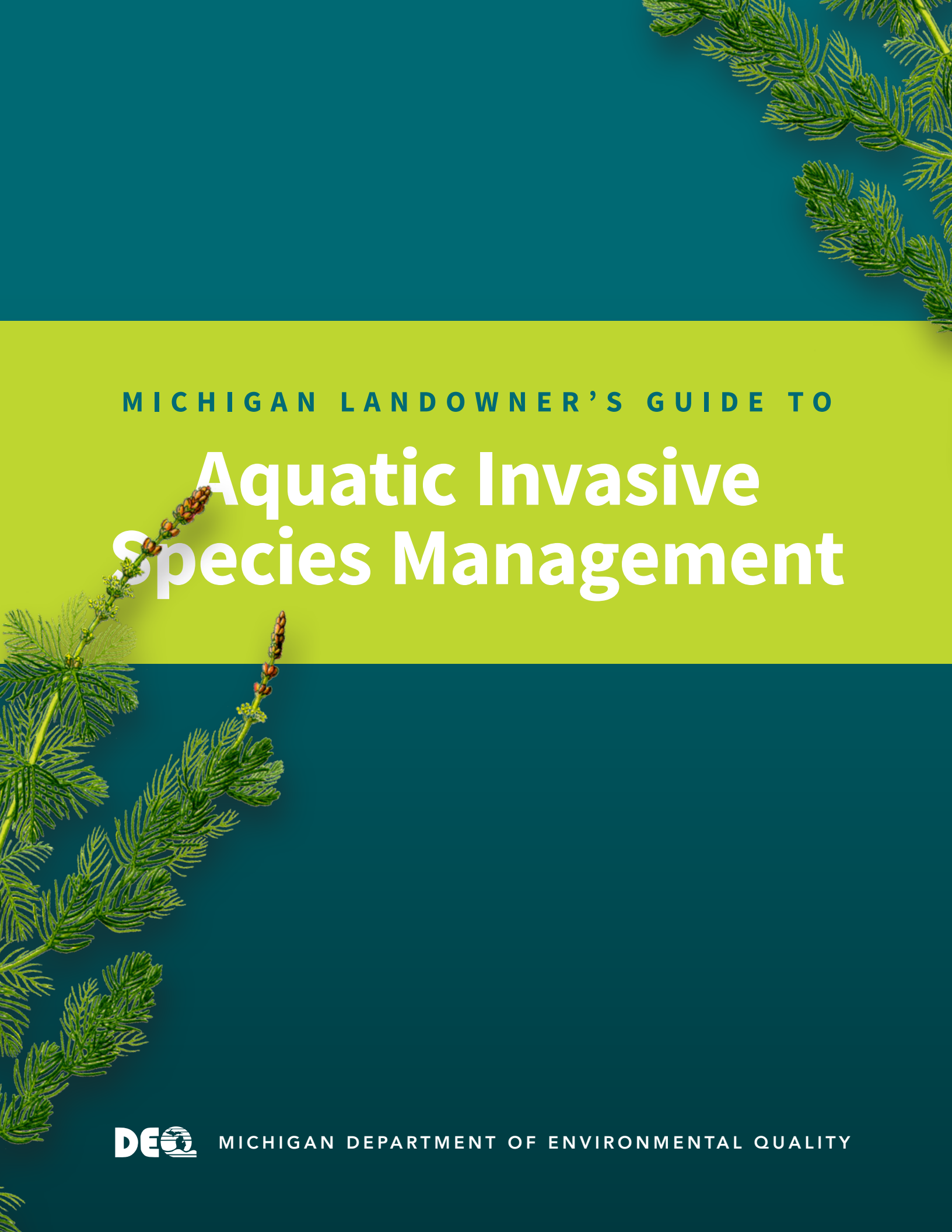
MICHIGAN LANDOWNER'S GUIDE TO

Aquatic Invasive Species Management



MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

For more information, visit *www.michigan.gov/invasives*

Environmental Assistance Center: 800-662-9278

An Introduction to this Guide

This guide is designed to help Michigan property owners and managers identify, report, prevent and control aquatic invasive species (AIS). For the most up to date information about invasive species in Michigan, visit *www.michigan.gov/invasives.*

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AIS in Michigan

A number of invasive aquatic plants and animals have already made their way to Michigan's waterways. Some, such as Eurasian watermilfoil and rusty crayfish, are considered established in Michigan, while others are in the early stages of introduction. Michigan's invasive species website, *www.michigan.gov/invasives*, provides identification information for invasive species of concern in the state, whether established, emerging or species with a high probability to become invasive if they reach Michigan.

