The MiCorps Monitor: Fall 2014

The newsletter of the Michigan Clean Water Corps, Issue 12

Welcome!

Welcome to the Fall 2014 edition of the *MiCorps Monitor*! As always, this edition is full of updates and information on the activities and individuals of the Michigan Department of Environmental Quality's Michigan Clean Water Corps (MiCorps).

Please note: this PDF is a an archived version of the original, web-based newsletter. As such, some features (photos, captions, navigation) are not available, and links may be broken. We apologize for the inconvenience!

MiCorps

Monitoring Michigan's Water Quality

www.micorps.net

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Article 1:
How did the stream cross the road?
(A look into MiCorps' newest stream monitoring practice)

"Ideally, the road doesn't know it went over a stream and the stream doesn't know it's going under a road."

I often use this statement, or something similar, to describe what the goal of a culvert replacement would be. Unfortunately, this scenario is not the case for many road/stream crossings in Michigan, and likely around the world.

When culverts were historically installed, the stream science available now did not exist. So we have been left with culverts that are too narrow, set at incorrect elevations, not aligned with the stream, and many other problems. Though they may pass the water effectively, culverts of this nature have been impacting streams since the day they were put in. Fish can't swim through, material and natural water flows get blocked, sediment pollution comes from the dirt roads, changes in water temperature and chemistry take place, and the list goes on.

Fortunately, awareness and action on the issue have been increasing greatly in recent years. The U.S. Fish and Wildlife Service, U.S. Forest Service, the Environmental Protection Agency, the Michigan Departments of Environmental Quality and Natural Resources, and many other agencies turned their attention to finding and fixing bad culverts. Just last year, MiCorps initiated a new competitive grant process to help conservation groups mobilize their volunteers to gather data on crossings. It is easier said than done, though. Fixing road/stream crossings takes good science, better communication, highly functional partnerships, and of course, money.

The tide is changing though, and changing quickly. The topic of culverts continues to gain more and more attention. Road managers anticipate the next round of high water or planned improvements to infrastructure and are thinking about stream function. Natural resource professionals better understand the impacts culverts can have on streams and are proactively targeting their improvement.

Funding to improve road/stream crossings is now originating from more and more sources, including state and federal agencies, non-profit conservation groups, local governments and most importantly County Road Commissions (CRCs). It is important not to simply think of funding as cash. Project examples continue to accumulate in Michigan that have CRCs, who manage many of our roads, contributing their labor and equipment to the project. It may seem obvious that the CRC would be part of culvert replacement projects since the roads are their responsibility. However, when CRCs provide their labor and equipment as in-kind contributions to a project, it creates a source of match, and proof of collaboration, that is undeniable to any funding source.

There are competitive sources of funds to support the purchase of road materials and new culverts or bridges and there are the local agencies able to effectively and efficiently do the work. This is where a regional or local conservation nonprofit organization is able to bring the necessary partners together. Navigating which agency funds which type of project and why, is one level of expertise a nonprofit organization can provide to the partnership. Another is to manage permitting, design and engineering, and ultimately lead the fundraising efforts. They broker the deal and their ability to do so is getting stronger.

Data: that's what is strengthening the conversation. The impacts culverts can cause to streams are becoming better understood. Now, there is a mechanism or protocol to collect the data about those impacts. It is no longer a conversation of "This culvert is bad." It has become a conversation about "This is a bad culvert, because..." Whether a poorly designed road/crossing causes velocities that are too fast for fish, or they block sediment movement, or the road erodes sediment into the stream, or the culvert creates a waterfall too high for fish to jump, there are ways to collect data and to show "how bad it is."

More importantly, conservation groups across the Great Lakes are collecting this data based on culverts in an entire watershed. When each culvert is represented in a data set, it becomes that much easier to compare road/stream crossings and assess which ones pose no problems to streams and which are in need of improvement. With data for every road/stream crossing having been collected, the conversation again shifts from "This one is bad." to "This one is the worst." Being able to put your finger on a map and point out the culvert that most negatively impacts the stream is powerful, especially when you have the data to prove it.

Undertaking a full watershed inventory of road/stream crossings is no small task. There is a well written protocol and standard data form and online database, but ultimately every site has to be visited and two pages of data get collected at each stop. The data depicts whether the culvert is set at the correct elevation, if it is large enough for stream flows, if stream material is transported through the culvert, if fish can freely swim up and downstream, if the road contributes too much sediment, if there is additional erosion, or if the crossing is actually in really good shape with respect to the stream. All of those impacts are derived from the information collected at each site.

The good news is that as the value of having the data and being able to prove the severity of sites is being recognized by funding agencies. This means conservation groups are getting financial support to implement the inventory and data collection across entire watersheds. CRCs also have access to software that enables them to collect the same data using the same protocol. All the while, this data is being used to raise funds, to collaborate across sectors of the community, and to improve our roads and streams.

So through the inventory process, the case can be made as to which culverts need replacing based on their impacts to the stream and its ecosystem. As the funds come in and crossings are improved, stream function is restored. The new culvert can pass flood flows and there is lower risk to the road. With the culvert sized appropriately, the stream can transport material and natural water velocities under the road and fish can again swim freely. So, the road doesn't know the stream is there and the stream doesn't know the road is there. Yet, you will know that none of it would have happened if you hadn't been there.

For more information on completed road/stream crossing inventories or the methods to collect the data, please feel free to contact Patrick Ertel, Michigan DNR, by phone at 989-732-3541 x. 5047, or by email at ertelp@michigan.gov.

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Article 2:
Watershed Management Planning for Restoration and Protection

Editor's Note: Many MiCorps volunteers ask what to do when their monitoring data show that the quality of their lake, stream, or river is going downhill. Nonpoint source (NPS) pollution upstream in the watershed is often the most common source of these problems. It might seem like NPS pollution is outside of your control - but it isn't! Watershed Management Plans can correct NPS pollution, and you can be a part of it. Here's how to get started or to contribute to ongoing efforts.

The following article revisits Mr. Bob Sweet's (Michigan DEQ, Nonpoint Source Pollution Unit) October 2013 presentation on Watershed Management Planning from the ninth annual MiCorps Conference. We again thank Mr. Sweet for his participation in that event.

