

Monitoring Section Updates, Fall 2017

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Monitoring Program Goals, Tim Asplund

Greetings! Welcome to our Monitoring Program’s Newsletter. We will share some of our messages through this summary of our recent work directly to you, and welcome your thoughts and suggestions!

This year the Water Quality management team updated our program goals, objectives and performance measures for the coming work planning period and identified four top priorities on which to focus.

“**Monitor and Assess the State’s Surface Waters**” is front and center in the goals.

Objectives and Metrics related to this goal are listed in the table below.

While the priority areas represent only a fraction of the work that we do, the summary metrics represent a wide array of your efforts as well as the various projects and activities described in this newsletter. The full presentation of program goals, objectives and performance measures are located on the [Water Quality Intranet Homepage](#).

Please feel free to [contact me](#) or [Greg Searle](#) with any questions regarding this effort.

| Objectives | Metrics |
|---|--|
| <ul style="list-style-type: none"> Implement an annual monitoring work plan that reflects the 2015-2020 Water Resources Monitoring Strategy as approved by EPA. Submit the Integrated Report to Congress every two years. | <ul style="list-style-type: none"> Status report by number of waterbodies (lakes, streams, rivers, wetlands) monitored and assessed Summary of the key findings from the most recent Integrated Report (e.g. % of waterbodies meeting designated uses) |

Monitoring Strategy Implementation

In 2015/16 the WQ Program worked with USEPA to finalize the remaining elements of the state’s 2015-2020 Water Resources Monitoring Strategy, capping off nearly two years of work with staff, managers and partners representing programs from throughout our Division. Since the strategy’s approval, we have achieved the following as an agency:

- Wetlands Technical Team was formed (Tom Bernthal) with progress on core quality monitoring and metric creation. In process of integrating wetlands monitoring into work planning process.
- Lakes Monitoring Team formed (Katie Hein) with major strides achieved on aquatic plant monitoring, metric creation, and plans for porting the data into SWIMS.
- 46 lakes were monitored under the Directed Lakes category with studies planned for 2018 and write-ups underway.

- 25 Targeted Watershed Assessment Projects have been conducted, with 14 of these studies published as WQ Plans reflecting condition findings and advancing recommendations for workplans.
- WQ staff completed the 2016 and 2017 Monitoring Work Plan, with over 100 lakes, 500 streams, 44 rivers, and 25 watersheds monitored each year.
- Updated GIS tools are in the works to better screen continuous data and to more successfully explain monitoring condition.
- Funding was secured to better track and maintain condition data and management actions to understanding the location and type of work conducted and to better analyze resource change and successes.

— Lisa Helmuth

Sample of 2017 Achievements

- WQ and DG program conducted in-lake sampling on Lake Winnebago near drinking water intakes to assess risks of algal toxins.
- Establishing comprehensive large rivers monitoring and assessment work to fulfill Clean Water Act obligations
- Gathered data on attainment status for lakes, rivers, and streams in preparation for 2018 Integrated Report
- Uploaded major datasets (FERC, etc.) to SWIMS and expanded connectivity to partner systems for efficient reporting of water quality data and management actions (ATTAINS grant).



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National Lake Assessment Study 2017



Shelby Kail and Sarah Fanning
National Lake Assessment

In 2017, Wisconsin DNR participated in the National Lake Assessment, a survey of lake health across the entire United States. Fifty-two lakes in Wisconsin were randomly selected and surveyed for the physical, chemical and biological condition of lakes.

Parameters measured include:

- Secchi depth, comprehensive water chemistry, atrazine, E. coli, microcystin and cylindrospermopsin, assemblages of phytoplankton, zooplankton, and benthic macroinvertebrate com-

munities, dissolved carbon dioxide and methane, fish eDNA, sediment contaminants and grain size, and shoreline habitat.

- As an add on, Wisconsin conducted full *plant point intercept surveys* and *AIS early detection surveys* on nearly all 52 lakes.