An invasive species is one that is not native and whose introduction causes harm, or is likely to cause harm to Michigan's economy, environment or human health. Most non-native species are not harmful, and some provide economic benefits. Many non-native species in Michigan, including multiple salmon species, fruits, vegetables, field crops, livestock and domestic animals, are important to our economy and lifestyle. Invasive species cause harm when they out-compete native species by reproducing and spreading rapidly in areas where they have no natural predators and change the balance of the ecosystems. Aquatic invasive species can clog waterways, limit access to lakes and rivers for recreation, negatively impact native species by altering habitat and reducing food and shelter resources. When invasive species infest an area, it may require management, such as invasive weed control or cleaning of water intakes, boat hulls and docks.

The invasion curve (Figure 1) illustrates how both the size of an infestation and the cost to control it increase over time. There is typically only a brief window of time available for successful eradication if initial prevention fails. Prevention should remain a priority for invasive species management because control costs quickly escalate once an invasive species becomes established. In other words, preventing invasive species from being introduced is the most cost-effective approach, which is why it is a top priority for invasive species management.

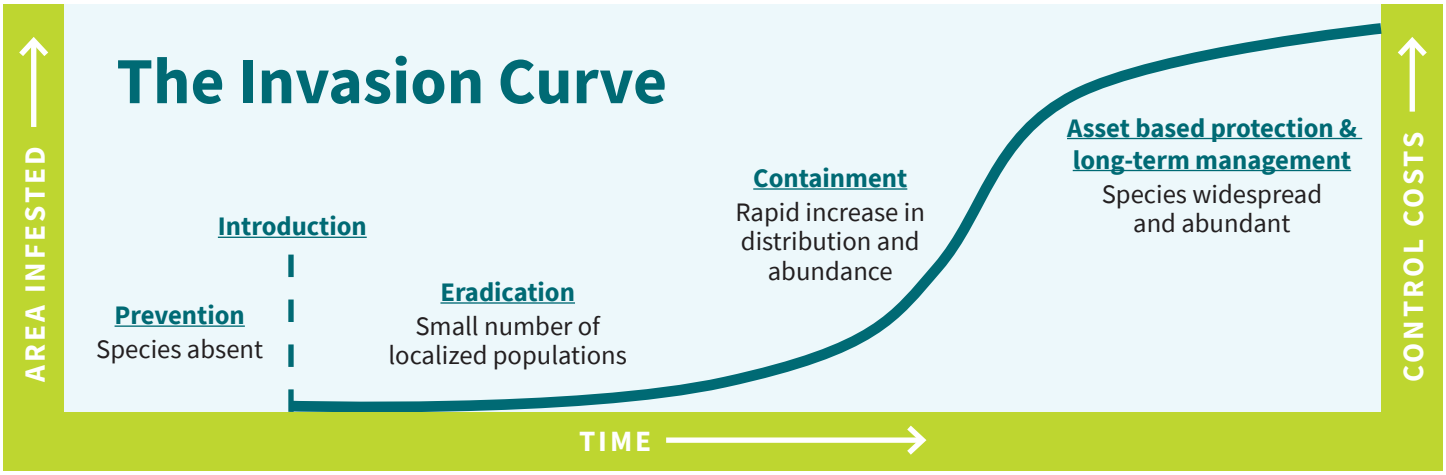


Figure 1. The invasion curve

Michigan's **Aquatic Invasive Species State Management Plan** addresses the following four goals, all of which are related to the contents of this guide:

Goal I: Prevent new introductions of AIS into Michigan waters.

Goal II: Limit the dispersal of established populations of AIS throughout Michigan waters.

Goal III: Develop a statewide interagency early detection and rapid response program to address new invasions of AIS.

Goal IV: Manage and control AIS to minimize the harmful environmental, economic, and public health effects resulting from established populations.

View the entire management plan at *www.michigan.gov/invasives* by clicking on the "Control & Management" tab.

Michigan's Invasive Species Watch List

Invasive species on Michigan's Invasive Species Watch List are priority species that have been identified as posing an immediate or potential threat to Michigan's economy, environment, or human health. These species either have never been confirmed in the wild in Michigan or have a limited known distribution. Early detection and timely reporting of occurrences of these species is crucial for increasing the likelihood of preventing establishment and limiting negative impacts.

Prohibited and Restricted Species

Certain species are regulated under Michigan's Natural Resources and Environmental Protection Act (Part 413 of Act 451). If a species is prohibited or restricted, it is unlawful to possess, introduce, import, sell or offer that species for sale as a live organism, except under certain circumstances. The term "prohibited" is used for species that are not widely distributed in the state. Often, management and control techniques for prohibited species are not available. The term "restricted" is applied to species that are established in the state. Management and control practices are usually available for restricted species.