Who hasn't heard the old English proverb "Measure twice and cut once"? The literal meaning is quite clear: take careful measures and double check them before making a cut to save both time and material. While this proverb is said to have originated in the guilds of the 16th century (carpenters, joiners, tailors, and masons are all potential sources), it still rings true today. But how does it apply to watershed management planning? First, what exactly is a watershed and what is nonpoint source (NPS) pollution?

Simply put, a watershed is all of the land area that "sheds" its rain and snowmelt to a common point, typically a lake or stream. An easy way to think about this is to compare a watershed to the peaked roof of a house. During a rainstorm, water striking the roof will run down either side to the gutters, and each face of the roof is in fact a separate watershed. To convert this to a more practical example think of the roof peak as a mountain range or series of hills and the gutter as a river or stream.

As water from rain or snowmelt moves across the land (i.e., runoff) of the watershed, it naturally picks up small particles of soil (sand, clay, and organic material) and moves it down slope eventually depositing it in its lake or stream. The water will also dissolve minerals and other substances as it moves over and through the soil. It's easy to see how water quality can be impacted by the characteristics of the watershed.

As we develop land we impact this transport of materials to our lakes and streams. Fertilizers and pesticides from farms and yards; salt, metals, and oil and grease from roads; and litter and debris can all be moved by runoff and eventually delivered as pollutants to our lakes and rivers. This polluted runoff is known as nonpoint source pollution since it doesn't have a defined source such as a pipe or smokestack. While point sources have largely been controlled through regulation, nonpoint sources have proven more difficult to control due to their diffuse sources. Nonpoint sources are most easily controlled at the watershed level, and

this explains why watersheds are the basis for Michigan's Nonpoint Source Program.

Working on a watershed scale can be a complex and difficult undertaking. Remember "Measure twice and cut once"? Wiktionary lists the figurative meaning of this proverb as "Plan and prepare in a careful, thorough manner before taking action," which is exactly what is required in watershed management planning. While the NPS Program deals with watershed management plans approved under specific State and Federal criteria, the basic watershed management planning steps might be distilled to: organize, assess, prioritize, plan, and implement. These steps are diagramed below.

You'll notice that the diagram demonstrates that in practice watershed planning and watershed management are iterative processes. Over time you will solve some problems and new ones will arise. Priorities will change. New information will become available. Plans won't work exactly the way you thought. For all these reasons it is important to occasionally take stock of your progress and reassess your plan. Five to ten years is the typical cycle time for watershed management plans in Michigan.

Besides the purported savings of time and resources, how else might you benefit from a watershed management plan? Without a doubt the biggest hook for most is funding. While funding to produce a watershed management plan has always been limited, many funding sources now require implementation projects be based on a watershed management plan. Even when a funding source doesn't require that projects are from watershed management plans, it is often beneficial if they are. A project's inclusion in a watershed management plan indicates a level of public support as well as some thought as to prioritization.

Where do you go for more information about watershed management plans? A great place to start is the NPS Program homepage (www.mi.gov/nps). It includes links to: NPS staff (most are experienced planners at the watershed level), guidance and resources for preparing plans that meet State and Federal criteria, information about the almost 150 existing plans and the local organizations that wrote them, funding information, and technical guidance for best management practices to control NPS pollution.

The following list includes just some of the many online funding and information sources that may be helpful for a watershed management planning project. The list is far from complete, but it does include some of my favorites.

Information Sources:

1. Michigan Nonpoint Source Program - Information about the sources and control of NPS pollution, watershed planning, and funding: www.mi.gov/nps
2. Michigan Surface Water Information Management (MiSWIM) System - An interactive map-based system that allows users to view information about Michigan's surface water: www.mi.gov/miswim
3. MDEQ, Surface Assessment Section - Water quality reports and information about the States monitoring activities as well as links to Total Maximum Daily Loads (TMDLs): http://www.michigan.gov/deq/0,1607,7-135-3313_3686_3728---,00.html
4. Michigan Natural Features Inventory (MNFI) - Data Sources: http://mnfi.anr.msu.edu/data/index.cfm

5. Pre-settlement Vegetation: http://mnfi.anr.msu.edu/data/veg1800.cfm
6. USGS, Michigan Water Science Center - Web page for the water resources of Michigan; includes a direct link to information on Michigan's streams, ground water, water quality, and many other topics: http://mi.water.usgs.gov/
7. NOAA, Coastal Change Analysis Program - Land cover and land change information: http://www.csc.noaa.gov/digitalcoast/data/ccapregional
8. USEPA, EJView - A good mapping site for environmental and demographic/social information on a watershed (12 digit HUC) or political boundary basis: http://www.epa.gov/environmentaljustice/mapping.html
9. USEPA, Surf Your Watershed - Links to environmental information on an 8 digit HUC basis: http://cfpub.epa.gov/surf/locate/index.cfm
10. Social Indicators Data Management and Analysis (SIDMA) Tool - Links to social surveys and results (requires free registration): http://35.8.121.111/si/home.aspx

Funding Sources for Watershed Based Planning and Implementation:
Note: Eligible activities, priorities and amounts available may change year to year for individual funding programs. Limited funding is typically available for planning activities.

1. DEQ Grants and Loans Catalog: DEQ - Grants and Loans
2. Catalog of Federal Funding Sources for Watershed Protection: ofmpub.epa.gov/apex/watershedfunding
3. DNR Grants: www.michigan.gov/dnr-grants
4. Cyber-Sierra's Conservation Grants Center: http://www.conservationgrants.com/
5. Great Lakes Basin Program for Soil Erosion and Sediment Control: www.glc.org/basin

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Article 3:
Volunteer Stream Monitoring Grants Awarded for 2014

MiCorps is pleased to announce that seven organizations have been selected to receive volunteer water quality monitoring grants in 2014 to further expand the existing network of volunteer-dependent monitoring groups and committed citizens who work to monitor water quality in Michigan. Since 2005, the Volunteer Stream Monitoring Program (VSMP) has provided financial and technical assistance in the form of competitive grants to local units of government and nonprofit entities to initiate or improve local volunteer monitoring programs around the state. Grantees are trained to collect reliable, high-quality benthic invertebrate and stream habitat data that is then used by the Michigan DEQ as a screening tool to focus and prioritize future work. Data collected under this program is also shared via the MiCorps Data Exchange (www.micorps.net/data/view/search/) for use by other resource professionals and interested parties.