We had an extremely successful field season with help from regional partners. This survey provides an opportunity to inventory our state's smallest and most remote lakes in addition to large lakes more heavily influenced by humans.

The Wisconsin State Laboratory

of Hygiene analyzed the chemical parameters and results can already be found in SWIMS. Preliminary results will be shared at Wisconsin Lakes Convention, 2018 Wisconsin Lakes Partnership Convention and Water Action Volunteers Symposium **April 18-20, 2018, Stevens Point.**

For more information [see the National Lakes Assessment Project.](#)

— Katie Hein, Lakes Monitoring Coordinator, PhD

What Can Plants Tell Us?

Rachel Carson helped us understand the link between pollution, ecosystems, and human health when she published *Silent Spring* in 1962. Since then, we have worked hard to understand human activities in an ecological context. We know our activities affect the land and water, but how? As we walk the landscape, where do we see signs of stress? What areas are particularly healthy? These questions underlie one of the core priorities of the Monitoring Section: To monitor and assess the condition of Wisconsin waterbodies. To accomplish this task, we might look directly at the sources of stress that are on our radar. But in the current day and age, the number of human-related stressors is large, and it can be difficult and expensive to measure everything that might be important. Margaret Palmer once described the 'heartbeat' of ecosystems: a doctor might take your pulse as an indicator of your general health, but what is the equivalent for waterbodies?

As in real life, health is more complex than a single pulse reading,

and the same goes for ecosystems. In the monitoring section we are working on a new addition to our diagnostic toolbox. We already have methods to assess lake condition using total phosphorus and chlorophyll, but now we can also use aquatic plants.

Our work shows that aquatic plants respond predictably to a number of human-related stressors. By quantifying the relationship between species-specific tolerance, plant abundance, and stress, we were able to develop a method to categorize lake health based on plant communities. This method is useful because it allows us to identify lakes in poor and good condition.

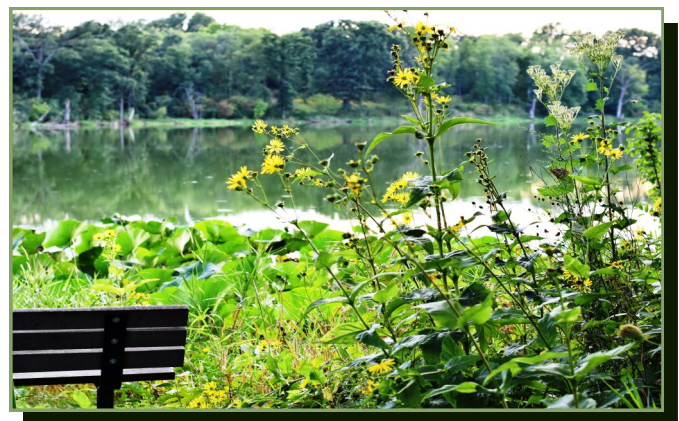
We hope to use this information to strategically focus our work where it may have the greatest positive effect.

For the future, we look toward celebrating the outstanding quality of our lakes and moving those that could use a little help in the right direction.

— Alison Mikulyuk, Botanist, PhD



National Lake Assessment, Photo by K. Hein



Stricker's Pond, Middleton, Photo by L. Helmuth



Training — Safety and Monitoring SOPs

Safety—This year **Mike Sorge**, Southern District veteran biologist, will lead our ongoing Safety and Training Team. The Team will be meeting in early December to review safety and technical training needs for water resources staff and propose a training calendar for 2018.

Currently, the [Safety Team has a series of Standard Procedures](#) and key training subject areas as high priorities for attention to ensure the best use of equipment, safety procedures, and ready access to standard protocols.

The Safety Operating Procedures are located on

the WQ Bureau website—note [SOP 4 – Monitoring During Open Water Season](#) was recently updated to include [trailer safety training materials](#), which were presented in 2017. Monitoring SOPs— Newly available is a central location for all [monitoring SOPs in the bureau](#).

