

PIPELINE

MICHIGAN ASSOCIATION OF COUNTY DRAIN COMMISSIONERS

MANAGING MICHIGAN'S WATER RESOURCES SINCE 1899

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Endangered Species

Eastern Massasauga Rattle Snake

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PIPELINE is published four times a year. It is funded by the Michigan Association of County Drain Commissioners, and with advertising revenues. The Michigan Association of County Drain Commissioners is a nonprofit, statewide association.

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PRESIDENT'S MESSAGE

DAVID THOMPSON

Monroe County Drain Commissioner



Hello all,

In my last message, I mentioned the State's focus on infrastructure and wetland mitigation and told you that our work will be in the spotlight. I went on to quote a pearl of wisdom from Theodore Roosevelt that applies to all of us, both individually and collectively.

I would like to continue that theme in this message, beginning with a quote from another wise and famous man: "Logic clearly dictates that the needs of the many outweigh the needs of the few." Spock may have only been half man, but his logic was certainly whole.

It is imperative that we remember that we are public figures and, as public figures in the spotlight, we must be mindful of our everyday actions. Poor decisions don't just reflect poorly on you—they also reflect poorly on your office and this organization as a whole.

In centuries past, the public had to rely on their memory. While punishment for bad behavior may have involved public shaming—think stockades or

scarlet letters—it was finite. The passing of time usually led to forgiveness and second chances. That is no longer the case with social media. Now, public shaming is much more relentless.

It is safe to assume that every person you encounter is carrying a device that can take your picture. It is also safe to assume that each of those people will have access to the internet to upload your picture. If your picture happens to depict bad behavior, and it gets uploaded to the internet, the situation goes from bad to worse and is immediately out of your control.

We are only as strong as our weakest link. In this age of social media when careers are ruined by viral pictures of bad behavior, please be mindful of legacy when making your daily decisions—not just of your personal legacy, but also the legacy of your office and of this organization as a whole.

All the very best,

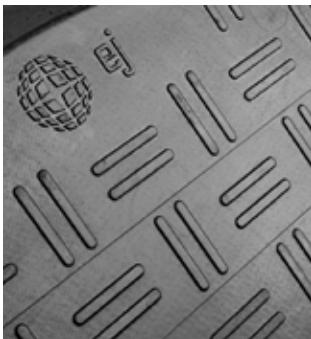
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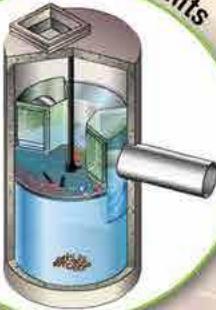


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THE IMPORTANCE OF EDUCATION AND OUTREACH

SHARING OUR ROLE WITH THE MICHIGAN LEGISLATURE

Joe Bush

Ottawa County Water Resources Commissioner



Joe Bush and Deena Bosworth testifying before the House Local Government Committee

It seems to happen often that I run into a constituent who doesn't know what the role of a Water Resources Commissioner is within the county that I serve. Their understanding doesn't even improve when I mention that my position is the former Drain Commissioner. Therefore, whenever I am given the chance, I love sharing my passion for this job with others.

On March 8, Deena Bosworth, Michigan Association of Counties, and I headed into the House Local Government Committee meeting to highlight the importance of Drain Commissioners and Water Resources Commissioners. Deena and I had the honor of sharing our passion about our state's waterways and the importance of maintaining open lines of communication with many varying groups of people. Collaboration is vital as we seek to improve Michigan's water quality, infrastructure, and natural resources.

It was a delight to share with them the relationship that has been built between large organizations such as the Department of Environmental Quality, Michigan Department of Transportation, Road Commissions, Farm Bureau and the personal relationships with the numerous farmers and home owners who call me with questions and concerns about their land. I serve

my county and share the importance of our water resources with all of Michigan's citizens. There are many conversations.

Drain Commissioners work tirelessly to protect and restore our state's water resources. Whether it is within a large lake, small pond, creek, or drain that is just a small stream of flowing water, all of the state's Drain Commissioners work hard learning the Drain Code to best facilitate each and every one of the counties we serve.

The role of Drain Commissioners is crucial within our state. Whether contacting legislators about drain code bills, returning phone calls to engineering firms, meeting with farmers, visiting a family at the site of their new home, or meeting a team of people at a culvert in a drain that needs a solution, it all encompasses the role of the Water Resources Commissioner. Taking the time to inform people about the talented individuals that serve in this state as our Drain Commissioners and Water Resources Commissioners only helps improve that relationship as we all strive to maintain and improve our water quality in this great state. Thank you for the role that each one of you play within your own county to make sure that the flowing waters of Michigan continue to be of the highest quality.

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DISTRICT MEETINGS



Part of the power sub-station at the Ludington Pumped Storage Plant.

NORTHWEST DISTRICT MEETING

The Northwest District met on Thursday, May 4th at the Pere Marquette Township Hall in Ludington. The meeting kicked off with a Consumers Energy presentation on the Lake Winds Energy Park and the Ludington Pumped Storage Plant. After the presentation, those in attendance split into two groups for the tours.

The Ludington Pumped Storage Plant was built from 1969-1973 at a cost of \$327 million. Consumers Energy owns 51% and Detroit Edison owns 49%. The plant has 6 units that can produce a total of 1,872 megawatts of electricity, making it able to power a city of 1.4 million people. By displacing higher-cost generation, the plant saves Consumers Energy and Detroit Edison customers millions of dollars per year.

The annual property taxes for the plant exceed \$10 million, which is converted into community and school improvements. Total annual operation and maintenance spending is about \$16 million. Through salaries (approximately 40 area residents are employed at the Plant) and materials, this puts money back into the community.

The reservoir for the plant is 2.5 miles long, 1 mile wide and 110 feet deep. The total area encompasses 842 acres and holds 27 billion gallons of water, 17 of which are useable for generating power. In 1999, the Ludington Pumped

Storage Plant was named one of Michigan's "Top 10 Civil Engineering Projects of the 20th Century" by the Michigan Section of the American Society of Civil Engineers.

The plant is currently undergoing an \$800 million overhaul and upgrade of all six units. Site Infrastructure activities commenced in 2011, and the upgrading of one unit at a time began in 2013 and will finish in 2019. This project will extend the periodic outage cycle from two year cycles to three year cycles and will let the plant operate for at least 30 years before the next major overhaul.

The Lake Winds Energy Park is a \$235 million park that creates a new source of clean, renewable energy from the wind that blows across our state. Construction of this park started in the fall of 2011 and began serving customers by the end of 2012. The park includes 56 wind turbines that have the

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Doug Richardson, PS
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Tour attendees at one of Lake Wind Energy Park's wind turbines.

capacity to produce up to 100 megawatts of clean electricity and spans across more than 16,000 acres over roughly 30 square miles.

These turbines are placed to minimize shadow "flicker," a strobe-like effect that may, under certain conditions, be caused by the shadows of rotating wind turbine blades. Surrounding land owners will experience 10 hours or less of shadow flicker per year.

The Lake Winds project was projected to bring \$33 million in direct and indirect economic benefits to Mason County. Those benefits started with jobs: around 150 construction jobs as the energy park was built and 12 permanent jobs. This project, coupled with the Ludington Pumped Storage Plant, equals more than \$1 billion of investments in Mason County.

Following the tours, the meeting continued at the Pere Marquette Township Hall. The group held a brief business meeting and heard a legislative update from Lauren Dutcher with Fahey Schultz Burzych Rhodes, PLC.

NORTHEAST DISTRICT MEETING

On Monday, May 22nd, the Northeast District met at the Caledonia Charter Township Hall in Owosso. The meeting was hosted by Shiawassee County Drain Commissioner Tony Newman. The group held their business meeting and received updates on legislation moving in Lansing, along with presentations by two guest speakers and a tour of the adjacent Memorial Health Care Facility Property.

Innovative Solutions for County Drain Projects

Chris Owen, P.E., Vice President of the Michigan Section of American Society of Civil Engineers, shared with the group the American Society of Civil Engineers' 2017 Report Card. This year, America's Infrastructure scored a D+ overall. The status quo or slight improvement will not get us where we need to be from an infrastructure grade perspective; we need to embrace innovation.



ADS HP Storm pipe supporting construction loads.