Reporting and Identification Resources

Proper identification and reporting of an invasive species can be critical for timely responses to Watch List occurrences and appropriate management and control options for other invasive species.

- Visit *www.michigan.gov/invasives* and click on "Species Profiles & Reporting Information" to learn key characteristics for priority invasive species in Michigan.
- The Midwest Invasive Species Information Network (*www.misin.msu.edu*) also has excellent identification resources, including a smartphone application.

Figure 2: Example of AIS Signage for a Boat Launch

Prevention

Once an invasive species becomes widely distributed in an ecosystem, eradication becomes nearly impossible and long-term control may be warranted. Millions of dollars are spent statewide each year to manage the impacts of aquatic invasive plants alone. Therefore, preventing new introductions is the most economical approach for invasive species management. Prevention is the first goal of Michigan's Aquatic Invasive Species State Management Plan (DEQ, 2013). To prevent and limit the dispersal of AIS, the following actions are recommended:

- Raising awareness of the importance of preventing AIS spread by removing plants, mud, and any other debris from boats, trailers, and gear prior to leaving or entering a waterbody.
- Increasing monitoring and reporting of existing AIS populations to inform prevention efforts.
- Coordinating and collaborating among multiple partners at local and regional levels.
- Encouraging research and development of new techniques for monitoring and preventing the spread of AIS.

A number of resources exist to help landowners and managers prevent the introduction and spread of AIS. Some examples include:

- Installing AIS prevention signage at public access points such as boat launches, beaches, and piers. See Figure 2 (on page 2) for an example.
- Implementing education and outreach campaigns in your local area. See Appendix A for resources.
- Following decontamination procedures for field equipment and vehicles for anyone who works, plays, or volunteers in lakes, streams, or wetlands. View details and an online decontamination training module at *www.michigan.gov/invasives*. Follow the "Take Action" tab to "Aquatic Professionals, Researchers, and Volunteers".

Monitoring

At its core, monitoring is gathering information to answer a question. A number of AIS related questions can be answered by conducting the correct type of monitoring, including:

- *Are AIS present at a location?*
- *If AIS are present, how widespread and abundant are they?*
- *Are management efforts effectively controlling the AIS population(s)?*

The information provided by monitoring can be used to develop achievable management objectives, inform management decisions, and can be an important component in preventing AIS spread.

AIS monitoring falls into two main categories: 1) Early detection; and 2) Determining changes in the population.

Volunteers monitoring their lake for aquatic invasive species.

EARLY DETECTION

Finding AIS before they become established or widespread is commonly referred to as early detection. Detecting AIS early in the invasion can reduce their spread if paired with timely management action. In the early stages of invasion, a species generally has limited distribution and/or low density, which means control efforts and cost are generally lower than for an established infestation. Eradicating AIS may also be possible if detected early and effective control options are available. The goal of early detection monitoring is to find a target species as soon as it has been introduced. There are several important considerations when developing and executing an early detection monitoring plan:

1. **Decide on the target species.** Early detection means that the selected species are not known to be at the location. It may be most effective to monitor for multiple species at a time. In fact, it may be possible to incorporate early detection monitoring into existing monitoring efforts.
2. **Choose who will perform the monitoring.** Depending on the scale of the monitoring and the target species this could be the property owner, volunteers, or hired professionals. Regardless of who performs the monitoring, be sure they correctly identify the target species.
3. **Determine the monitoring method(s) to use.** Frequency and timing of monitoring should be based on the target species. Early detection monitoring should be conducted annually at a minimum. If hiring a professional, they may have an established method they use. If volunteer monitoring is selected, joining an established statewide or regional effort such as the Cooperative Lakes Monitoring Program's Exotic Aquatic Plant Watch (EAPW) is recommended. To learn more and get a copy of the EAPW monitoring procedures, visit *micorps.net/lake-monitoring/clmp.documents.*
4. **Be sure to record non-detect data.** Documenting where monitoring has occurred in the past, even if target species are not found, can be used to inform future monitoring efforts.
5. **Be prepared to respond if AIS are found.** Having a response plan prepared can help to ensure a cohesive, timely, and efficient response.

DETERMINING AIS POPULATION CHANGES

Having accurate, reliable data on the location and density of AIS is critical for making management decisions. This information is best determined by observing current conditions via monitoring. Comparing monitoring results over time can provide information on whether an AIS population is increasing or decreasing. When AIS are initially found at a location this information can be used to inform initial management actions. Monitoring throughout the season can help determine if control efforts are being effective. AIS management and the necessary monitoring program are often long-term endeavors.