This internal website is a companion to the public facing site where the Monitoring Strategy’s primary studies, procedures, and products are available to the public. Over the coming months, all monitoring SOPs will be migrated to this central location, as well as available in the SWIMS system connected to method and projects. — *Lisa Helmuth, WQ Monitoring*



Little Bear Creek

Water Quality Planning

This summer monitoring section staff and field biologist completed 14 water quality monitoring (WQM) plans to describe the results of targeted watershed assessments statewide conducted in 2014 through 2016. At least one WQM plan was completed in each region.

These WQM plans build upon our state’s adopted Water Resources

Monitoring Strategy (2015-2020), which outlines Targeted Watershed Assessment monitoring based on site specific management questions, including evaluation of best management practices or general condition assessments. These plans provide data summaries, maps, and analyses designed to fine-tune management decisions in the studied areas. The plans also

support partners in the creation of County Land and Water Plans, Nine Key Element Plans, and Total Maximum Daily Load implementation work to restore and protect Wisconsin’s waters.

The 14 plans are available online and a public comment period will be held in November. [Read More...](#)

PDF style and online WQM

plans are available as well as Power-Point presentations highlighting the project purpose and major findings of the project.

The general Wisconsin Areawide Water Quality Management Planning Webpage provides details about the history and connections for water quality planning. [Read More...](#)

— *Victoria Ziegler, Rivers & Lakes Section*

New Monitoring Publications

Stream Fragmentation Study

From headwaters to mouths there is a continuum of change along streams and rivers. To function properly these different environments need to be connected. It’s long been recognized that Wisconsin’s 3,800 dams fragment river systems.

What are the impacts of the state’s 80,000+ culvert and bridge roadway crossings of stream and rivers? The assessment of barriers to fish passage in the Driftless Area ecoregion study provides some answers to the types and extent of stream fragmentation problems in this ecoregion in Illinois, Iowa, Minnesota, and Wisconsin. [Read more...](#)

Starkweather Creek Sediment Toxicity Study

Most urban streams received polluted runoff from impervious surfaces. This study provides insights into whether urban pollutants are toxic to aquatic life in Starkweather Creek in the City of Madison. [Read more...](#)

Reference Condition Development for Wadeable Streams

Reference conditions are numeric benchmarks that can be used to assess whether stream resources are meeting their ecological potential. Reach-specific current conditions and reference conditions were developed for 26 physical, chemical, and biological field measures routinely collected from streams. These data will be available in Water Condition Viewer map layers



These data can be used to estimate the current condition on streams where recent sampling data is lacking and the reference condition data provides information on what streams should be like in the absence of human disturbance. [Read more...](#)

— *Mike Miller, Stream Ecologist*



Harmful Algal Blooms

Staff continued drafting a monitoring and response plan for harmful algal blooms (HABs) and associated toxins in Lake Winnebago, with a final plan anticipated in **December 2017**.

This work is funded by the US EPA and is intended to support development of a long term monitoring and assessment strategy for Lake Winnebago addressing recreational, public health, and drinking water uses, with a focus on HABs and their toxins.

Gina LaLiberte provided support and guidance to DNR

staff, local public health officials, and lake associations as part of the Harmful Algal Bloom Surveillance Program, which is a partnership between the DNR, Wisconsin Department of Health Services, and Wisconsin State Laboratory of Hygiene. Most requests in 2017 were for HAB identification and recreational safety guidance.

Despite above-average rainfall in the spring, average to below-average July and August temperatures may have moderated the occurrence of intense blooms throughout the state. There were several high profile bloom

events this year which received significant media attention. After a stretch of high temperatures in June, a massive bloom appeared in Madison's Lake Mendota. An ongoing bloom in Milwaukee's Veterans Park lagoon prompted the relocation or cancellation of events two consecutive weekends in August.

— Gina LaLiberte, Diatom Scientist,
Statewide HAB Coordinator



Harmful Algae Blooms plague many waters.