Owen asked the group to share some of the problems they've experienced with pipe. Many of the answers included: joint failure, age, soil issues, poor connection and corrosion. He asked the group to consider the following solutions: Design Service Life, Performance Based Specifications, Innovations in pipe material, and Competition to maximize savings. To improve service life, Owen suggests a performance based approach that preserves the product's service life by making sure it's installed correctly. Every material has a quality assurance process to ensure pipes are produced to strict material standards. However post-installation inspection standards vary widely across our state. Post-installation inspection

per AASHTO Standards includes simple recommendations for mandrel testing of flexible pipe and crack width measurements for concrete pipe. By taking these measurements shortly after installation, an owner has the information to determine whether that pipe was installed correctly. Simple video inspection is not sufficient. Crack width measurement and deflection testing will improve the service life of all pipe installations.



Kent County Road Commission installing a 40-foot by 60-inch corrugated pipe for a county drain crossing.

He gave a brief background of the different pipes Advance Drainage System produces which include Mega Green, N-12, HP Storm, SaniTite HP and HPXR 75. The high performance fiber reinforced polypropylene pipe is 30" – 60" in diameter and the core is made with double gasketed HP Storm and wrapped with a fiberglass polypropylene outer wall. With this type of pipe, the benefits include a shallow cover application, increased construction or live loading, use of native soils, wide range of backfill materials, watertight storm sewers and sanitary sewer trunk lines. High performance fiber reinforced products are the next generation pipe in all types.

The Commons: A Memorial Healthcare Community Development



The Meadows assisted living complex.

Doug Scott with ROWE Professional Services Company discussed the recent project completed with the Memorial Development Corporation (MDC) called The Commons. In 1998, Memorial Healthcare retained ROWE to prepare concept drawings for an assisted living/retirement community. The property consisted of a 38.4-acre parent parcel and a 3.27-acre access parcel. A site plan was approved, but there was no funding to move forward and the project was placed on hold.

In 2013, Memorial Development Corporation contracted with a developer to construct The Meadows assisted living complex. ROWE prepared an overall master plan for the development, which included the assisted living facility, medical offices, a nursing home, and independent living facilities. The site plan approval was granted that year and construction began in 2014.



A regional detention pond at the facility.

In 2013, the Shiawassee County Drain Commission (SCDC) had not yet adopted storm water guidelines, so they worked with several consultants to prepare draft guidelines. These draft guidelines were used for the project's storm water management design (Phase 1). The storm water management design included first flush / filter basins on each site and a larger regional detention pond.



An outlet control structure.

Just as Phase 1 was nearing completion, MDC obtained 80 acres of land immediately north of the existing property, which increased the total development to more than 120 acres. Shiawassee County committed to building a new nursing home to replace Pleasant View, so a new master plan was needed.

As Phase 2 was beginning, the SCDC adopted storm water management guidelines and two regional detention ponds are planned. All developments had low-flow filtration basins onsite and a sediment forebay in a larger pond.

The lessons learned from this project included: always plan for more development (go one size bigger), know your water table, work with governmental agencies in the planning stages and look for low market value properties for detention pond locations.

SOUTHEAST DISTRICT MEETING

The Southeast District of MACDC met May 31st at Northern Concrete Pipe's Clarkston facility. Following a barbecue lunch and chapter meeting, everyone was invited to tour the Clarkston plant.



Meeting attendees touring the Clarkston plant.

In the yard, four participants were able to see a two-week old 42" concrete pipe passing a test for 28-day strengths on the 3-edge bearing machine. They were also given a demonstration on the proper technique for installing pipe and manhole gaskets.

Inside the plant, the tour group observed the V-Roc machine and saw the fully automated process for removing the steel pallets on which the concrete pipe is manufactured on. In addition, they observed the de-burring of the bell and spigot ends of the pipe prior to the pipe being

moved outside for shipping. The entire process is performed of which is done in a 72-second span.

Participants also watched the Hawkeye machine was manufacturing 3 different products in each set. Participants watched this machine produce a 30" pipe, a 36" pipe and a 48" manhole riser in a single set. This manufacturing process uses dry cast technology and allows Northern Concrete Pipe to manufacture these products - from pouring the molds with material to stripping the molds and moving the products to be steam cured - in a matter of 12 minutes.

Northern Concrete Pipe has the capability of manufacturing pipe up to 144". During the tour, attendees also watched 96" pipe being produced on the Simplex machine. The MBK machine showed participants how wire cages are manufactured for concrete pipe by tac-welding coiled steel wire to strands of wire as they are rotating in the machine. The MBK machine can be programmed to manufacture cages based on the class of pipe the cages will be going into.

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A 42-inch pipe undergoing and passing a 28-day strength on the bearing machine.



Automated process of removing the steel pallets and deburring of the bell and spigot ends.

Northern Concrete Pipe invites other District groups and Engineering Firms to tour their plants.

SOUTHWEST DISTRICT MEETING

The Southwest District met on May 12th at the St. Joseph River Yacht Club with 40 in attendance. The meeting included a short business update and legislative and legal report. Stu Kogge from GEI gave a wetlands and endangered species update.

Eaton County Deputy Drain Commissioner Eric Deibel and Stu Kogge then discussed the use of the Collector App for ArcGIS and how it improves field data collection. In addition, they discussed

how it can provide real-time data display at the office GIS and generate reports, all by simply using your mobile device.

Next, Lance Korp from Pro Predators spoke about beaver trapping, the habits and intelligence of the beaver and how understanding it is important in dealing with the beaver as part of drain maintenance activities.

Following a short break, Greg Lamkin and Alan Boyer, LSG Engineers & Surveyors, and Dan Yerks, Wightman & Associates, presented an Intro to Value Methodology, the principles and processes of value engineering and how to incorporate them into the drain design process. Dan and Greg, along with others from other consulting firms, recently completed VM training offered by SAVE International and sponsored by the Berrien County Drain Office.

At the end of the meeting, John Brennan, from Fahey Schultz Burzych Rhodes PLC, led a discussion about lessons learned. Attendees took turns sharing stories about the specific lessons they each have learned in connection with drain work. The group got to hear stories from several perspectives - lawyers, engineers, and drain commissioners. In many cases, the truth was stranger than fiction. Some of the stories had a comical twist, and all stories offered an opportunity to learn from each other's experiences.

STAFF SPOTLIGHT



Drain Commissioners, Water Resources Commissioners, and Public Works Commissioners are responsible for administering laws involving flood protection, stormwater management, and soil erosion. Their specific duties vary significantly from county to county and may include drain maintenance, lake improvement, lake level control, review of stormwater drainage plans, and operation of sanitary sewer facilities, to name a few.

The staff spotlight is an opportunity for each of us to learn more about the individual staff members on both a personal and professional level. These individuals are dedicated to serving the public and helping the drain/water resources offices run as smoothly and efficiently as possible. Please take a moment to read their stories.

If you would like to see a particular individual featured in an upcoming Staff Spotlight, please contact Michelle LaRose (mlarose@livgov.com) or Hillary Walilko (walilko.h@gcsionline.com).



KEITH GRABOSKE, P.E.

CHIEF ENGINEER

**MACOMB COUNTY
PUBLIC WORKS
COMMISSIONER,
CANDICE S. MILLER**

**YEARS AT THE
COUNTY: 31**

Now I can say I have worked for three Commissioners :)

I was hired at this office 31 years ago as a Soil Erosion inspector by Tom Welsh, the first of six different job titles I've had here. I have a B.S. in Forestry with a concentration in Soil Science. I was offered a position with the Engineering Dept. two years into my career if I agreed to go back to school and get a Civil Engineering degree. I said yes, attended Lawrence Technological University at night while working full time during the day and received that B.S. in '95.

I assist staff, work with consulting engineering firms on drain projects, meet with developers and their consultants on sites this office has jurisdiction over. I conduct Boards of Determination on drain petitions and serve on an intercounty drain board as a Deputy. I get out in the field as needed to offer opinions on easement encroachment issues,

inspect problems, or help solve a problem on a contract. I also deal with our local municipalities and the public on various drainage issues and complaints.

Here's a couple challenges: There never seems to be enough time in the day or enough money in the drain accounts.

I really enjoy exercising and being outdoors. I like to run, cycle, camp, canoe, hunt, fish, and hike. Also, enjoy being in the northeast part of the lower, working on my property or just having fun outdoors.



Jim and his partner during a canoe race. on the Clinton River They're pictured under the I-94 bridge as they were heading upstream towards Mt. Clemens and the finish line.

THE SWAMP RATTLER IN MICHIGAN THE LAST STAND FOR THE EASTERN MASSASAUGA RATTLE SNAKE

*David A. Mifsud, PWS, CWB, CPE
Herpetological Resource and Management, LLC*

In October 2016, the U.S. Fish and Wildlife Service (FWS) added the Eastern Massasauga Rattlesnake (*Sistrurus catenatus catenatus*) to the Federal Endangered Species Act. As a wetland dependent species, their listing will likely influence drain projects throughout the state and how we approach water quality and landscape management.