Full grants are awarded to eligible monitoring programs to build upon an existing program over a period of 18-24 months. Smaller, one-year "start-up" grants are awarded to newly forming volunteer monitoring groups to assist them in developing a monitoring strategy for their community and to build capacity for their program so that they might be eligible to apply for a full grant in future years. Successful grant recipients are able to demonstrate a commitment to continuing the monitoring program in years to come.

This year, the VSMP has awarded four full grants and three start-up grants, totaling nearly $50,000 in funds, to support the recipients' volunteer monitoring work beginning in 2014.

In 2014, MiCorps also awarded a single Road/Stream Crossing Inventory Pilot Program grant in the amount of $8,500 to establish a volunteer-based program in which volunteers visit and assess the condition of road/stream crossings to protect and enhance streams throughout a target watershed. Poorly designed and maintained road/stream crossings directly degrade the quality of Michigan rivers and creeks and steep slopes and high foot traffic can cause excessive erosion and stream culverts can increase water speeds, increase erosion, and block fish movement. There exists a distinct need to understand where these problem areas are so that maintenance funds can be properly allocated. MiCorps will provide training to the grantee, and the data will be entered into a publicly available database and used by various agencies as a screening tool. Depending on the success of this pilot program and availability of funding, this new monitoring program may be offered as part of the MiCorps volunteer stream monitoring programs in future years.

Full grants:

Au Sable Institute of Environmental Studies
Project Title: Upper Manistee River Watershed Volunteer Monitoring Project

Watersheds: Upper Manistee River
Funding Amount: $11,651
Contact: Paul Wiemerslage, Ph: 231-587-8686 paul.w@ausable.org

The Au Sable Institute of Environmental Studies seeks to monitor macroinvertebrate populations and stream conditions at nine sites in the Upper Manistee River Watershed, while educating residents on water quality and protection. Data collected will be used to identify degraded areas within the watershed where best management practices (BMPs) can be implemented.

Timberland Resource Conservation & Development Area Council
Project Title: Coldwater River Watershed Monitoring
Watersheds: Coldwater River
Funding Amount: $11,623
Contact: Kristi Klomp, Ph: 616-451-4844, timberlandrcd@gmail.com

The Timberland RC&D Area Council seeks to monitor macroinvertebrate and habitat conditions at seven sites in the Coldwater River and its tributaries, including Tyler and Duck Creek and Messer Brook. The long-term dataset will be used to benchmark changing conditions in the streams and to develop recommendations for long-term protection and enhancement of the river and its tributaries.

Marquette County Conservation District
Project Title: Upper Escanaba River Watershed Volunteer Stream Monitoring Project
Watersheds: Escanaba River
Funding Amount: $11,220.45
Contact: Allyson Dale, Ph: 906-226-2461, allysonmdale@gmail.com

The Marquette County Conservation District seeks to generate water quality data and to foster stewardship in local citizens and partners through macroinvertebrate monitoring at eight sites along the Escanaba River, a coldwater trout stream that suffers from sediment deposition from degraded road-stream crossings.

Jackson County Conservation District
Project Title: Jackson County Conservation District's Adopt-A-Stream Program
Watershed: Upper Grand River
Funding Amount: $7,950
Contact: Kandice Karll, Ph: 517-784-2800, kandice.karll@macd.org

The Jackson County Conservation District seeks to expand their Adopt-a-Stream program to monitor macroinvertebrate populations at ten new sites within the Upper Grand River watershed and to recruit new volunteers to the program. The District will use volunteer engagement to educate the public on water quality issues within the Jackson Urbanized Area and the Upper Grand River watershed.

Start-up grants:

Van Buren Conservation District
Project Title: Paw Paw River Watershed Monitoring Project
Watershed: Paw Paw River
Funding Amount: $2,923.25
Contact: AJ Brucks, Ph: 269-657-4030, alison.brucks@mi.nacdnet.net

This start-up grant is intended to establish a macroinvertebrate monitoring program along the middle section of the Paw Paw River watershed, which is a tributary to the St. Joseph River. While long considered a jewel of Southwest Michigan, it is becoming increasingly apparent that the Paw Paw River is under stress due to increasing sediment loads from agricultural land uses, increased storm water runoff from development, and the threat of additional Concentrated Animal Feeding Operations (CAFOs) planned for the watershed. The proposed project will help to fill gaps in data and provide more up-to-date data on particular problem areas. In addition, the development of a volunteer monitoring program in this area is anticipated to get larger numbers of people working on and thinking about water quality and river health issues within the watershed.

Ingham Conservation District
Project Title: Ingham Conservation Stream Monitoring Program
Watershed: Upper and Middle Grand River, Red Cedar River
Funding Amount: $2,354
Contact: Michelle Beloskur, Ph: 517-676-2290, michelle.beloskur@macd.org

This start-up grant is intended to establish a macroinvertebrate monitoring program in the Upper and Middle Grand River and Red Cedar River watersheds within Ingham County. Sampling takes place along the Red Cedar River on a bi-annual basis and a round of sampling was done in the Middle Grand River Watershed to assist with the development of a watershed management plan, however there are still significant gaps in the county where the need for sampling exceeds the available programs. This project will help to close these gaps, providing regional continuity in data collection and reporting. The project will also help to provide data for previously unsampled tributaries in the Red Cedar River Watershed and provide on-going monitoring of invertebrate populations in waterways targeted for nonpoint source pollution reduction.

The Little Forks Conservancy
Project Title: Cedar River Watershed Monitoring Program
Watershed: Cedar River
Funding Amount: $2,276
Contact: Elan Lipschitz, Ph: 989-835-4886, elipschitz@littleforks.org

This start-up grant is intended to establish a macroinvertebrate monitoring program in the upper section of the Cedar River, a blue ribbon trout stream within the Saginaw Bay watershed. As one of three designated blue ribbon trout streams in the Saginaw Bay region, it is a sought after destination for anglers. However, there is a concern that potential sources of nonpoint source pollution (i.e., concentrated animal feeding operations, agricultural runoff, etc.) may negatively impact these valuable, yet fragile, cold-water trout streams. The development of a strategic monitoring plan for the watershed will help to establish long term

data that can highlight new stressors early on and identify areas to focus restoration and education efforts.