Monitoring population changes requires more effort than early detection monitoring. While both require surveying all areas where the target species may be present, determining population changes also requires collecting data on the spatial extent and relative density of the target species over time. The information collected should be based on specific measurements rather than perceptions or opinions. It is also important to ensure monitoring is done in a way that is repeatable. This allows for easy comparison between past, present, and future data. Examples of sampling protocols are available online from numerous organizations including the Michigan Clean Water Corps *(www.micorps.net),* Maine's Volunteer Lake Monitoring Program *(www.mainevlmp.org/wp-content/uploads/2014/03/MMI-Citizens-Guide-For-Web.pdf)*, and Michigan Department of Environmental Quality's Aquatic Nuisance Control Program *(www.michigan.gov/documents/deq/wrd-illm-surveyprocedure_445615_7.pdf)*.

Management and Control

If left unchecked AIS may become abundant and dominate suitable habitat. Starry stonewort, an invasive alga, is an example of a species that can form extensive mats on the bottom of a lake. To keep AIS from taking over, some form of control may be required. Once an AIS is widely distributed in a waterbody, it is nearly impossible to completely eradicate it, which is why prevention is the most cost-effective way to manage AIS.

Knowing where and how an invasive species was introduced to a property may help stop reintroduction after management has occurred. Understanding sources and pathways of spread can make the difference between continual maintenance and successful local eradication.

Starry stonewort growing in an inland Michigan lake.

A primary consideration in any invasive species management and control plan is determining costs and funding sources. Management and control of invasive species at the local level is often funded through private funds, local municipalities and units of government or through grants. Management funds can also be raised through special assessment taxes, which are funds collected by a taxing authority assessed against real estate parcels for public projects such as invasive species control.

CHEMICAL CONTROL

Research over the past two decades has greatly improved the chemical management of invasive species, specifically in species selectivity and a reduction of chemical use rates. There are often two types of herbicides in use for aquatic invasive plant control: systemic and contact. Systemic herbicides are absorbed through the leaves, which negatively affect the plant's vascular tissue. Systemic herbicides are transported throughout the plant and can kill the entire plant, including the roots. Contact herbicides kill only the plant tissues exposed to the chemical. Herbicides can also be either selective or nonselective. Nonselective herbicides can impact nontarget species, while selective herbicides target specific species without harming desirable species. Two common lawn and garden herbicides are good examples of target selectivity. Glyphosate (the active ingredient in Roundup™) is nonselective, while 2,4-D (commonly found in "weed and feed" products) is selective because it can kill broad-leafed nuisance weeds without harming the turf grass.

Applying herbicide to a lake to control aquatic vegetation.

In Michigan, an Aquatic Nuisance Control Permit is typically required for chemical treatment of surface waters pursuant to Part 33, Aquatic Nuisance Control, of the NREPA. Chemical control options for aquatic invasive plants in Michigan must be approved for aquatic use. For current chemical control options and permit information, visit the ANC webpage at *www.michigan.gov/anc.*

There are some challenges regarding herbicide treatment of aquatic invasive plants. Chemical control is usually at the cost of the landowner or lake association and may need to be repeated every 1-3 years for systemic herbicides (due to seed reproduction and growth and spread of any plants not treated earlier) and multiple times in a single season for contact herbicides. Over time, this can be a costly form of management, and repeated applications using similar treatments could potentially induce a strain of chemically resistant plants.

PHYSICAL CONTROL

Physical control refers to either manually removing biomass from a lake or altering the lake environment so that the habitat is less suitable for plant growth. Examples include hand raking, weed harvesting boats, and lowering lake water levels. Most physical control options are time-consuming and labor-intensive, need to be repeated during the growing season, and removal is often not species-specific which means other native plant species may be unintentionally removed along with the target invasive species. The removal of native plant species can have negative impacts to the lake ecosystem, as these native species provide food and important habitat for fish, invertebrates, and other wildlife.

Divers deploying a natural fiber benthic barrier.

Harvesting is a relatively common method using large boats equipped with cutting blades to mechanically cut and collect the plant material. Once collected, the plants are offloaded to shore. This method provides some flexibility on the timing of control and provides immediate results. However, mechanical harvesting is not selective and may damage native plants that provide valuable fish and wildlife habitat and food sources. Furthermore, removal of the upper portion of the plant is only effective in the short-term. Over time, harvesting can exacerbate the problem if any plant fragments are dropped during the process because some invasive plants can spread via fragments.

Some aquatic invasive plants may be removed by hand using a method called diver assisted suction harvesting (DASH) where SCUBA divers hand pull plants from the lake bottom and a boat with a vacuum-like pump collects the plants. The DASH method can work in areas of early infestation as well as around structures such as docks or piers and is moderately selective; however, this method is highly labor-intensive, requires specialized plant identification skills, and can increase turbidity in a waterbody.