INTRODUCTION

Among the nearly sixty species of amphibians and reptiles that call Michigan home, the Eastern Massasauga Rattlesnake (EMR) also known as the Swamp Rattler is the State's only pit-viper. This wetland dependent snake is a sentinel species for ecosystem health and indicator of landscape and community health. Interestingly, the Massasauga is not the only venomous snake in Michigan; however, it is the only species that poses any risk to humans or pets. Other species are mildly venomous to small prey to help catch them and assist with digesting food. Once common across the Great Lakes basin, this species has experienced significant declines. Across its range, the EMR is reported to occur in only 60% of counties it was once historically found, and where present, in much smaller numbers and often isolated populations. Michigan is known to be the last stronghold for the species, with higher numbers documented here than any other State or province, even though populations here have also experienced substantial declines due to several factors.

ECOLOGY

The Massasauga can be found in a wide variety of wetland habitats including wet prairies, shrub swamps, fens and bogs, and sedge meadows; as well as adjacent upland communities such as prairies, grasslands, old fields, floodplains and coniferous forests. The habitat preferences of EMR vary regionally throughout their range and even within Michigan. Southern Michigan populations are typically associated with more open wetlands such as prairie fens and wet meadows, while northern populations are typically found in lowland coniferous forests including cedar swamps. Their use of different habitat communities also varies seasonally, with snakes depending on wetland habitats in fall through spring and drier uplands in the summer.



The Eastern Massasauga Rattlesnake is a thick bodied snake that can grow up to two feet in length. Identifying characteristics include a grayish background with dark alternating blotches down the back and sides, a well-developed segmented rattle on the tail, wide diamond shaped head, and vertical cat-like pupils. Unlike all other Michigan snake species, the tail of EMR is thick and does not taper to a point at the end.

In general, EMR are active between April and October. Hibernation occurs primarily in crayfish chimneys or small mammal burrows (known as hibernacula). While the microhabitat that EMR chooses to hibernate in varies, sites must be located below the frost line as presence of water that does not freeze is critical. Snakes will often return to the same site annually to overwinter, making the management of large hibernacula a conservation priority. Identification of these areas requires experience and expertise in this species and their habitat needs. Emergence from hibernation typically occurs as ground temperatures reach closer to air temperature in late March to early April, but vary based on seasonality. Individuals are known to stay in close proximity to their hibernacula for up to several weeks before dispersing to their summer habitats, although this behavior varies widely across the species range.



Example of a crayfish chimney used by Eastern Massasauga for overwintering habitat

The EMR feed primarily on small mammals (making them important consumers of pest species), with younger snakes feeding on a wider variety including smaller snakes, amphibians, and insects. The swamp rattler also has several predators including large snakes, birds (primarily hawks and herons), and mammals (typically raccoons and foxes).

THREATS AND MANAGEMENT

Several factors have contributed to the decline of EMR. The primary threats in recent years have been habitat loss, degradation, and fragmentation. Urbanization and conversion of wetlands for agricultural purposes eliminate critical EMR habitats entirely and also disrupt the connectivity between wetlands and adjacent upland communities. Massasaugas living in fragmented landscapes are at higher risk of injury or death, including an increased risk of road-related mortality.

Persecution represents another challenge that EMR populations face. Historically a larger issue, the



Habitat fragmentation caused by site development, as seen here, is a major threat to the long-term viability of Massasauga populations.

indiscriminate killing of snakes (particularly venomous species) continues to pose a major threat to this species. Public education and outreach efforts are an effective tool for preventing unnecessary harm. In general, Massasauga will attempt to avoid confrontation and typically remain motionless when approached. Unless directly disturbed, such as handling, it is uncommon for this species to strike, and injuries from bites to humans are rare.

As described above, Massasaugas inhabit a variety of wetland and upland habitats throughout the year. Several of the natural communities they rely on require regular management activities to maintain their quality and suitability for EMR and other wildlife. Unfortunately, many of these practices have the potential to harm local EMR populations if appropriate timing and techniques are not followed, including altering wetland hydrology, mowing or mechanical treatment of woody vegetation, and prescribed fire. A number of these impacts can be avoided through the implementation of Best Management Practices. Consulting with professional herpetologists with demonstrated experience working with this species is strongly advised. Understanding the species' seasonal activity and temperature requirements and when it is acceptable to perform activities is vital to minimizing threat and avoiding "take."

Disease has also emerged as a notable threat for EMR and other rare and declining reptiles and amphibians.

Most notable for the Eastern Massasauga Rattle Snake is Snake Fungal Disease (SFD). This relatively recent discovery is highly lethal and currently has limited treatment options. Causes for the spread of SFD are unknown but measures can be made to minimize it by adopting best management practices when working in EMR habitats, including sanitizing field equipment (including boots) with a dilute bleach solution. The MDNR has developed guidelines for decontaminating equipment. More information can also be obtained by revising the Michigan Amphibian and Reptile Best Management Guidelines. Manuals are available for free download at HRM’s website www.herpman.com.

STATUS AND REGULATIONS

Widespread declines are not a new trend for this Eastern Massasauga, with numbers noticeably dwindling for decades. It was made a Federal Candidate species by the Fish and Wildlife Service in 1999 and just recently fully elevated to Federally Threatened in October 2016, affording it protection under the Endangered Species Act (ESA) throughout its range. The Massasauga is state-listed as Special Concern, Threatened, or Endangered in every state or province where it is found. In Michigan, the species has held the status of Special Concern since 1992.

The Federal Endangered Species Act (ESA) of 1973 works to protect vulnerable, listed species by prohibiting “take” (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect) and trade in listed plants and animals, except under federal permit. Harm is defined as an act that kills or injures listed species and may include significant modification or destruction of habitat where it impacts a listed species through impairment of essential behavior. For example, draining a wetland that is a known hot spot for hibernating EMR can be devastating to a local population and would be considered “take.”

Officially, the EMR is still considered a Special Concern species in Michigan. Currently, Special Concern affords it protection within the State. In Michigan, all Special Concern amphibians and reptiles are protected by the Michigan Department of Natural Resources (MDNR) Fisheries Division Order 224.13, which states that “take” from the wild or possession of any such species is prohibited except as authorized under a permit. Other Special Concern species include Wood Turtles, Blanding’s Turtles, Eastern Box Turtles, Butler’s Garter Snake, Queen Snake, Black Rat Snake, Eastern Smooth Green Snake, Fowler’s Toad, Pickerel Frog, and Northern Mudpuppy. While the Massasauga has not been formally elevated on

Michigan’s Threatened and Endangered species list, the protective regulatory status maintained at the Federal level is recognized at the State level as well. However, Part 365 Section 324.36505(1) states “a person shall not take, possess....” a species on the state and federal lists. Therefore the EMR, is protected by the state’s Endangered Species Protection legislation.

The Michigan Department of Environmental Quality also has jurisdiction over the protection of land where protected species occur and can reject or modify permit applications or incorporate permit conditions to minimize impacts associated with wetland disturbance.

MANAGING A LANDSCAPE WITH EASTERN MASSASAUGA

The Massasauga is considered a bioindicator species due to their habitat complex requirements and sensitivity to disturbances in the environment. Managing the landscape for EMR not only protects their habitat but also benefits a wide range of other flora and fauna and may improve the overall end product of various water management activities.

As a federally protected species, the presence of EMR on the landscape where a project is located often requires project managers to take additional steps before conducting certain actions that may cause “harm” or “take” to EMR or their habitat. This may include obtaining necessary permits to work where EMR are present and/or making modifications to wetland permits for areas that support EMR habitat. The Fish and Wildlife Service recently completed habitat analyses that can be used to identify potential EMR habitat and locations. Working with professional herpetologist or wildlife biologists in Michigan or the Great Lakes region with demonstrated experience with EMR will reduce risk to this species and the potential need for permits.

For areas where EMR do occur, land management efforts that involve otherwise lawful activities but can result in harming or killing of the species requires an incidental take permit along with the development of a Habitat Conservation Plan (HCP). FWS staff is available for any questions regarding the need for an incidental take permit and seeking out their guidance during the permitting process is recommended. Under section 10(a)(1)(B) of the ESA, this protocol develops partnerships with non-federal parties to ensure that effects of an authorized incidental take are sufficiently minimized and mitigated. This process allows necessary land management



Examples of the various habitat types used by Eastern Massasauga

activities needed to conserve the ecosystems which listed species depend on, ultimately contributing to their long-term recovery. HCPs must include the assessment of impacts likely to result from proposed take, and mitigation measures that will be taken to avoid take. Potential mitigation measures that can be incorporated into a HCP include payment into an established conservation fund or bank, preservation (via acquisition or conservation easement) of existing habitat, enhancement or restoration of degraded former habitat, establishment of buffers around existing habitat, modifications of land use practices and restrictions on actions. Once approved, an HCP provides the permit holder a “no surprises” assurance,

meaning that should unforeseen circumstances arise, FWS will not require additional compensation or restrictions on use of land, water, or other natural resources beyond the level already agreed to in the HCP. This is an effective long-term measure to allow for Drain Commissioners to continue their necessary work while addressing potential impacts to protected species.