Road/Stream Crossing Inventory Pilot Grant:

Timberland Resource Conservation & Development Area Council
Project Title: Buck Creek Road/Stream Crossing Inventory
Watershed: Buck Creek
Funding Amount: $8,500
Contact: Kristi Klomp, Ph: 616-451-4844, timberlandrcd@gmail.com

Buck Creek, a subwatershed of the Lower Grand River, flows through Gaines Charter Township, Byron Township, and the cities of Kentwood, Wyoming, and Grandville, with an estimated 210 road/stream crossings. The data collected from this project will help to determine the current and potential impacts that road/stream crossings have on waters within the Buck Creek watershed, as well as prioritize placement of BMPs to mitigate water quality, habitat, and contamination concerns for the watershed.

Volunteer River, Stream and Creek Cleanup Program

While not specifically funded under the MiCorps umbrella of programs, the DEQ also offers an additional grant program, the Volunteer River, Stream and Creek Cleanup Program (VRSCCP), that may be of interest to local units of government and other partnering entities looking to engage volunteers and promote stewardship through watershed activities. If you've never applied for a grant before or are interested in gauging the interest of potential volunteers in your area, this program might be a good "stepping stone" opportunity to consider before applying for a MiCorps Volunteer Stream Monitoring grant or to supplement existing volunteer programs already underway.

Since 1998, the VRSCCP program has provided small grants ($5,000 or less per award) to support volunteer river cleanup efforts on rivers, streams and creeks throughout the state to improve the waters in Michigan. Funds for this program are generated by fees collected from the sale of the State's Water Quality Protection license plates (Public Act 74 of 2000). Awards under the program are intended to pay for trash removal and the clean-up of other anthropogenic debris, and can support equipment purchases for things like waders and other supplies and volunteer appreciation items to be used for the sponsored cleanup event and future cleanup activities.

The VRSCCP is managed by the DEQ and administered under contract by the Great Lakes Commission. To find out more about the program, the funding process, or to read about volunteer events in your area, please visit the program website at www.glc.org/projects/water-quality/streamclean.

2015 Grant Application Packages

Grant Application Packages (GAPs) for the 2015 grant cycle for the grant programs described above will be available later this winter. Please visit www.micorps.net/streamgrants and www.glc.org/projects/water-quality/streamclean for additional information and application instructions.

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Article 4:
Alger County: More Streams than People

Editor's Note: For each installment of the MiCorps Monitor, we ask a current MiCorps member organization to highlight their efforts related to volunteer stream monitoring. This issue's contributor, the Alger Conservation District, is currently supported, in part, by a 2013 MiCorps Volunteer Stream Monitoring Program (VSMP) grant. They also received a 2012 VSMP start-up grant prior to that to develop their monitoring program.

Alger County is a large part of a beautiful, sprawling landscape along the Lake Superior shore that's known for its abundant inland lakes, streams, and waterfalls. This angler's paradise, immortalized by Hemingway (yes, *that* Hemingway), seems to lend itself to a program like MiCorps. But having a heavenly diversity of waterways at your feet can only take you so far. So we applied for and received a MiCorps startup grant. What a great way to give us the resources to identify groups of volunteers and test out some PR and outreach while developing a full grant proposal! We looked at data from our watershed program to help us pinpoint some streams that have potential nonpoint source contamination issues and should be monitored. That gave us a framework. Still, turning that framework into a successful, long-term, county-wide stream monitoring program has been a tall order.

One of our first orders of business was to hire Josh Forrester as our stream monitoring coordinator. Josh had worked with us as an undergraduate intern while he was attending Northern Michigan University, so he had a little familiarity with Alger CD programs. Even so, jumping right in with only a few weeks before our first official fall sample was a big thing to ask of him. Prepping identification cards for the field, display panels for training, lining up the volunteers instead of running screaming, he rose to the challenge, and we had a pretty smooth inaugural fall event.

Where do you find volunteers in a county that spans 915 square miles, a two hour drive end to end, and has just 10.5 people per square mile? That's a question we're working on. Northern Michigan University and Pictured Rocks National Lakeshore have supplied us with some volunteers both expert and novice. And Josh's expertise with social media has reached new pools of net kickin', bug-pickin' talent. Still, we know that recruiting and retaining volunteers and finding the staff time and funding to do it will be one of our biggest challenges going forward.

Another challenge around these parts is the weather. For the most part, the weather cooperated during our fall 2013 event. However, our Slapneck Creek group likely has fond memories of sampling in early October with frozen BBs of sleet bouncing off of our windbreakers and a brisk north wind reminding us that winter is coming. We're Yoopers, though. No big deal. What's more, the bugs do not care. The mayflies and scuds and net-spinning caddis flies and all their entomological brethren were plentiful and active. It's

amazing how seeing those little critters warms your heart, even if your fingers are approaching maximum numb.

Back in May 2013, the very heavy snow, late melt, and persistent raging water levels had delayed the mock collection we'd planned under our startup grant, so we were less than surprised when the spring of 2014 put us in the same position. Figuring that lots of snow and deep spring flow are the norm rather than the exception up here, we've adjusted our goals and our QAPP and decided, for consistency's sake, to schedule our collections in early June. Our guru Paul Steen (MiCorps Staff, Huron River Watershed Council) expressed some concern that sampling as late as June might compromise the variety of data if we were to miss the mayfly hatching. So we checked with some local fishermen for their take on mayfly hatch, anecdotal though it might be, and obtained some actual hatch data for local lakes from Pictured Rocks National Lakeshore. As it turns out, mayflies around here aren't crazy enough to actually come out in May. They're more like June (or even July) flies. So, not a problem.

Of course, we continue to battle challenges both old (the neverending quest for funding) and new (I didn't think it was possible for the ruts in that two-track to get any deeper). Until the tax coffers are overflowing with road and conservation funding, we'll keep applying liberal amounts of work ethic to every squeaky wheel and hoping that we're making "Papa" proud!