Has Water Quality Changed?

As Water Resources staff conducts biologic assessments of stream communities to assess overall health, we are often asked the question "How do we know when things have changed?" The chemical, physical and biological characteristics of streams vary over space and time due to many factors, including

local weather patterns (flood, drought, temperature, etc.), recruitment success, species competition, sampling efficiency, among many others. As a result, no two samples conducted by DNR will look exactly the same. This begs the question, if there is restoration or degradation of water quality, how can we tell if there is a real change, versus natural variability?

Over the past 10 years WR staff have devoted significant monitoring time to identifying reference streams (those with very little disturbance) and then initiated a monitoring program to sample 43 of these sites annually.

Having the first five years of data on hand, we analyzed the natural variability of biologic communities at these sites and how that related to

stream type, size, weather and other variables.

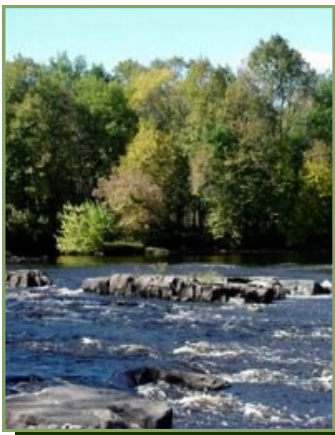
It turns out that our tools for measuring biologic communities are *remarkably precise*, given the variable nature of the subject.

We can expect that our Indices of Biotic Integrity (IBIs) will vary in numeric score approximately 10% from the long-term average, while also being resilient to extreme weather events. Much of this can be attributed to the statistical rigor of water resources tools, as well as *staff's strict adherence to monitoring SOPs* that aim to reduce bias and inherent variability.

This monitoring project is ongoing and in future iterations, with more years of data, we may be able to refine are estimates even further as we understand the drivers of inherent, natural variability.

The full report including a description of the monitoring program, statistical analysis and interpretation was completed in 2017 and can be found in EGAD (3200-2017-01).

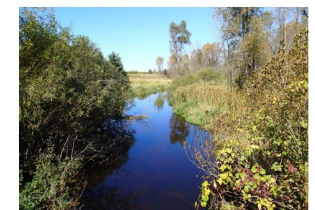
— Mike Shupryt , Stream
Monitoring Coordinator



Black River

Wadeable Streams Trend Network
Monitoring Program: 2010-2014

Michael Shupryt and Jonathan Kull, Wisconsin Department of Natural Resources



Wadeable Streams Trend Network
Monitoring Program: 2010-
2014

Information Technology Updates

Database trainings will be scheduled in each District (Region) database work, finding and managing data, and water quality planning. Please share your wish list for learning to [Matt Rehwald](#)

We're approaching the end of the 2017 monitoring season. As a reminder, monitoring projects in SWIMS that are ending this year should be properly closed out:

- Overall project status should be set to **Complete**.
- Forms, methods and equipment should be populated under the Monitoring tab in the project wizard
- A Final Report document should be associated with the project
- Status updates should be populated under the Project Status tab in the project wizard (only if the Final Report is uploaded), otherwise set your project to "Final Report Needed")
- [Help pages for SWIMS are available](#) on the DNR intranet.
- Great progress was made recently by one of our two summer interns, **Angela Baldocchi**, who worked with UWSP to scan and store five years of macroinvertebrate field sheets for all fieldwork events.
- Angela will work with the SWIMS Team to attach these forms to the fieldwork events in SWIMS so that background information, including anecdotal notes, will be at your fingertips for future reference.