Although federal regulations of listed species such as Eastern Massasauga can create additional obstacles for initiating projects necessary for the management of water on a landscape, their presence can also provide several benefits. Additional sources of funding are often made available to projects that directly target or indirectly benefit listed species and their habitats. For example, by incorporating EMR habitat restoration needs into a storm water management project, resources may become available that are otherwise not an option. Consultation with a professional wildlife biologist experienced with the habitat needs of EMR may be an advantageous way to approach future projects where the species is involved.



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NORTH SHORE DRAIN

2017 INNOVATION & EXCELLENCE AWARD WINNER

Brian Cenci, P.E., Eng., Inc.



The North Shore Drain was undertaken to address three separate and distinct drainage issues that affected three different, yet adjoining, drainage areas. Understanding the history and the complexity of the drainage issues is key to understanding the unique and innovative work necessary to accomplish the solutions under one petition, as a County Drain project.

The North Shore Drain is located in the southwest portion of Casco Township in Allegan County. This area of the Drainage District abuts the Van Buren County line and is the north end of the quiet beachside community, South Haven. The properties within the Drainage District are predominately small vacation homes on lots less

than ¼-acre. Within the last several years, larger permanent dwellings and vacation homes began to surface, and corresponding drainage problems intensified.

HISTORY & BACKGROUND OF DRAINAGE ISSUES

WASHINGTON ST.

In 1993, residents of Casco Township submitted a petition to the Allegan County Drain Commissioner (ACDC) to establish a new drainage district and corresponding drain, called the North Shore Drain. The Drain and Drainage District were established in 1994; and in 1995, construction started. The 1995 North Shore Drain project was to provide drainage to low areas near the county

- ALLEGAN COUNTY

INNER



Washington Street post construction (1 month after)

line along Baseline Road, northward along the east side of North Shore Drive, and eastward down Washington Street. The assessment for this extensive project was paid off over many years by residents until 2005.

Unfortunately, the 1995 project did not resolve all of the issues addressed in the petition and, after only a few years of relief, flooding persisted. Some of the flooding was a result of the original Drain being constructed only three to five feet deep in order to avoid utilities and to keep the costs down; also, many properties were not high enough to drain toward the road. Additionally, the 1995 project did not alleviate the standing water or the problems associated with a high perched water

table, and residents complained that their sump pumps ran continuously. The Drain Commissioner received frequent maintenance requests from Washington Street residents subsequent to the 1995 work, partially because the 1995 enclosed drain system often clogged with gravel, since the road was unpaved.

Tragically, residents suffered flooding and residual problems throughout the entire payback period for the 1995 construction work. Property owners understandably expressed frustration and discord throughout the planning and design phase of the project, unparalleled even by drain project standards.



Flooded yard on Washington St. after the 1995 project

COLUMBINE / WEST WING ESTATES

Columbine Estates, constructed in the late 1990s, made up the North Base Drain (consolidated into the North Shore Drain with this more recent petition). In the mid-2000s, several large flooding incidents caused water to back up between

“How do we know that this time the solution is going to work and that the problem is going to get fixed? That’s what they told us the last time we went through this whole complicated process! So, you’re going to need to convince me.....other than just telling me it will work.”

— Washington St. resident in the North Shore Drain Drainage District at the First Scope Mtg. (December 17, 2013)

C o l u m b i n e Estates and West Wing Estates downstream. West Wing Estates, as a private condominium development, had never received official

plan review from the ACDC. Private drains and infrastructure had been installed for the entire development right before the peak of the housing bubble and subsequent crash in 2008. Suddenly, home building in the nearly empty West Wing Estates ceased and the process of turning the infrastructure over to the County halted. This 15-acre densely planned housing development now depended entirely on one 12-inch outlet for its downstream drainage. In the years that followed, a few large rain events overwhelmed the private drain and private detention infrastructure within West Wing Estates. This excess stormwater flooded several basements in the neighboring Columbine Estates, upstream. Lawsuits ensued, but no remedy was possible without an overhaul of the entire North Shore drainage system.

EUCLID, PERSHING AND ADAMS STREETS AND JENSEN’S RV CAMPGROUND

The north end of the Drainage District (later referred to as Branch 1) had longstanding drainage problems, having no prior drain work

or significant drainage infrastructure. This area has some developed properties, the largest of which is a very popular RV Campground that is a staple of the community. This campground and the downstream properties on the gravel roads of Adams, Euclid and Pershing had well documented an increase in flooding since the South Haven Middle School was built just upstream in the early 2000s. Along the roadways, most of the houses are lower than the roads, which are gravel, and the rights-of-way are exceptionally narrow, being only 30 feet wide.

2017 AWARD-WINNING - NORTH SHORE DRAIN PROJECT

On November 19, 2012, Casco Township submitted a consolidation petition to the ACDC for consolidation and improvement to the North Shore Drain, the North Base Drain, and surrounding areas. As a result of this petition, in June of 2013, Eng., Inc. (the consulting engineer for the project) was asked to perform a drain study to examine the existing conditions and determine possible courses of action for repairing any drainage issues within the large consolidated Drainage District. Eng. presented these findings to a Board of Determination. The Board found that the project was necessary and the consolidated North Shore Drain Drainage District was established.

Tackling three different problems in three different areas of a drainage district was rather complex. To add to the challenge, the ACDC and Eng. needed to design the solution on the heels of the somewhat unsuccessful previous project – *which had only recently been paid off by many of the same District residents.* Establishing the drain all the way to a public waterbody (Lake Michigan) was not practical, so the drain would have to end further upstream. Easements would not be obtained from downstream residents, who always feared that increased runoff from the project would further erode their properties along Lake Michigan. However, a total of 17 new drain easements were obtained by Eng. for the ACDC; none required any financial compensation or legal proceedings.

With the decision to stop the drain before reaching Lake Michigan, essentially at either North Shore Drive or Baseline Road, the Engineer needed to design a system that would have no net or negative impact downstream from the vast amount of increased runoff and improved



collection system to be constructed upstream. This imperative became particularly crucial when one resident, who owns property where the legal County Drain both stops and starts, was unwilling to sign an easement and the DEQ required this design parameter be proven before granting a DEQ Permit as well.

In an effort to share resources, the drain contract also included utility and infrastructure work paid directly by Casco Township (local road paving) and the City of South Haven (water main and water service work). Adding to the complexity of the design, the rights-of-way in the Adams, Euclid and Pershing roadways were only 30 feet wide. With the gravel road being approximately 20 feet wide, no more than five feet existed on each side of the road to accommodate a drainage collection system. Incredibly, these rights-of-way already contained full utilities as well (sanitary, gas, electric, water, phone and cable). Any pipe for collecting stormwater would need to be installed amongst this labyrinth of existing infrastructure.



Working on utilities in the narrow right -of-way

Initially, the Township had approached the Drain Commissioner and Road Commission requesting to have these three roads paved. However, after the project was bid, for financial reasons, the Township was forced to cancel all but one of the street paving projects. Paving would have allowed curb and gutter to collect stormwater runoff from the road, relieving adjacent properties. Without it, the Engineer had to redesign the entire area, as paved roadways were no longer part of the stormwater management plan. The new design required a new DEQ Permit subsequent to the bidding and selection of the contractor (Hoffman Bros. of Battle Creek, Michigan).

PUBLIC INVOLVEMENT AND EDUCATION

With so much at stake, property owner input was critical and proved to be invaluable. The ACDC and Eng. made considerable efforts to keep everyone engaged and involved. Most of the homes in the District are vacation homes and homeowners can be absent several months of the year. With property owners located all over the country, the ACDC and Eng. used several methods to keep communication open, including:

- Two separate scope meetings were held (December 2013 and August 2015) at the Preliminary and Final stages of design. At both meetings, design alternatives with their cost estimates were presented and discussed with residents. Project Manager, Brian Cenci, PE, and Project Engineer, Ryan McEnhill, PE, attended both meetings and presented project solution options that guided the long-term design and success of the project. Doing these two separate scope meetings at distinctly different key project milestones helped to keep residents informed of the

status of the project, but more importantly, its scope and ultimate design.