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Article 5:
Environmental DNA Monitoring of Invasive Species with the Help of MiCorps Volunteers

Monitoring and early detection of aquatic invasive species in Michigan is very important to preventing their spread and reducing their potential impact. As evidence shows in the case of the zebra mussel (which has been invading our waters here in Michigan since the 1980s), these invaders, once present, can dramatically affect ecosystems and local economies. Zebra mussels eat a large amount of local waters' phytoplankton, outcompeting native species for food. In addition, hundreds of millions of dollars are spent each year to control zebra mussels that have clogged intake pipes and damaged recreational structures and equipment. Successful monitoring and early detection of future invaders has the potential to prevent successful establishment, allowing us to circumvent problems, like those caused by zebra mussels, in the future.

Traditional techniques for invasive species monitoring are time-consuming and can be expensive. It can also be a daunting task for a single group to monitor the over 11,000 Michigan lakes. I am a member of a research team at Michigan State University (MSU) that has simplified aquatic invasive species monitoring in Michigan by developing a technique for detecting the environmental DNA of invasive species from easily-collected water samples. The original purpose of the project was to establish an early detection tool targeting six high-risk potential future invaders: one fish (northern snakehead), four invertebrates (killer shrimp, fishhook waterflea, *Daphnia cristata*, and golden mussel), and one plant (Hydrilla). For research and monitoring purposes, each sample used in the project was also tested for a number of other current and potential invaders. Through sample collection assistance from MiCorps volunteers, our team has gone from a group of scientists in a laboratory to an invasive species monitoring "dream team!"

What is eDNA?

Environmental DNA (eDNA) is a term for the genetic material that is free-floating or trapped in cells that have shed from an organism into the aquatic environment. Examples of sources of eDNA in your lake include: feces or urine, eggs, juveniles, seeds, scraped-off cells, or organism death and decay. Since eDNA degrades in the aquatic environment with time, detection of it in a lake suggests that the invasive species is or was recently there. This makes eDNA an attractive option for invasive species monitoring. Using preliminary data, the MSU team has established methods for collecting water samples that enhance the probability of invasive species detection. These include the collection of filter concentrate from a simple filter-funnel as well as one liter of plain water. The eDNA is then measured in a reaction called DNA amplification, which uses an enzyme to copy a specific DNA sequence until it reaches observable quantities, with the aid of fluorescent dye for visualization.

Revolutionizing Invasive Species Detection

One of the key aspects of this project was the utilization of a hand-held device that can be taken in the field to detect eDNA, right after the sample is collected. The device uses chips that are pre-loaded with everything needed to complete the detection reaction, and just requires the addition of the water sample. Once the chip is inserted into the device, an application on a connected iPod Touch turns the equipment on and begins the detection process. The reaction takes approximately one hour after the water sample is added. In all, the time for the whole process from sample collection to result takes under two hours!

How has MiCorps Helped?

Through assistance from a large number of enthusiastic MiCorps volunteers, our eDNA team has been able to analyze over 200 samples from various lakes and rivers all across Michigan. Because our research is focused primarily on the development of this new technique, this large number of samples has been critical to our success! Many volunteers have even been collecting multiple samples at various times of the year to help determine how eDNA levels change throughout the seasons. Sample collection kits were distributed to interested volunteers, which included the required equipment, instructions, and shipping labels. There were a few overlaps in lakes, where a volunteer collected samples from the same lake as a member of the MSU eDNA team. The eDNA invasive species results were the same! This suggests that the sample collection procedure is volunteer-friendly, and that our MiCorps volunteer network is a great asset for invasive species monitoring.

Future Work

Some new features for this research will be introduced in fall 2014 to spring 2015, including trials of some of the handheld Gene-Z devices in the hands of some users. Gene-Z devices will be sent into the field to perform the eDNA detection at various locations to answer some interesting questions. These include: Is the protocol easy for volunteers to use? Are results reliable compared to other methods? Is the device rugged enough to be used under a variety of environmental conditions? Other exciting upcoming features include the integration of a new "iSAW" application for smartphones. This app will be used to view eDNA results from all samples sent to the eDNA team, request a sampling kit, or leave feedback for future studies.

If you would like more information about the project or would like to get involved in sample collection, please contact Maggie Kronlein at kronlei2@msu.edu, Dr. Jo Latimore at latimor1@msu.edu, or Dr. Syed Hashsham at hashsham@egr.msu.edu. This research is funded under the EPA Great Lakes Restoration Initiative, grant number GL-00E01127-0.

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Article 6:
Focus on the CLMP

What is the CLMP?

MiCorps is made of two main components - the Volunteer Stream Monitoring Program and the Cooperative Lakes Monitoring Program (CLMP). The CLMP is the second oldest volunteer lake monitoring program in the country and has been an important component of Michigan's inland lakes monitoring program for over 40 years. The primary purpose of the CLMP is to help citizen volunteers monitor the water quality of their lakes and document changes in lake quality over time. CLMP participants collect data on a variety of different parameters including: Secchi disk transparency, total phosphorus, chlorophyll a, dissolved oxygen, temperature, aquatic plant identification and mapping, and monitoring for exotic plants.

2014 Inland Lakes Convention and CLMP Training Event

Informative, inspiring and highly organized were just a few of the words used to describe the inaugural three day *Michigan Inland Lakes Convention: Partnering to Protect Michigan's Inland Lakes*. The event, hosted by the Michigan Inland Lakes Partnership (MILP) May 1-3, 2014 at Boyne Mountain Resort in Boyne Falls, Michigan attracted 372 lake enthusiasts, professionals, researchers, local government officials, and students. Breakout sessions and workshops covered a multitude of inland lake topics, including lake management, aquatic invasive species, natural shorelines, and law. The event included eight hands-on workshops, over 30 presentations, a guided tour of the Michigan Department of Natural Resources (MDNR) Oden Fish Hatchery, and over 50 exhibits focused on Michigan's inland lakes.

This year's CLMP annual training event was held as part of the Michigan Inland Lakes Convention. Over 80 participants learned how volunteers in the CLMP program monitor water transparency, phosphorus, chlorophyll, dissolved oxygen, and aquatic plants in their lakes.

Next year we will be headed back to Boyne Mountain for the training, held in conjunction with Michigan Lakes and Stream Annual Conference on May 1-2, 2015. Registration is not yet open, but more details will be provided at http://www.mymlsa.org.

New to the CLMP!