SWIMS Updates

- Now you can search for results and fieldwork events by more than one station at a time! [Read Directions Here!](#)
- This summer, Field SOPs were the focus of data management in SWIMS. To support that work, the SWIMS screens were enhanced to better search and download methods, SOPs, and equipment! [Read Directions Here!](#)
- New mapping tool (eLT) in WATERS and SWIMS to be launched this November. A new help guide is now available and trainings will be scheduled to help with the transition. This enhancement will allow the eLT to work in Chrome, whereas currently the eLT only works in internet explorer.
- USGS Print Labslips from SWIMS are now available: [Using the USGS station number on SWIMS Labslip Generated Forms](#)

SWDV

- SWDV manager **Jonathan Kult** left in mid-September for a new permanent position with Lands and Facilities. We wish him well in his new role. Interviews were held to hire a new GIS expert to support SWDV, WCV and the ATTAINS grant. Our new employee should be starting in November!
- A new FERC Project Boundaries layer went live in early September! This is the culmination of work by one of our two summer interns, **Alyssa Miannecki**. The FERC layer shows the areas around Federal Energy Regulatory Commission (FERC)-regulated dams where both DNR and FERC have jurisdiction for permits. [Here](#) is a page with more details.

—Matt Rehwald, IT Coordinator

Monitoring Planning for 2018 — Yes, already!

We know that a few of our Water Resources Biologists are still wrapping up field work from 2017, but the Monitoring Section is already thinking about plans for 2018! We have formally reached out to the other programs in the agency that rely on water resources data and information – Water Evaluation, Wastewater, Waterways and Wetland Protection, Runoff Management, Water Use, Drinking Water and Groundwater, Office of Great Waters, Fish Management – to solicit monitoring priorities and specific project ideas or needs.

We will be reviewing these priorities and project ideas over the next few weeks and developing guidance for district staff to help **develop the 2018 monitoring work plan**, including priorities for Targeted Watershed Assessments, Directed Lakes projects, Follow-Up Monitoring for Integrated Reporting and AIS, Non-point Effectiveness Monitoring (319 Project funding) and Local Needs projects. As in years past, **project submittals will be due on or around February 1st, with final decisions on the 2018 workplan no later than April 1, 2018.**

As a heads up, our 2018 Monitoring Work Plan will be dominated by several high profile projects, partly as a result of the recently passed State Budget which included funding for both **Central Sands Lakes Study** and the **Northeast WI TMDL** focused on tributaries that drain directly to Lake Michigan between Door County and Sheboygan. Fortunately these projects came with dedicated funding, which we are

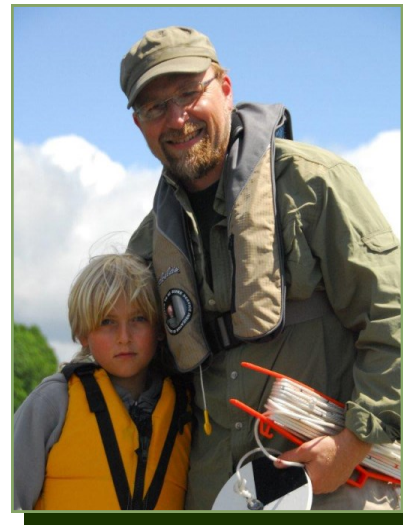
hoping to tap into to supplement our annual monitoring budget.

We will also be implementing the next iteration of the **National Rivers and Streams Assessment in 2018 and 2019**, as well as conducting intensive **biological monitoring on the Wisconsin River** as part of our large rivers monitoring initiative. These projects provide an opportunity to leverage additional monitoring data collection efforts by aligning local needs, TWA, AND Directed Lakes projects in these areas and provide efficiencies in staffing. More to come on this front in early December!

I am excited by these initiatives and the value that other programs place on our staff to help address priority water resource information needs for the Department – look forward to great things in 2018!

Thank you once again for all your great work!!!

—Tim Asplund, Monitoring Section Chief



VISUALS

Photos of resources can remind us of why we do our work.



Wolf River



Boblink on a Fence



Peshtigo River



Andy Hudak



Sugar River



Wolf River Headwaters 9/16/2014



Left Foot Creek



Calvin Creek



Big Spring



Monitoring Section Spring 2017 Outing



Oak Creek at Pennsylvania Ave