- Project Manager Cenci also personally met or spoke with nearly half of the property owners in the Drainage District (approximately 110 properties) to discuss the history of their property, the project and potential drainage solutions.
- Cenci, on behalf of the ACDC, sent out regular emails to update property owners and stakeholders detailing critical points of the project, keeping them involved and part of the process. Since most of the homes were seasonal, email was a valuable communication tool allowing Eng. to present different design options and obtain feedback. Prior to construction, these updates were sent every two or three months for nearly two years; during construction, emailed progress updates were sent each month.

DESIGNS, INNOVATIVE CONCEPTS, ENVIRONMENTAL AND WATER QUALITY BENEFITS

The most unique component of this project was the low-impact design used to retrofit the new storm drain infrastructure into a constricted utility corridor (30-foot rights-of-way for all the streets, except 40-foot for Washington Street). Along Washington Street, which became the only street to be paved, very shallow infiltration swales were constructed with sand, pea stone, specialized filter fabric and perforated pipes adjacent to the



Narrow 30-foot right-of-way on Pershing St.

roadway to facilitate sub-surface drainage. This bio-engineered soil profile significantly reduced the amount of sediment entering the system and reduced peak flows as well, allowing for smaller pipes to be used for the entire collection and conveyance system. Consequently, ditches along the roadway were not necessary, and small catch basins could be installed between driveways with shallow swales that were still visually appealing and easily mowable.



Downstream eroded ditch near North Shore Drive prior to construction

On Branch 1, since the existing rights-of-way were only 30 feet wide, areas were needed to store the large increase in directed stormwater runoff that would drain toward the already eroding ravine down to Lake Michigan (the non-County drain section previously described). The ACDC and Engineer worked with residents and the Road Commission to turn over a collection of unused road rights-of-way to the Drain Commissioner. Areas of the platted North Shore Manor, formerly known as Lincoln Avenue, Wilson Street and Harrison Streets, were used to develop a series of in-line detention areas to provide detention volume, so that no negative impact would occur on downstream properties from the North Shore Drain. These in-line detention areas were also planted with native wetland seeds to restore the wetland vegetation and habitat lost as part of the

construction activities in this area. This detention system was key to this project's success, since obtaining easements for a large detention area over several small existing buildable lots would have been nearly impossible and not economically viable. The detention areas were installed linearly, adjacent to homes, so that a maximum amount of stormwater could be contained in each area.



In-Line Detention area during construction

Each of these areas was also designed with an underdrain system to eliminate standing water in dry times. Property owners did not want stagnant water with mosquitoes next to their homes. This was a critical moment of trust between the design team and the public. The public needed to trust that stormwater could accumulate next to their homes after large rain events in a "holding area," yet would eventually drain out as designed – leaving no stagnant water.

Additionally, these in-line detention areas were used in West Wing Estates and on Jensen's RV Park, which is located to the east of North Shore Drive. The in-line detention areas helped to reduce the pipe size from a 36-inch down to only a 15-inch discharging from this area. Again, this was necessary to meet the burden of proof to downstream residents and the DEQ that no adverse or negative impacts would be witnessed from the increase in stormwater volume and improved collection now flowing downstream.

Respecting the nearly 100-year-old trees that line North Shore Drive and Washington Street was also a large component of this project. The trees are part of the history of this area, and neither the residents nor the design team wanted them damaged. Consideration for the trees impacted design and construction methods; a deeper drain had to be installed below both the sanitary sewer and the water main, all the way up Washington Street and along North Shore Drive in order to avoid these trees. This is rarely done in urban areas, and required the construction to be limited to the width of a small trench box along North Shore Drive, all the while encountering a high perched water table that required constant dewatering. In the end, not a single large specimen tree was lost or had its roots damaged on the project.



In-Line Detention areas constructed adjacent to existing residence

With the close proximity to Lake Michigan, a high concentration of sand in the top layer of soil made sediment loading a significant concern. Several of the in-line detention areas were built like two-stage ditches, where a small pilot channel transported the majority of stormwater and cross veins were installed to control sediment. For large storm events, a wider bench cross-section could be accessed to dissipate flooding and downstream impacts from the increase in stormwater.

Green stormwater design techniques using fascines, strategically placed limestone riprap, cross veins, j-hooks and coir fiber logs (filled with topsoil and native seed for a growing medium) were installed for toe erosion management in the existing ditch and ravine for several hundred feet from Lincoln Avenue to North Shore Drive. To mitigate concerns raised by downstream residents, remediation of excessive scouring and erosion in this ravine was necessary, especially

with the improved collection and conveyance drain system constructed upstream. Once the upstream in-line detention areas were installed, the residents noticed a remarkable improvement. The bank restoration work was performed using small machinery, and the absolute minimum number of existing trees were removed during installation.

COST EFFECTIVENESS

After bids were received, the Township found it could not afford the majority of previously planned paving work in conjunction with the North Shore Drain. Thus, much of the prior designed collection methods of rolled curb and gutter in the road were not possible. This affected the design and the DEQ Permit, since the initial bid project had far more infrastructure within the roadway for a collection system. The new design needed to move the collection system off the gravel roadways and into front yards wherever possible. The initial total project cost was \$1.85 million, with a construction cost of \$1.35 million. After all the redesign work (and the removal of the street paving from the project), the total project cost

presented at the Day of Review was \$1.28 million, with a total construction cost of around \$900,000 making up the majority of that cost. The Engineer was able to work with the low bid contractor (Hoffman Bros.), the DEQ, Road Commission and residents to eliminate approximately \$200,000 in paving costs from the construction contract. The redesigned collection system near Washington, Euclid, Pershing and Adams Streets netted a cost savings of nearly \$350,000 (\$250,000 in construction) to residents of the Drainage District on top of that. In the end, the project cost was reduced by almost 1/3 after initial bids were taken. This made the project more affordable to the residents within the Drainage District.

SUMMARY

The North Shore Drain project started out with a difficult set of circumstances: a large petition project from the 90s that was mostly ineffective, persistent flooding problems, high resident frustration was high and financial limitations altered the design. However, Eng. and the ACDC were able to overcome these and a myriad of other physical and permitting obstacles in order



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to complete one project that addressed several separate drainage issues.

As with most projects in this area of the state, the North Shore Drain project was planned so that the majority of the work would not occur between Memorial Day and Labor Day. Construction started in December of 2015, resumed in April of 2016 and was substantially complete by early June of 2016. All roads were paved by Memorial Day, 2016.

In February, MACDC presented the ACDC and the design team with the 2017 Innovation and Excellence Award for the North Shore Drain. 2017 is the second year in a row that the Allegan County Drain office and Eng., Inc. received an Innovation and Excellence Award while working together (in 2016 for the Walker Drain). This achievement – consecutive winner by the same drain office and engineer – is unmatched since the drain awards have been structured in their current format.



Medemar

DRAIN COMMISSIONER RESPONSE

“For the second year in a row I’m truly humbled and honored to be receiving this award. I think winning an award for this project shows that, just like with our 2016 winner the Walker Drain (Eng., Inc. was also the engineer on that project), that unique projects which are well designed, functional and work well don’t need to be several millions of dollars to build. Here we took bids and the cost was way too much to spread on the residents so I had Brian (project manager Brian Cenci, PE of Eng., Inc.) go back and value engineer every aspect of the project. We went from a 1.35 million dollar construction project to \$900,000 in less than a month. The fact that we could reduce costs that much and still build such a high-end project is pretty remarkable and a testament to Eng., Inc. (engineer), Hoffman Bros. (contractor) and my office staff working together. I want to thank the Association again for this Award and for recognizing what a good project this ended up being.”

Denise Medemar, Allegan County Drain Commissioner



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LAKE LINGO

CUTTING THROUGH THE JARGON

Tony Groves and Pam Tynning

Water Resources Group, Progressive AE

Drain and water resources commissioners often deal with lakes and lake issues. Be it a statutory lake board, a legal lake level, a drain project or general discourse with a constituent, lakes are often a topic of discussion. This article provides background information on some of the technical language used to describe lakes and lake processes. Hopefully, this information will provide a better understanding of lakes, lake water quality, and some basic lake jargon.