We would like to welcome the following new lakes to the CLMP for the 2014 sampling season:

Lake Name	County
Allen	Lenawee
Avery	Montmorency
Big Bass	Lake
Great Bear	Van Buren
Chippewa	Mecosta
Duck	Grand Traverse
Duck	Gogebic
Eagle	Kalamazoo
Manitou	Shiawassee
Moon	Dickinson
North	Washtenaw
Little Portage	Livingston
Rainbow	Kalkaska
Thread	Genesee
Wall	Barry

The 2014 field season wraps up!

380 volunteers monitored 217 of Michigan's lakes this summer through the CLMP. We are continually impressed by the level of commitment and care these wonderful people show toward their lakes.

Parameter	# of Lakes Enrolled in 2014
Secchi Disk	217
Spring Total Phosphorus	178
Summer Total Phosphorus	197
Chlorophyll	141
Dissolved Oxygen	59
Exotic Aquatic Plant Watch	33
Aquatic Plant Identification and Mapping	8

Although data collection is now complete, it takes a bit of time and elbow grease to process all the data. Expect to see the 2014 report released by February 2015. However, the 2014 Spring Phosphorus data is available now.

2013 CLMP Data

The 2013 CLMP annual report that was released last February can be obtained online here. This document contains information on the parameters collected by CLMP volunteers and, in particular, why these parameters matter to the health of our lakes. The annual report also lists all of the data collected by our volunteers in 2013 in printed tables.

All the data collected through the CLMP program are available online on the searchable Michigan Data Exchange (www.micorps.net). The Michigan Data Exchange allows users to view the lake data online and also download it into Microsoft Excel files. Reports for specific years are also available at www.micorps.net/lakereports.html.

CLMP 2015 Online Enrollment

Enrollment for the 2015 season of the CLMP will begin later this fall (early to mid-October). You can register online or you can request a paper registration form from Jean Roth, Michigan Lake & Stream Associations, by calling 989-257-3715. Lake associations as well as dedicated individuals are welcome to participate in helping the CLMP monitor Michigan's inland lakes.

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Article 7:
Updates and News from the CLMP Exotic Aquatic Plant Watch

During 2013, MiCorps staff and partners conducted 10 side-by-side lake visits with Exotic Aquatic Plant Watch (EAPW) volunteers. These lake visits were designed to help volunteers begin their EAPW surveys and to help us to identify any obstacles preventing volunteers from enrolling in and completing the EAPW program. We learned a whole bunch about how to help our volunteers! Some of our findings were highlighted during the EAPW training at this year's Michigan Inland Lakes Convention at Boyne Mountain Resort. These procedural additions included tips on choosing where to survey for invasive plants in the lake, and an emphasis on taking good photographs for reference and identification assistance. A more structured data sheet was provided to make it easier for volunteers to record their observations. And a new Michigan State University Extension publication, A Michigan Boater's Guide to Selected Invasive Aquatic Plants (Extension Bulletin E-3189) is now provided to all enrolled volunteers to help with the identification of invasive plants during the survey effort.

We can already see the benefits of these improvements to the program. There was a substantial increase in program enrollment (2013: 24 lakes enrolled; 2014: 33 lakes enrolled), an increase in report submissions (2012: 56% of enrolled lakes submitted data at the end of the season; 2013: 67% of enrolled lakes did so), and 90% of lakes that we visited during the summer of 2013 successfully completed their surveys and submitted reports to the CLMP.

What's New This Year?

In 2014, EAPW volunteers are not only embracing the *'Knowledge is power'* adage (from Issue 11, Article 3: MiCorps Cooperative Lakes Monitoring Program Volunteers and Staff Working to Enhance Exotic Aquatic Plant Detection), but volunteers are utilizing the EAPW program to 'confirm and verify' what has already been found in their lake and to track changes over time. This development is great news for Michigan lakes because not only is it extremely important to identify if and what exotic species are found in a lake, but if found, it is even more important to monitor these plant populations to guide management decisions. Volunteers in the EAPW are now becoming fully engaged in the health of their lakes. For these lakes, understanding what is going on - even after an exotic is discovered - can be vital to a successful monitoring, management, or eradication program.

We are once again visiting EAPW lakes to work with volunteers all over the state, and will visit at least 10 lakes before the 2014 monitoring season is over. We are particularly interested in determining what motivates volunteer participation in the EAPW program. In general, participation appears to be driven by the following questions and concerns:

1. *Are neighboring lakes with exotics affecting our lake when it comes to aquatic invasive species?*
2. *Are signs posted at our lake's boat launch site doing an adequate job of keeping new exotics out of our lake? Do we need a boat washing station?*
3. *Are our current in-lake weed management strategies and treatments working? How can our lake association become more involved in the monitoring process so that we can justify the money we are spending on managing our lake?*
4. *Do we have hybrid milfoil in our lake? How can we tell? Are the chemicals being put in our lake putting us at higher risk for a hybrid milfoil infestation?*

These recurring questions and concerns illustrate that volunteers are thinking above and beyond just *'Do we have invasive plants in our lake?'*, but they are thinking about where exotics are coming from, what can be done to limit introduction of new species, and how effective the treatments being used to manage these plants really are. The answers to many of these questions go beyond the scope of the EAPW monitoring program itself, but volunteers recognize that monitoring invasive plants in their lake is a critical part of a good lake management plan.

What's Next?

We're thinking about how to improve participation in the EAPW even more. To that end, we're considering:

1. The possibility of making side-by-side visits to enrolled lakes a permanent part of the EAPW program;
2. Electronic methods for collecting and reporting data while in the field, including location data and digital photographs; and
3. Tips and techniques for engaging more volunteers on each lake to assist with the EAPW survey, which can be time- and labor-intensive.

Active and engaged local volunteers are the best defense for an exotic aquatic plant offense, even when there are valuable and thorough referees, such as consulting companies and lake associations, involved in the game. It is important for our volunteers to know that they can be active participants, not just spectators, in the life and health of their lakes, and that we are working alongside them, all over Michigan, to achieve this goal.

If you are interested in enrolling your lake in the 2015 Exotic Aquatic Plant Watch, have ideas on how we can improve the program, or would simply like to learn more, visit the CLMP pages on the MiCorps web site, or contact Dr. Jo Latimore at Michigan State University (latimor1@msu.edu, 517-432-1491).