Waterbodies that have a dam, augmentation well, or other control structure used to regulate the lake levels may consider water level manipulation an option for AIS management. This is achieved by lowering the water level for the winter, which exposes the lake bottom and kills some AIS by drying and freezing. However, there are negative effects of using this method, as manipulation of water levels affects all fish, wildlife, and vegetation in the system. In addition, some invasive species such as EWM are capable of surviving in deeper waters than most native aquatic plants, which means that lowering water levels could result in a disproportional negative impact on the shallow growing native plant species.

Lastly, benthic barriers refer to the placement of natural or synthetic materials on the lake bottom to shade out plants. Traditional benthic barriers are impermeable mats made of synthetic materials (e.g., plastic sheets). Benthic barriers have been shown to be effective in reducing some aquatic invasive plant biomass over several seasons; however, this method is neither permanent nor species-specific. Benthic barriers can degrade or eliminate important shallow habitat areas and food sources; can inhibit the movement, spawning, nesting, and rearing of native species; may encourage macroalgae growth (e.g., invasive starry stonewort, *Nitellopsis obtusa*); and may require significant maintenance. However, benthic barriers may be appropriate for small infestations or in areas where they will have minimal negative impacts (e.g., around docks). More recently, natural fiber benthic barriers, which degrade over time, have been deployed to test in several lakes. Natural fiber benthic barriers are gas permeable and may provide an opportunity to control aquatic invasive plants, reduce the maintenance needs, and allow for native plant recolonization.

Disposal of Aquatic Invasive Species Plant Materials

If your management actions involve physically removing the target species it is important to properly dispose of the materials being removed. Some invasive plant species can regenerate from small fragments, produce copious seeds, or survive fire. Failure to properly dispose of your management spoils could result in the target species being spread to a new location. Proper disposal minimizes the risk of spread and helps prevent the reestablishment of the invasive species after management. The proper method for disposal of invasive species varies by the type of plant species and when in the plant's life cycle it was collected. For general guidance on invasive plant disposal check out Michigan Citizen's Guide to Invasive Plant Disposal at *www.michigan.gov/invasives* by clicking the "Control & Management" tab.

BIOLOGICAL CONTROL

Biological approaches to aquatic invasive species management, while limited to only a few target species, offer a unique suppression option, particularly because when used appropriately they minimize or avoid altogether the negative impacts to native plant species. Many organisms, including weevils, fungi, moths, carp and midges, have been tested for potential EWM biocontrol, and some have shown promise. For example, the native milfoil weevil (Euhrychiopsis lecontei) has shown preference for EWM as food compared to the native Northern watermilfoil, so nontarget impacts are uncommon. The main drawback to biological control is that it is not a quick fix, but rather a long-term and sometimes continual effort with varying effectiveness. Michigan does not currently regulate activities regarding movement of the native milfoil weevils. However, there is currently no commercial source for weevils in Michigan, which limits the use of this technique throughout the state.

The use of biological controls and pesticides is regulated under Part 31 of the NREPA and the National Pollutant Discharge Elimination System (NPDES) Pesticide program. However, a permit is not required from the State of Michigan for certain methods of biological control, such as the introduction of Galerucella beetles for purple loosestrife control, but the introduction of banned species (e.g., grass carp) to control plant growth is illegal in the State of Michigan. Contact your local Michigan Department of Natural Resources (MDNR) office for further information.

INDIRECT CONTROL

The maintenance and restoration of a native plant community may improve aquatic invasive species management and control efforts. Native aquatic vegetation is an integral component to a healthy ecosystem in many lakes. Native plants provide diverse habitat to aquatic insects, mollusks, crustaceans, larval and adult fish, and wildlife. Lakes with a healthy native vegetation community are less likely to experience algal blooms, and native plants compete directly with invasives for space, nutrients, and light, thereby helping to slow their establishment, growth, and spread within a lake. Native plant restoration is often overlooked when management and control efforts are planned or conducted but when included, it may improve success.

Natural vegetation zones along the shoreline may also slow aquatic invasive plant growth. Inputs of sediment and nutrients, in particular phosphorus, result in increased aquatic plant growth, including invasive plants. Natural vegetation buffers around a lake can intercept and uptake excess nutrients from farming and lawn fertilizers. In addition, native vegetation provides shoreline stabilization, thereby preventing or limiting erosion.