LAKE TROPHIC STATE

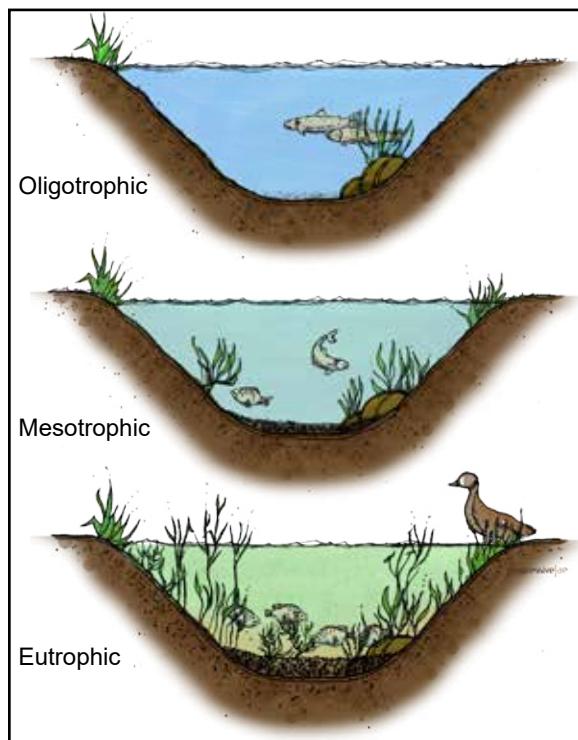
Limnology is the study of the physical, chemical, and biological characteristics of inland waters, a primary focus of which is the study of inland lakes. At last count, Michigan has 10,031 lakes five acres or greater in size, so there is plenty of fodder for limnological study in Michigan. Like most scientists, limnologists tend to classify things, and lakes are no exception. Lakes can be classified into three broad categories based on their productivity or ability to support plant and animal life. The three basic lake classifications are oligotrophic, mesotrophic, and eutrophic.

Oligotrophic lakes are generally deep and clear with little aquatic plant growth. These lakes maintain sufficient dissolved oxygen in the cool, deep bottom waters during late summer to support cold water fish such as trout and whitefish.

Eutrophic lakes have poor clarity, and support abundant aquatic plant growth. In deep eutrophic lakes, the cool bottom waters usually contain little or no dissolved oxygen. Therefore, these lakes can only support warm water fish such as bass and pike. Lakes that fall between the two extremes of oligotrophic and eutrophic are called **mesotrophic** lakes.

Under natural conditions, most lakes will ultimately evolve to a eutrophic state as they gradually fill with sediment and organic matter transported to the lake from the surrounding watershed. As the lake becomes shallower, the process accelerates. When aquatic plants become abundant, the lake slowly begins to fill in as sediment and decaying plant matter accumulate on the lake bottom. Eventually, terrestrial plants become established and the lake is transformed to a marshland. The natural lake aging process can be greatly accelerated if excessive amounts of sediment

and nutrients (which stimulate aquatic plant growth) enter the lake from the surrounding watershed. Because these added inputs are usually associated with human activity, this accelerated lake aging process is often referred to as cultural eutrophication. The U.S. Geological Survey estimated that about 25% of Michigan lakes are oligotrophic, 52% are mesotrophic and 23% are eutrophic (Fuller and Taricska 2012). Examples of oligotrophic lakes include Glen Lake in Leelanau County, Torch Lake in Antrim County, Crystal Lake in Benzie County, and Higgins Lake in Roscommon County. Houghton Lake, the largest lake in Michigan, has both mesotrophic and eutrophic characteristics.



Lake trophic states

TROPHIC STATE INDICATORS

Key parameters used to evaluate a lake's productivity or trophic state include total phosphorus, chlorophyll-a, and Secchi transparency.

Phosphorus is the nutrient that most often stimulates excessive growth of aquatic plants and causes premature lake aging. By measuring phosphorus levels, it is possible to gauge the overall health of a lake.

Chlorophyll-a is a pigment that imparts the green color to plants and algae. A rough estimate of the quantity of algae present in the water column can be made by measuring the amount of chlorophyll-a in the water column.

A Secchi disk is a round, black and white, 8-inch disk that is used to estimate water clarity. Generally, it has been found that plants can grow to a depth of about twice the Secchi disk transparency.

Generally, as phosphorus inputs to a lake increase, algae growth and chlorophyll-a increase and Secchi transparency decreases.

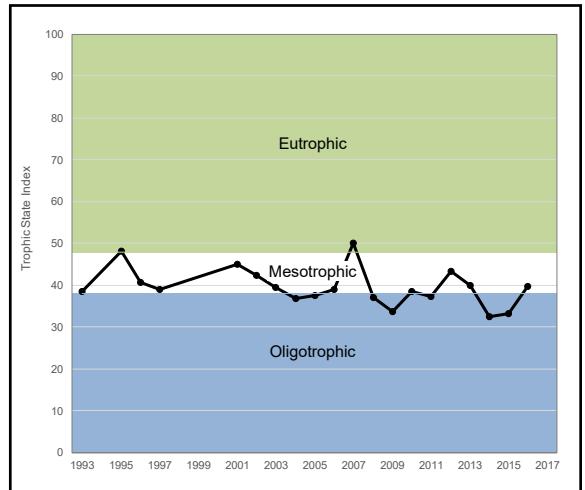
Carlson's Trophic State Index (TSI) was developed from mathematical relationships that allowed phosphorus, chlorophyll-a, and Secchi transparency readings to be converted to a numerical scale from 0 to 100, with increasing numbers indicating more productive lakes. The TSI can be used to determine the trophic state of Michigan lakes using values reported by USGS (Fuller and Taricska 2012) as follows:

Less than 38	Oligotrophic
38 to 48	Mesotrophic
Greater than 48	Eutrophic

Michigan's Cooperative Lakes Monitoring Program (CLMP) began in 1974 and is the second-longest running volunteer monitoring program in the country. Currently, as part of the program, data are collected annually from about 250 lakes, and are classified using Carlson's TSI.

To illustrate TSI, the chart below shows TSI values based on 20 years of data for Goguac Lake in Calhoun

County, Michigan. The chart shows that Goguac Lake is mesotrophic, but it is also apparent that there is variability in the lake year to year. Because of the natural variability in most lakes, changes in lake water quality can be difficult to detect. In fact, it may take many years of regular sampling in a given lake to detect a statistically significant trend in water quality.



Goguac Lake trophic state index (TSI) 1993-2016, based on averages of spring phosphorus, and summer chlorophyll-a and Secchi transparency.

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TEMPERATURE AND DISSOLVED OXYGEN

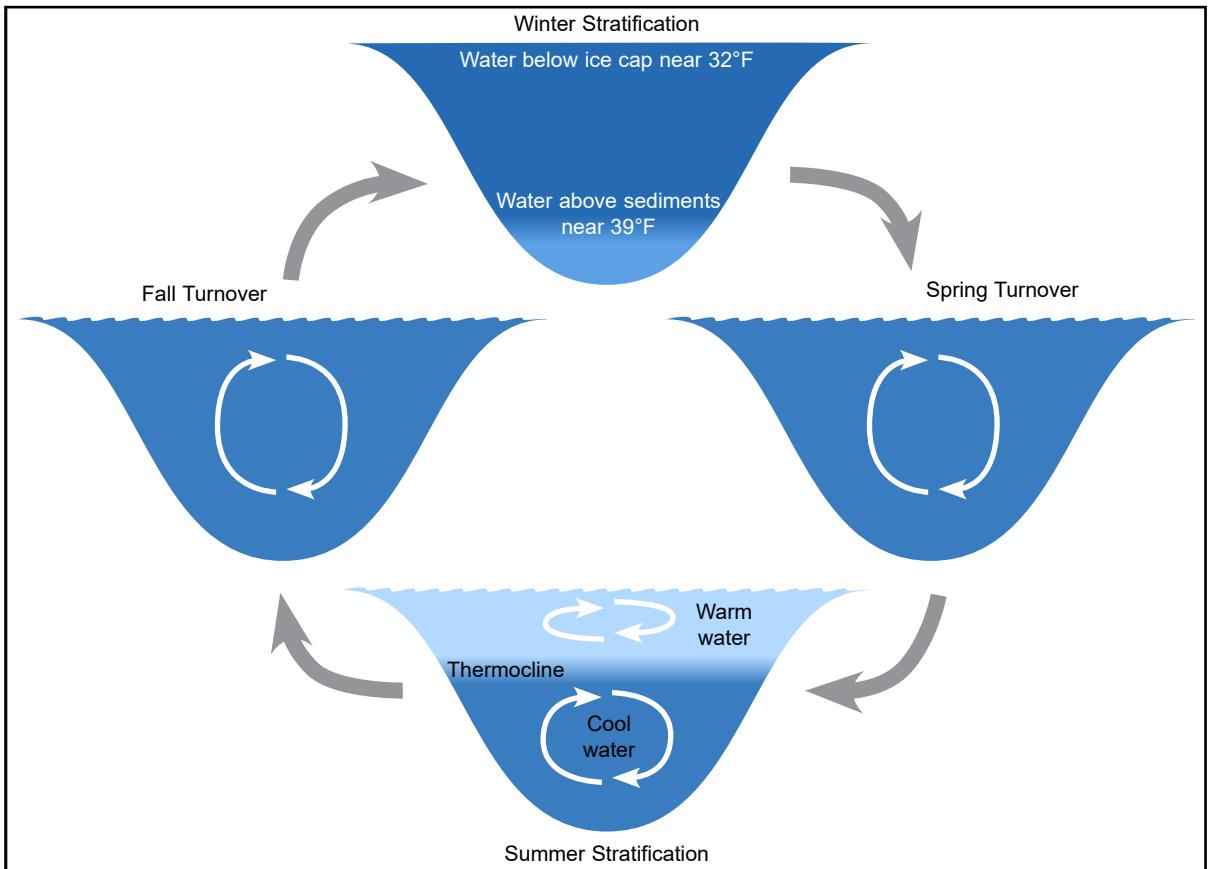
Other parameters that strongly influence lake water quality include temperature and dissolved oxygen. In fact, in terms of a lake's fishery, these are probably two of the most important measurements.