Funding for this work is provided from citizen donations collected through fees associated with the sale of Michigan's Water Quality Protection License Plates, through the Michigan DEQ.

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MiCorps
Monitoring Michigan's Water Quality
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Article 8:
Volunteer Corner: Getting to Know Kim Andrews,
Volunteer Monitor on Kelsey Lake (Cass Co.)

Wanting to learn from and recognize the volunteers who give of their time and energy to monitor the health and quality of our lakes and streams, the MiCorps team has dedicated a section of the MiCorps Monitor to these inspiring individuals. For the fall 2014 installment of the Volunteer Corner, the MiCorps team caught up with lake monitor and lead volunteer with the Kelsey Lake Association, Kim Andrews, to learn about her experiences in their recently formed volunteer lake monitoring program.

MiCorps Monitor: *How long have you been a volunteer with the Cooperative Lakes Monitoring Program (CLMP) for Kelsey Lake and what is your role?*

Andrews: Our lake joined the CLMP in 2012, so this is our third year in the program.

Several years ago, after I became president of our lake association, we started to notice die-offs of weeds on the lake. These were beginning to be problematic and were clogging the channel that connects Big Kelsey and Little Kelsey, preventing residents' pontoon boats from getting through. So we decided to conduct a phosphorus test and just paid for that out of pocket to see what was going on.

After that, I was online and stumbled upon MiCorps (and the CLMP). I was surprised to learn that this program existed and thought it was just what we needed to do to learn about our lake. So I immediately signed us up so that we could continue to monitor the health of both Big and Little Kelsey. When others heard that I had signed us up, they wanted to know how they could help. So I've been leading and coordinating our team since then, but with help from others.

We started out doing transparency (Secchi Disk) the first year, and then moved on to Chlorophyll last year and are continuing both tests again this year. This monitoring gives us data to eventually identify trends and possible solutions, rather than just anecdotal "evidence."

MiCorps Monitor: *Describe the lake setting where you monitor. Are there specific issues or trends that you're looking to identify or address through this monitoring?*

Andrews: Big Kelsey and Little Kelsey are technically one lake but they are two sides connected by a channel. Kelsey Lake is small (roughly 100 acres) but pretty clean at this point. Big Kelsey is relatively undeveloped on one side and has some wooded lots; however, Little Kelsey has some nearby farms and gets runoff from the road that separates the farms from the lake.

After the weed die-off a few years ago, we began to be concerned about the phosphorus levels in the lake, especially since you can see where the runoff drains into the lake after a heavy rain. We've actually noted areas of weed growth right at this point in the lake from aerial photos as well.

We're also concerned about our lake levels, since nine new irrigation systems were installed last year alone that draw from the area's groundwater to support the nearby farming. Since we began monitoring the lake levels, we noticed that the lake dropped five inches last year as a result of the accidental removal of beaver dams on the lake which allowed for water to flow out of the lake to a nearby creek. However, the beavers have come back this year, and with all of the rain we've had, our lake levels are back up again this year.

We have also had a couple of areas with nuisance weeds, and so we've worked with Dr. Jo Latimore (MSU) and Bill Dimond (DEQ) under the program to make sure we are handling things correctly. As a result, we've started a cut and collect program and a composting program to help control the weeds rather than eradicate them.

MiCorps Monitor: *Please tell me about your monitoring team. Is the team comprised of the same group of volunteers each time? How do you engage new volunteers?*

Andrews: I've done the CLMP training and work on the spring and summer chlorophyll sampling, primarily. But we have another dedicated volunteer who does the secchi disk monitoring and then there's a team of 6-8 volunteers who regularly work on the Exotic Aquatic Plant Watch. Sometimes we get as many as 20 volunteers when we advertise our monitoring events in our association newsletter. We also promote participation at the association meetings.

Our involvement in the MiCorps monitoring has helped to reinvigorate our association and has given our group of volunteers a sense of purpose. Everyone has a stake in protecting the lake now. We have families volunteering together and kids involved as a way of earning community service credits. My hope is that they'll learn about the importance of protecting our lake and eventually take over these programs in the future.

MiCorps Monitor: *Can you tell me a little bit about your background and how you first became a volunteer with the CLMP?*

Andrews: Well, the initial phosphorus test that we did out of pocket because of the weed die-offs is what prompted us to join MiCorps. But I grew up on Lake Michigan and have always been on the water. I especially love boating. When I was growing up, I wanted to be a marine biologist. I still have a general interest in the wildlife and have recently been trying to identify the kinds of turtles we have on the lake. Monitoring the lake gives me an excuse to get outside!

MiCorps Monitor: *What is your favorite part of being a volunteer monitor? What keeps you involved year after year?*

Andrews: My favorite part of the monitoring is feeling like we're not just using up our resources, but are looking to protect them. We have a very clean lake and would like to see it stay like this. I want to be able to pass this resource on to our kids in good condition. Instead of just running the boats and using the resource, I want to be able to keep an eye on the lake's conditions. Last year's drop in lake levels is a prime example - and because of that, we couldn't use our boats on the lake.

MiCorps Monitor: *What do you see as possible outcomes from this monitoring effort? How will the watershed and surrounding community benefit from this work?*

Andrews: I hope to see preservation of the lake as an outcome from our efforts. Since we're right by the farms and irrigation systems, and we can see the runoff into the lake, we really have to watch the lake conditions. Our plan is to watch our monitoring results for a few years and then we might ask for a grant to put in a retention pond to help filter the road and farm runoff before it reaches the lake.

MiCorps Monitor: *Do you have any advice for others who might be interested in volunteering as a lake or stream monitor, or starting a volunteer monitoring program?*

Andrews: Do it! I can't believe that there are groups who haven't done it, but they may just not be aware of the program. We didn't even have volunteers lined up when I first signed us up for the program. I just did it. And then people wanted to know what they could do to help out. We were experiencing a low ebb to our association membership at the time, and we were running low on funding, but this motivated people to begin to donate to the association's preservation fund. We've also transitioned the use of the lake's boat slip fees to help pay for our monitoring expenses and have been able to keep the monitoring program self-sustaining in that regard. Now we have plenty of volunteers and adequate funds to do our work because MiCorps is so inexpensive.