Michigan Natural Shoreline Partnership

The Michigan Natural Shoreline Partnership's (MNSP) mission is to protect Michigan lakes through conservation and restoration of natural shorelines. The MNSP offers information on how to protect your lakefront property through healthy shoreline erosion protection and landscaping. On the MNSP website you can find a list of contractors that have gone through the Certified Natural Shoreline Professional Training. You can also find a list of recommended native plants to help you find the right plant for the right place, whether it is wet, dry, sunny or shady. The MNSP also offers the MI Shoreland Stewards Program (*www.mishorelandstewards.org)* to recognize property owners who are practicing good stewardship of their lakefront property. While not focused specifically on AIS, the resources offered through MNSP can be an important part of preventing and managing invasive species on waterfront property. To learn more, visit the MNSP website at *www.mishorelinepartnership.org*.

A combination of laminar flow, sometimes referred to as lake aeration, and bacterial augmentation has been suggested as a management option for EWM control. Several principles have been put forward as to how aeration of the bottom sediments, in concert with the addition of bacteria and enzymes, can result in EWM population reduction. The general concept is that increasing the aerobic bacterial activity will reduce nutrient rich sediments and slow EWM growth. However, there are concerns that this method has the potential to have detrimental impacts to native vegetation, fish and wildlife habitat, and overall stability of the lake ecosystem. There are no known peer reviewed studies that corroborate the mechanism behind or the efficacy of this method for controlling higher plants or address the impacts of this technique. Anecdotal evidence from lakes where this has been done range from successful reduction of EWM to increases in EWM. A study found cyanobacteria levels were reduced in a hypereutrophic Florida lake following aeration. However, the same study observed a significant decline in zooplankton populations (an important food source for fish) after aeration began. More information on the efficacy and impacts of laminar flow and bacterial augmentation are warranted and further research is needed.

Management and Control Resources

STATUS AND STRATEGIES FOR ESTABLISHED AIS IN MICHIGAN

AIS established in the environment continue to negatively impact Michigan's waters and economy. The zebra and quagga mussel invasions of the Great Lakes basin serve as primary examples of the significant negative effects AIS can have on water quality and aquatic ecosystems in general. Goal IV of Michigan's AIS State Management Plan is to "Manage and control AIS to minimize the harmful environmental, economic, and public health effects resulting from established populations;" however, management and control plans for specific established AIS in Michigan are often lacking. In 2013, the DEQ's Water Resources Division (WRD) was awarded a United States Environmental Protection Agency (USEPA) 205(j) grant to address this information gap by:

1. Summarizing the current level of understanding on the biology and ecology of key established AIS in Michigan.
2. Summarizing current management options for established AIS in Michigan.
3. Identifying possible future directions of AIS management in Michigan.

The three outcomes above are compiled for the following 16 species in online documents:

- Flowering Rush (Butomus umbellatus)
- Spiny water flea (Bythotrephes longimanus)
- Carolina Fanwort (Cabomba caroliniana)
- Fishhook water flea (Cercopagis pengoi)
- Asiatic clam (Corbicula fluminea)
- Grass carp (Ctenopharyngodon idella)
- Zebra and Quagga mussels (Dreissenid sp.)
- Glossy buckthorn (Frangula alnus)
- Eurasian ruffe (Gymnocephalus cernua)
- European Frogbit (Hydrocharis morsus ranae)
- Round goby (Neogobius melanostomus)
- Starry stonewort (Nitellopsis obtusa)
- Rusty crayfish (Orconectes rusticus)
- Curly leaf pondweed (Potamogeton crispus)
- New Zealand mud snail (Potamopyrgus antipodarum)
- Eurasian watermilfoil (Myriophyllum spicatum)

To view the status and strategies documents for each of the above species, visit *www.michigan.gov/invasives* and click on the "Management & Control" tab.

Phragmites Adaptive Management Framework

The Phragmites Adaptive Management Framework (PAMF) is a collaborative effort to develop an adaptive management strategy for invasive Phragmites. PAMF is focused on approaches that maximize effectiveness and efficiency of Phragmites management through three areas: a monitoring protocol, a model that predicts how Phragmites will respond to different management alternatives, and a central database with an associated web hub where the results from all management efforts are reported. While PAMF is specific to invasive Phragmites, the concepts involved may be useful for management of other invasive species. To learn more, visit the PAMF website at *www.greatlakesphragmites.net/pamf*.

Invasive Phragmites growing along a shoreline.

A treated stand of invasive Phragmites.