TEMPERATURE

Temperature is important in determining the type of organisms that may live in a lake. For example, trout prefer temperatures below 68°F. Temperature also determines how water mixes in a lake. As the ice cover breaks up on a lake in the spring, the water temperature becomes uniform from the surface to the bottom. This period is referred to as spring turnover because water mixes throughout the entire water column. As the surface waters warm, they are underlain by a colder, more dense layer of water. This process is called thermal stratification. In deeper lakes during summer there are three distinct layers. This is referred to as summer stratification.

Once thermal stratification occurs, there is little mixing of the warm surface waters with the cooler bottom waters. The transition layer that separates these layers

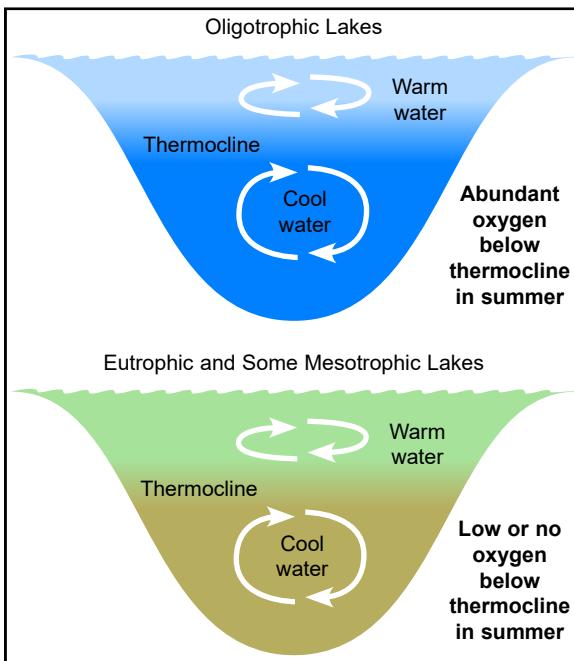
is referred to as the thermocline. The thermocline is characterized as the zone where temperature drops rapidly with depth. As fall approaches, the warm surface waters begin to cool and become more dense. Eventually, the surface temperature drops to a point that allows the lake to undergo complete mixing. This period is referred to as fall turnover. As the season progresses and ice begins to form on the lake, the lake may stratify again. However, during winter stratification, the surface waters (at or near 32°F) are underlain by slightly warmer water (about 39°F). This is sometimes referred to as inverse stratification and occurs because water is most dense at a temperature of about 39°F. As the lake ice melts in the spring, these stratification cycles are repeated. Shallow lakes do not stratify. Lakes that are about 15 to 30 feet deep may stratify and destratify with storm events several times during the year.



Seasonal thermal stratification cycle.

DISSOLVED OXYGEN

An important factor influencing lake water quality is the quantity of dissolved oxygen in the water column. The major inputs of dissolved oxygen to lakes are the atmosphere and photosynthetic activity by aquatic plants. An oxygen level of about 5 mg/L (milligrams per liter, or parts per million) is required to support warm-water fish. In lakes deep enough to exhibit thermal stratification, oxygen levels are often reduced or depleted below the thermocline once the lake has stratified. This is because deep water is cut off from plant photosynthesis and the atmosphere, and oxygen is consumed by bacteria that use oxygen as they decompose organic matter (plant and animal remains) at the bottom of the lake. Bottom-water oxygen depletion is a common occurrence in eutrophic and some mesotrophic lakes. Thus, eutrophic and most mesotrophic lakes cannot support cold-water fish because the cool, deep water (that the fish require to live) does not contain sufficient oxygen.



REFERENCES

Fuller, L.M. and C.K. Taricska. 2012. Water-quality characteristics of Michigan's inland lakes, 2001–10: U.S. Geological Survey Scientific Investigations Report 2011–5233, 53 p., plus CD-ROM.

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Michigan Association of County Drain Commissioners 118th Annual Summer Conference

Schedule at a Glance Tuesday, July 18

- 1:30 - 3:00 PM **Legislative Meeting**
Arctic Bay
- 3:00 - 5:00 PM **Board of Directors Meeting**
Arctic Bay

Wednesday, July 19

- 10:00 AM **Registration Opens**
Northern Lights
- 12:00 PM **Lunch on your own**
- 1:00 - 1:15 PM **Call to Order and Welcome**
Northwest Territories
- 1:15 - 3:00 PM **Educational Sessions**
Northwest Territories
- 3:00 - 3:15 PM **Break**
Northwest Territories Prefunction
- 3:15 - 3:45 PM **Educational Sessions**
Northwest Territories
- 6:00 PM **Reception**
Lodge Deck & Pavilion
- 7:00 PM **Dinner & Award Presentation**
Lodge Deck & Pavilion
- 9:00 PM **Entertainment**

Thursday, July 20

- 7:00 - 9:00 AM **Breakfast**
James Bay Hall
- 9:00 - 10:30 AM **Educational Sessions**
Northwest Territories
- 10:30 - 10:45 AM **Break**
Northwest Territories Prefunction
- 10:45 AM - 12:00 PM **Educational Sessions**
Northwest Territories
- 12:00 - 1:00 PM **Lunch**
James Bay Hall
- 1:00 - 5:00 PM **Networking Activities**
Various Locations
- 6:00 PM **Reception**
James Bay Hall
- 7:00 PM **Dinner**
James Bay Hall

Friday, July 21

- 7:30 - 9:00 AM **Breakfast**
James Bay Hall
- 9:00 AM **MACDC District Meetings**
Northwest Territories
- 9:30 AM **Business Meeting**
Northwest Territories
- 10:30 AM **Adjourn**

CONFERENCE SESSIONS Wednesday, July 19

1:15 - 2:00 PM DEQ Update and Priority Initiatives

Heidi Grether, Director, Michigan DEQ
Director Grether will talk about new things going on in the Dept. of Environmental Quality, her priorities for the department, and major issues facing the department and Michigan.

2:00 - 2:30 PM Drone Law

Kevin Fanning and Doug Kelly, Clark Hill PLC
This presentation involves the growing field of "Drone Law." It will provide legal insight, counseling and litigation avoidance strategies related to drain commissioner use of unmanned aircraft systems (UAS) or "drones." The presentation will provide review of the regulatory landscape and its application with applicable laws governing drain inspection and easement use.

2:30 - 3:00 PM Construction Administration for Open Drains

Ronald B. Hansen, P.E. P.S., Spicer Group
This is interactive session that reviews from start to finish the construction administration phase for an open drain project. The session includes a review and refresher of tasks for a Commissioner's or Commissioner representative consideration during construction. Topics such as construction permits, construction staking, construction inspection, material testing, soil erosion control, landowner agreements, progress payments, change orders, record keeping, reporting, restoration and other construction related tasks will be reviewed. Also, discussion on technology that could enhance data management in construction phase.

July 19 - 21, 2017
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CONFERENCE SESSIONS *continued*

3:15 - 3:45 PM Read Them Right: How to Read Engineering Drawings

Claire Schwartz, Fishbeck Thompson Carr & Huber
Increase your understanding of the hieroglyphics used by engineers to communicate.

3:45 - 4:15 PM Building and Maintaining Quality Relationships with your Road Commission

Marya N. Colpaert, P.E., Saginaw County Public Works Commission; Joe Wisniewski, P.E., Saginaw County Road Commission; Joe Bush, Ottawa County Water Resources Commission; Brett Laughlin, Ottawa County Road Commission

This session will stress how important a good working relationship is between drain commissioners and road commissioners. Additionally, it will hit on specific items the counties on the panel do to keep the lines of communication open. The intent for this session is to provide a panel of people to promote open discussion on this topic.