We couldn't do this kind of regular monitoring on our own - it would be cost-prohibitive. But this allows us to keep an eye on the invasive aquatic plants which, because our lake is so small, could have a horrible effect very quickly. Our participation in the program has also motivated people to get out there and participate in protecting the lake.

MiCorps Monitor: *What has been your most memorable moment or experience to date as a volunteer monitor?*

Andrews: Dr. Jo Latimore (MSU) and Bill Dimond (DEQ) were out to do a secchi disk reading with us on the lake and we saw something that looked like smoke in the water. It turns out it was likely just an algae growth after the spring thaw. But it was really neat looking and I was curious to learn more about it. With the aquatic plant watch, I also found out how difficult it is to positively ID plants. We found curly leaf pondweed and are now mapping where it is from year to year. So this makes me motivated to keep an eye on things.

MiCorps Monitor: *In what new direction do you hope to take the Kelsey Lake volunteer monitoring program in the future?*

Andrews: Now that we've gotten everything into place, my next goal is to make the

program self-sustaining so that there are other people to carry on once I decide that I'm done. We have a really good solid base, and I like having the kids involved. I want to see this all continue into the future.

MiCorps Monitor: *It's great to hear about all that you've done in such a short time! Thank you so much for your time and your passion, for sharing your insights with us, and for all that you do as a volunteer.*

About the Kelsey Lake Association: Founded in 1961, the Kelsey Lake Association (KLA) is a grassroots volunteer organization, comprised of property owners near and around the lake, who share an interest in maintaining water quality. Its members are committed to preserving, protecting, and enhancing Kelsey Lake and its properties for the benefit of all its members, including improvements to property values, quality of life, and the ecology of the beautiful lake and its environs. The KLA manages conservation efforts through careful investment and informed decisions and continues to work to foster a strong community environment by keeping its members informed of the issues affecting the lake and neighborhood and by sponsoring regular social events.

What would you ask our next volunteer lake or stream monitor? Please be creative and send your suggestions for future Volunteer Corner questions to Laura Kaminski, MiCorps Program Administrator, at laurak@glc.org.

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Article 9:
MiCorps Updates

2014 MiCorps Stream Training Event

The 10th annual MiCorps Volunteer Stream Monitoring Program (VSMP) introductory training session was held on July 2, 2014 at the offices of the Huron River Watershed Council in Ann Arbor. Twenty participants joined Dr. Paul Steen, MiCorps Program Manager, in learning more about how the VSMP works, how to plan a monitoring event, and how to collect and identify macroinvertebrates. Following indoor training, the group headed to the Huron River to practice macroinvertebrate collection and habitat assessment.

The training participants came from a variety of places and represented a variety of organizations across Michigan. The VSMP is centered on helping the leaders of conservation and stream groups set up their own monitoring program, and thus has adopted a "train the trainer" model. Many of the participants at the training were 2014 recipients of a one- or two-year VSMP grant.

This year's participants included representatives from:

- Flint River Watershed Council
- Friends of the Shiawassee
- Grass River Natural Area
- Ingham County Conservation District
- Jackson County Conservation District
- Mid-Michigan Environmental Council
- Timberland RC & D
- Van Buren County Conservation District

Thousands of volunteers across Michigan have worked with a MiCorps partner organization since MiCorps began giving grants in 2005.

2014 Annual MiCorps Conference and Training - Registration Now Open

The Michigan Clean Water Corps (MiCorps) conference and training is an annual event featuring optional training sessions and other pre-conference events during the afternoon and evening of Monday, October 27th, and presentations and dialogue on lake and stream monitoring activities in Michigan on Tuesday, October 28th.

The conference will include presentations from volunteers around the state, regional experts, and Michigan DEQ and MiCorps staff covering both lake and stream topics of interest and success stories from volunteer monitoring efforts. In particular, this year's conference will focus on sharing the program's monitoring data with lay audiences, assessing ecosystem

health by monitoring habitat alteration and invasive species, addressing watershed needs through watershed management planning, supporting monitoring efforts through the use of tools and educational opportunities, and celebrating at the successes and achievements of the MiCorps program over its first 10 years.

Our featured keynote speaker this year will be Julie Vastine, from the Alliance for Aquatic Resource Monitoring (ALLARM) at Dickinson College in Carlisle, Pennsylvania, who will present information on using volunteer monitoring as a tool for positive change.

In addition, both beginners and advanced volunteer monitors may attend one of two training workshops offered on the afternoon of October 27th ("Insect Identification" or "Field Training for Road-Stream Crossing Surveys").

The optional training sessions are offered free of charge to all interested participants (pre-registration is required to attend); however, there is a registration fee of $40 to participate in the conference sessions beginning on Tuesday, October 28th. Other pre-conference events are priced so that participants may select only those they wish to attend (some of these have additional registration fees). More information and conference registration is now available through October 20th from the conference website.

Upcoming Conferences and Events of Interest

Some additional upcoming events of interest include:

- **34th International Symposium of the North American Lake Management Society (NALMS)**
  November 12-14, 2014
  Tampa, FL
  http://www.cvent.com/events/nalms-2014-tampa-florida/event-summary-f6a0eb6239e148b9b3e15bb3fb22a8fb.aspx

- **Michigan Lake and Stream Associations Annual Meeting**
  May 1-2, 2015
  Boyne Falls, MI
  www.mymlsa.org

- **River Network's River Rally 2015**
  May 1-4, 2015
  Santa Ana Pueblo, NM
  http://www.rivernetwork.org/programs/river-rally

* New events are added often. Please visit www.micorps.net/calendar.html for a full listing.

In Case You Missed It: Freshwater Science Article Features MiCorps

Dr. Steen and MiCorps partner, Dr. Jo Latimore with the Michigan State University, recently

published an article in *Freshwater Science*, where they present MiCorps as a strong example of the key role of partnerships in freshwater science and management (citation and link are available below). This article grew out of a presentation given at the Society of Freshwater Science (formerly North American Benthological Society) conference two years ago. We were excited to be able to highlight MiCorps to this broad audience, and would be happy to receive your feedback as well.

- Latimore, J.A. and P.J. Steen. 2014. Integrating freshwater science and local management through volunteer monitoring partnerships: the Michigan Clean Water Corps. *Freshwater Science*, Vol. 33, No. 2 (June 2014), pp. 686-692. (Available at: http://www.jstor.org/stable/10.1086/676118

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