Permitting

BACKGROUND

The State of Michigan requires landowners planning to conduct certain activities in Michigan's regulated waterbodies to apply for and receive a permit from the Department of Environmental Quality (DEQ) before beginning the activity. The reason behind this is a concept called The Public Trust. The nature of Public Trust is that certain natural resources are of such importance to the public, such as air and water quality, that it is the perpetual duty of the state to preserve and protect these natural resources against pollution, impairment, and destruction. The Public Trust is written into the Michigan Constitution and is referenced in various state statutes; it is the state's duty to enforce the Public Trust. The state cannot abdicate control over property in which the whole people have an interest to leave them entirely under the control of private parties. Therefore, the Public Trust is still applicable on private waterbodies, even those held by a single owner. The Public Trust Doctrine provides the state authority to manage and protect the public's rights to use and enjoy Michigan's natural resources.

Riparian rights are the rights that are associated with the ownership of the bank or shore of an inland lake or stream, or along Great Lakes shorelines. Riparian rights can include the right to access navigable waters, dockage, usage of the water for general purposes (e.g., swimming, lawn watering, domestic use), and title to natural accretions (such as an increase of upland area due to deposition). The ordinary high-water mark (OHWM) is a line defining the boundary between upland and bottomland. This line is established by professionals using shoreline characteristics where the long-term presence of water leaves a distinct impression.

The bottomlands (areas below OHWM) of natural inland lakes and streams are owned by the riparian property owners. Uses of bottomlands by the riparian property owner are limited to their stated riparian rights (access, dockage, and water use). However, these rights are subject to the Public Trust, and it is the duty of the state to protect them from pollution, impairment, and destruction for the purposes of fish, wildlife, and fishing. Although the bottomlands of Michigan's inland lakes and streams are largely privately owned, the water, fish, wildlife, etc. are owned by the people of the State of Michigan and are managed and regulated by the state. Great Lakes riparian lands and bottomlands are regulated differently than inland lakes and streams. Great Lakes bottomlands are held in trust by the State of Michigan for the use and enjoyment of the public. The State of Michigan, as the owner and trustee, has a perpetual responsibility to the public to manage Great Lakes bottomlands and waters to protect Michigan's natural resources from degradation and to maintain the public's rights of hunting, fishing, navigation, commerce, etc. Michigan courts have determined that the Public Trust Doctrine includes areas from the water's edge to the OHWM on Great Lakes shorelands.

GENERAL PERMITTING INFORMATION AND REGULATORY AUTHORITY

The Natural Resources and Environmental Protection Act, 1994 PA 451 (NREPA) protects the environment and natural resources of Michigan by regulating discharges into the environment and the use and development of certain lands and waters. The NREPA also protects peoples' right to hunt, fish, and use Michigan's natural resources. There are numerous sections (referred to as Parts) to NREPA that apply to aquatic ecosystems (See table on page 9).

Decisions on permit applications regarding inland lakes and streams, Great Lakes shorelines, wetland, and aquatic nuisance control permit applications are based on the DEQ's review of the proposed project in light of the criteria in Part 301, Part 325, Part 303, Part 31, and Part 33 and the associated administrative rules. The applicant must show the project will not adversely affect the Public Trust, riparian rights, and aquatic resources.

JOINT PERMIT APPLICATION

The DEQ/USACE Joint Permit Application (JPA) covers the permit requirements from both state and federal regulations for projects involving inland lakes and streams, Great Lakes shoreline, wetlands, floodplains, and many other areas. The JPA should be submitted through MiWaters (*www.mi.gov/miwaters*), Michigan's online permitting website. Parts 301, 303, 325, and 33 have General Permit Categories (GP) and Parts 301 and 303 have Minor Project Categories (MP) under the JPA. GPs and MPs define types of regulated activities that would be expected to cause no more than minimal impacts (GP), or have only minor impacts (MP) that can, therefore, be reviewed through an expedited permit application process. Projects that fail to meet the requirements of an MP or GP category, may be permitted on an individual basis.

Target habitat	Activities	NREPA Part
All surface waters of the state	Chemical control of nuisance aquatic plants, algae, and snails associated with swimmer's itch	33 and 31*
	Licensing for persons applying pesticides	83 and 31*
	Prohibited and restricted species	413
Inland lakes and streams	Dredging, filling, constructing or placement of a structure on bottomlands Removal of shoreline vegetation may also be regulated	301
Great Lakes shoreline and submerged lands	Removal of shoreline vegetation may also be regulated	323 and 325
Wetlands	Placing fill, dredging, constructing or developing, and draining of wetlands	303

**large-scale applications of pesticides directly to, near, or over surface waters of the State may also be regulated by National Pollutant Discharge Elimination System (NPDES) permits.*