4:15 - 5:00 PM Townships and Drain Commissioners: Working Together

Larry Merrill, Michigan Townships Association
Townships help pay for almost every drain project, and often initiate the process. As projects are more successful when townships and drain commissioners work together during a project, learn more about township budgets and governance to improve communication and relationships with your local township officials.

Thursday, July 20

9:00 - 9:45 AM USDA Rural Development Financing for Drain Projects

Chris Maxwell, USDA Rural Development; Samir F. Matta, P.E. Lockwood, Andrews & Newmann; Alexis Vlahakis Cole, Woodworth Law Firm

The USDA Rural Development offers advantageous financing for drain projects meeting its criteria. Yet, in Michigan, only three drain projects have taken advantage of these favorable interest rates and terms, and the USDA would like to expand its involvement. This presentation will provide a detailed review of the USDA process, from initiation through construction, dispel confusion about the program, and discuss how drainage districts can realize significant cost savings.

9:45 - 10:30 AM Michigan Municipal Wetland Alliance: The Benefits of Making Compliance Cheaper

Deena Bosworth, Michigan Municipal Wetland Alliance; Stephen Shine, Michigan DNR

Get an overview of the public-private partnership between the Michigan Municipal Wetland Alliance and the state Department of Natural Resources. Learn how this program will enhance wildlife habitat, protect and preserve Michigan's water quality, and make wetland mitigation compliance less complicated, less expensive, and less time consuming for farmers, municipalities, and drain commissioners.

10:45 - 11:30 AM Tackling High Groundwater Problems: Sub-surface Drainage Discussion & Techniques

Brian J. Cenci, P.E., and Ryan C. McEnhill, P.E., Eng., Inc.
This presentation will discuss the ever increasing issue of high groundwater tables and sub-surface flooding that are facing drain offices. Dealing with high groundwater can be difficult because it's a "silent" problem; you can see surface flooding and you can see what land contributes to surface flooding, but not for most groundwater issues. The presentation will go through how to address this issue; from information to obtain when you start, considerations and tips for dealing with your residents, design techniques and even how to determine drainage districts. We will draw on our knowledge from several very successful projects in different counties and varying parts of the State that had high groundwater tables as the driving force for the petition

11:30 AM - 12:00 PM Drain Financing Primer: A Financial Advisor's Perspective

Paul Stauder, PFM Financial Advisors, LLC

This session will discuss the role of the Financial Advisor, when to hire them and what they can do to help finance drain projects successfully and avoid pitfalls along the way. Drain bond and note structures will be discussed along with tips on ways to get the best financing rates. The process for securing required State Qualified status annually will also be reviewed (you can't do bonds or notes without it!).

Register online at www.macdc.us

JEFFREY C. BOYD EARNS P.E.



Boyd

Eng., Inc. is pleased to announce that Jeffrey C. Boyd has earned his Professional Engineering License. Professional Engineers are required to earn a Bachelor Degree in Engineering, complete a minimum of four years of engineering work experience and pass two rigorous examinations.

Jeffrey C. Boyd, PE, is a Project Engineer with over five years of experience in the design and inspection of roadways, storm water management systems, sanitary sewers and water mains. Currently, Mr. Boyd is Project Engineer and Construction Inspector on the Groesbeck Drain project, for Ingham County Drain Commissioner, Pat Lindemann. Recently, Mr. Boyd was the lead inspector on back-to-back MACDC Innovation and Excellence Award winning drain projects (2017 North Shore Drain and 2016 Walker Drain, both for the Allegan County Drain Commissioner, Denise Medemar.)

Mr. Boyd earned a Bachelor of Science degree in Civil Engineering from Western Michigan University and is certified by the MDEQ as a Construction Site Storm Water Operator and in SESC Plan Review and Design.

“Jeff is definitely making an impact in the stormwater management community, but his skill set is very well rounded. He is a key member of our engineering team and continues to bring us excellence and innovation in his work,” said Gregory L. Minshall, PE, president of Eng., Inc. “We’re very proud of Jeff.”

F&V ADDS FIVE STAFFERS, FOUR TO BOOST EAST MICHIGAN SERVICES GROUP



Rose

Fleis & VandenBrink (F&V) continues to expand, adding five more staffers in Michigan.

Justin Rose, a civil engineer, and Ray Leppek, a CAD technician designer, have joined the Farmington Hills staff. Rob Behnke, a new marketing project manager in Grand Rapids, will be

heavily involved in new business development and cultivating existing client relationships in south and southeast Michigan.



Mitchell

Steve Mitchell is the firm’s new IT manager working out of Grand Rapids and Greg Diebolt, an engineering technician, joins the East Michigan Services Group in Midland.

“It is exciting to see our presence continue to expand in southeast Michigan,” said

Larry Fleis, PE, co-founder and president of F&V. “What is great about the recent additions is the experience they bring to our southeast Michigan engineering team.”

“Our East Michigan Group has tripled in the last four years.” Fleis added.

Rose has over 10 years of municipal experience, working on everything from surveying and inspection, to municipal and traffic engineering for both consultants and government agencies. One of Rose’s specialties is signal timing and signal design. His public and private experiences give him a unique perspective on how to attack problems and develop solutions. Rose received his bachelor’s degree in civil engineering from Wayne State University.



Leppek

Leppek has nearly 40 years of experience in civil engineer and land surveying, most recently with the Oakland County Road Commission.



Behnke

Behnke, the former Pennfield Charter Township supervisor, brings experience in resolving municipal issues and finding funding to complete infrastructure projects.

Behnke, who has also conducted over 900 seminars nationwide for a renowned benefits services company,

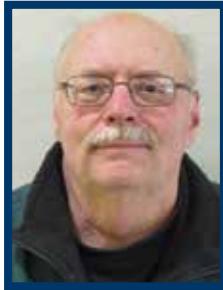
will also provide staff training for presentations and public relations support.

Mitchell has over 25 years of information technology experience working for businesses in the manufacturing, insurance, and retail service industries. He has a bachelor's degree in Business Administration from Cornerstone University.

He will oversee and manage information systems company-wide and coordinate needs in the network infrastructure as a result of the firm's continuing growing staff. He also manages and mentors staff responsive for various internal projects and helpdesk responses.

"Steve's experience in managing information systems for a large multi-location firm will be a real asset as he provides guidance for our rapidly growing systems," said Brian Rice, PE and principal.

Diebolt, who worked for the City of Bay City for 32 years as head of the construction department, completed millions of dollars of MDOT LAP for the City. He will be assisting the Midland office with inspection work and Stormwater Asset Management (SAW) field work.



Diebolt

JENNIFER L. JERMALOWICZ-JONES COMPLETES HER PhD



Jermalowicz-Jones

Jennifer L. Jermalowicz-Jones completed her PhD degree at Michigan State University with highest honors in Water Resource Development. The title of her dissertation was: "Evaluation of Riparian Community Capitals and their Relationship to Adaptive Management Outcomes".

During her attendance at MSU, Jennifer also obtained her Professional Watershed Manager Certification. Additionally, she received the prestigious Gilbert W. Mouser Fellowship in Environmental Education. Jennifer plans to stay at her company Restorative Lake Sciences and continue to work on lake restoration and management projects.

HUBBELL, ROTH & CLARK, INC. OPENS KALAMAZOO OFFICE

Hubbell, Roth & Clark, Inc. (HRC) has opened an office in Kalamazoo, the seventh location for the Bloomfield Hills-based civil engineering firm.

Located in Kingsedge Professional Office Park, 834 King Highway, the new office offers full-service civil engineering and provides services to municipal, industrial and private clients. The firm counts the Kalamazoo Road Commission and the City of Kalamazoo among its clients.

"The new Kalamazoo office is a significant step forward to the continued growth of our 102-year-old firm. As a member of the community, we will have the ability to better serve our clients," said Nancy Faught, HRC executive vice president.



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JULY 19 – 21, 2017

MACDC Annual Summer Conference
Crystal Mountain Resort, Thompsonville

AUGUST 22, 2017

Macatawa Area Coordinating Council
Green Infrastructure Seminar
Haworth Inn and Conference Center, Holland

SEPTEMBER 13 – 15, 2017

MML Convention
Holland

SEPTEMBER 24 – 26, 2017

MAC Annual Conference
Grand Hotel, Mackinac Island

To place your event on this calendar,
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A collage of nature photographs. The main image is a stream flowing through a wooded area with tall grasses. Three smaller inset photos show a stream with rocks, a pond surrounded by trees, and a gravel road. The text 'Engineering. Environment. Excellence.' is overlaid on the right side of the collage.

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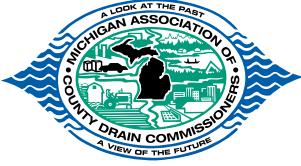
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