference & Training](#)

11/02/2016 - 11/03/2016
Tustin, MI

Manistee River Water Quality Data

Stream Teams currently monitor water quality at five locations within the watershed, Flowing Wells, Big Cannon Creek, Big Devil Creek, Maple Creek and Pierson Creek. Stream Teams perform a habitat assessment (fall only) and collect macroinvertebrates from each site, this data is used to compute a Stream Quality Index score (SQI) which will be used to benchmark changes in water quality over time. A full summary of our methods and procedures can be found in our [Quality Assurance Project Plan \(QAPP\)](#). Full individual stream reports are available online in the [MiCorps data exchange network](#), records can also be attained by contacting Au Sable directly. Biennial reports will be produced following our fall and spring collection events. A final year-end report will be distributed in August.

Understanding the SQI:

The Stream Quality Index is a measure of stream health and water quality based on the presence or absence of specific orders (and some families) of macroinvertebrates typical of healthy cold-water streams. Macroinvertebrate orders (and some families) are categorized into three groups according to how well they tolerate pollution: Group 1) Sensitive, Group 2) Somewhat-sensitive, and Group 3) Tolerant. Groupings are weighted to account for discrepancies in pollution tolerances with Group 1 organisms weighted higher than Group 2, and Group 2 higher than Group 3. Species abundance is also accounted for in the weighting scale with higher sample counts for each order receiving a higher weight than lower sample counts (with the exception Group 3). Macroinvertebrates within a stream sample are identified to the necessary taxonomic level, recorded and scored. An example macroinvertebrate data sheet can be viewed or downloaded [here](#).



Understanding Macroinvertebrate Family Data:

Identifying our macroinvertebrate samples to the family taxonomic level can give us more precise data and a more complete understanding of stream health. For example, the order Ephemeroptera (mayflies) is typically associated with high water quality, which is true in general. However, some mayflies do not need high water quality to survive and may be present in water typically associated with very poor water quality. Identifying our sample to the family level can, in some instances, help account for pollution tolerance discrepancies within orders. Family data can be viewed or downloaded on the [MiCorps Data Exchange](#), or by contacting Au Sable.

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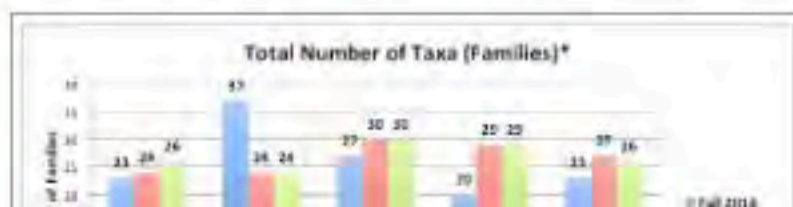
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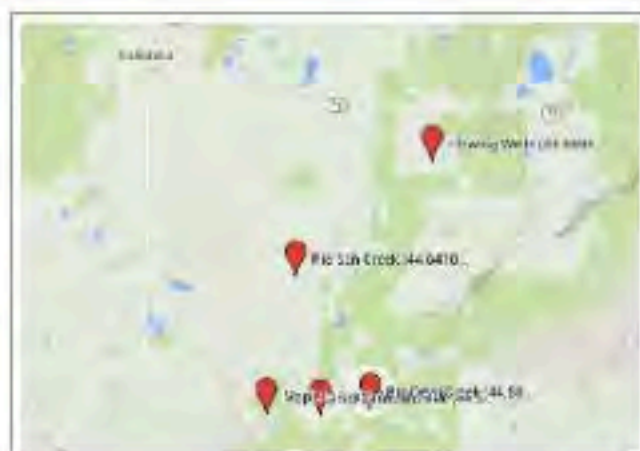


Citizen Science

One day each spring and fall volunteers help Au Sable Institute gather important water quality data from within the Upper Manistee River Watershed. Volunteer groups sample stretches of river for macroinvertebrates and report back on habitat conditions. This information gathered helps us track trends in water quality over time and can be used to inform policy and practice at the state and local level. We welcome all ages to participate as we hope to engage and educate a diverse group of volunteers including concerned citizens and local school students and teachers. We encourage you to join our efforts by becoming a member of our Stream Team! Please contact Project Manager, Paul Wiemerslage (paul.w@ausable.org or 231-587-8686) to learn more or sign up.

Sampling Sites

Au Sable currently monitors 5 locations within the Upper Manistee River watershed. Sites were chosen with regard to past history of sampling, proximity to road/stream crossings, access, and diversity of habitat. Each site spans 300 ft of stream and is sampled for 30 minutes each fall and spring. Click the image below for a map of each location.



Upper Manistee River

The Upper Manistee River faces a number of restoration challenges and future concerns. The watershed has experienced significant disturbance over the past century. Heavy logging within the watershed along with use of the river for log drives has permanently altered the stream corridor and substrate. Future concerns by local residents along the Upper Manistee include water withdrawals required for hydraulic fracturing, which is growing throughout the watershed. Three new hydraulic fracturing exploratory sites within the Upper Manistee have been proposed in the last

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Feb 18, 2015

Au Sable Institute's Volunteer Stream Water Monitoring efforts were recognized by the Michigan Department of Environmental Quality and Michigan Clean Water Corps (MiCorps) during the MiCorps stream monitoring conference held annually at the Ralph A. MacMullan conference center in Roscommon. Paul Steen, MiCorps Program Manager stated, "The Au Sable Institute has greatly contributed to the MiCorps community. The group is collecting data on key stretches of the Manistee that have been unsampled and largely unknown to the state biologists." This is the second certificate of recognition Au Sable has received for their work organizing volunteer monitoring efforts within the Upper Manistee River watershed. Paul Wiemerslage, Project Manager and Au Sable's Environmental Education Program Coordinator, said of the program, "We feel fortunate to have the support of MiCorps behind our efforts and their years of experience to help us accomplish the important task of protecting and conserving our local waterways."



A major initiative in the pursuit of "Citizen Science," Au Sable began their Volunteer Stream Water Monitoring Program in 2013 after receiving a start-up grant from MiCorps. Currently Au Sable monitors five locations within the Manistee River watershed. Volunteer groups of local area residents sample the stream for invertebrates and record important habitat characteristics

twice a year during the fall and spring. The information they have collected can be accessed online at the [MiCorps data exchange network](#) and will be used to document changes in water quality over time. Additional water quality information will also be available on Au Sable's website later next month.

"We've got a lot of community members who are concerned about the health of northern Michigan and they want to help any way they can." Wiemerslage continued, "The MiCorps program is an opportunity for these individuals to get involved and contribute to meaningful work aimed at protecting our watershed." Fred Van Dyke, Au Sable's Executive Director, noted, "All of us at the Institute commend and congratulate Paul, with all our neighborhood volunteers, on their deserving recognition accompanying this award. Paul's work in funding this effort and organizing these volunteers provides us at Au Sable with a very tangible expression of caring for God's creation, involving our neighbors in this important work, and serving scientists and managers who care for this watershed with valuable data on its condition. Together, these represent all of the things we want to be doing in our work at the Institute."



Spring training and sampling events are set for May 2nd and 16th respectively.

Individuals and groups interested in volunteering can contact Paul Wiemerslage at 231-587-8686 or paul.w@ausable.org.