PERMITS FOR PHYSICAL CONTROL BELOW OHWM

A permit is not required from the DEQ under Part 301, Section 30103(o) to remove plants below the OHWM of inland lakes and streams that are of an aquatic nuisance as defined in Part 33, Section 3301(b), as long as the removal is accomplished by hand-pulling without using a powered or mechanized tool. This exemption also requires all plant fragments to be removed and properly disposed of on land above the OHWM. Large-scale removal of plants using mechanized tools, benthic mats, weed rollers, lake draw-down, or any implement that disturbs the lake-bottom sediments requires a permit. Hand removal of aquatic invasive vegetation that is assisted by a suction tool for removal or transport of the plant material (Diver Assisted Suction Harvesting (DASH)) requires a permit under Part 301. A DASH permit under Part 301 is categorized in both MP and GP categories and is reviewed through an expedited permitting process. A permit is not required for hand-raking of lake bottomlands by the riparian owner or a person authorized by the riparian owner if the raked areas are unvegetated before raking and predominately composed of sand or pebbles. The raking shall be performed without using a powered or mechanized tool. Disposal of harvested material within inland lakes and streams, on Great Lakes bottomlands, or in wetlands is not allowed without prior written approval from the DEQ.

PHYSICAL CONTROL PERMITTING BETWEEN OHWM AND WATER'S EDGE

A permit is not required under Part 303 for the removal of vegetation in an area of unconsolidated material predominately composed of sand, rock, or pebbles that is located between the ordinary high-water mark and the water's edge, however these plants must be an "aquatic nuisance" as defined in Part 33, Section 3301. Mowing of vegetation between the ordinary high-water mark and the water's edge is also not subject to regulation under Part 303. These two exemptions do not apply to the St. Clair River flats. However, there is a GP under Part 303 for mowing of invasive species in the St. Clair Flats. Any other activities involving filling, constructing, operating equipment, developing, draining, or removing wetland soil or vegetation requires a permit. The removal of native shoreline vegetation is not recommended, as native vegetation provides protection against erosion and pollution, in addition to providing habitat for fish and wildlife.

GENERAL PESTICIDE USE UNDER PART 83 OF THE NREPA

The Michigan Department of Agriculture and Rural Development (MDARD) is the regulatory authority overseeing all pesticide use in the State of Michigan. Part 8313 requires that commercial applicators of pesticides that hold themselves out to the public as being in the business of applying pesticides shall obtain a commercial applicator license for each place of business. A person shall not apply a pesticide for a commercial purpose or in the course of his or her employment unless that person is either a certified applicator or a registered applicator. MDARD offers an examination to become a Certified Pesticide Applicator. The Pesticide Applicator Certification/Registration Application must be completed and submitted along with the application fee. The Category 5 – Aquatic Pest Management certification will certify applicators who use pesticides which are applied to lakes, ponds, streams, marshes, or ditches and tributaries which flow into them or which are applied to surfaces that contact such bodies of water to manage aquatic pests. This category does not include applicators who engage in mosquito management.

AQUATIC NUISANCE CONTROL

Chemical control of nuisance aquatic plants, algae, and the snails associated with swimmer's itch is typically a regulated activity that requires a permit from the DEQ's Aquatic Nuisance Control (ANC) Program, particularly when targeting species in inland lakes, ponds, streams, wetlands, road-side ditches, etc., where water is visibly present in the impacted area at the time of treatment. For shoreline areas along the Great Lakes or Lake St. Clair, a permit is required for all treatments below the OHWM, regardless of whether water is visibly present in the area of impact at the time of treatment.

A permit is not required for inland areas where water is not visibly present in the impacted area at the time of treatment. In addition, Part 33 grants authority to a bottomlands owner to chemically treat aquatic nuisances in a waterbody without issuance of a permit by DEQ if the waterbody meets all of the following criteria:

- No outlet from the waterbody
- No record of state or federal endangered or threatened species, pursuant to Part 365 of 1994 PA 451
- Surface area less than 10 acres
- Bottomlands are owned by either one person, or more than one person and written permission is obtained from each property owner
- The person posts the area of impact with notification signs in the manner provided in Section 324.3310(d) of the NREPA
- The person conducting the chemical treatment maintains any required written permissions and records of treatment, including treatment date, chemicals applied, amounts applied, and a map indicating the area of impact, for 1 year from the date of each chemical treatment. The records shall be made available to the department upon request.

Refer to the table on the opposite page to determine if you need an ANC permit to chemically treat aquatic nuisance vegetation and/or algae.

To determine if a proposed chemical treatment requires a permit, or for additional information regarding chemical control of aquatic nuisance plants, algae, and/or the snails associated with swimmer's itch, please contact the DEQ's Aquatic Nuisance Control (ANC) Program at DEQ, Water Resources Division, P.O. Box 30458, Lansing, Michigan 48909-7958; 517-284-5593; *deq-wrd-anc@michigan.gov*; or *www.michigan.gov/anc*.

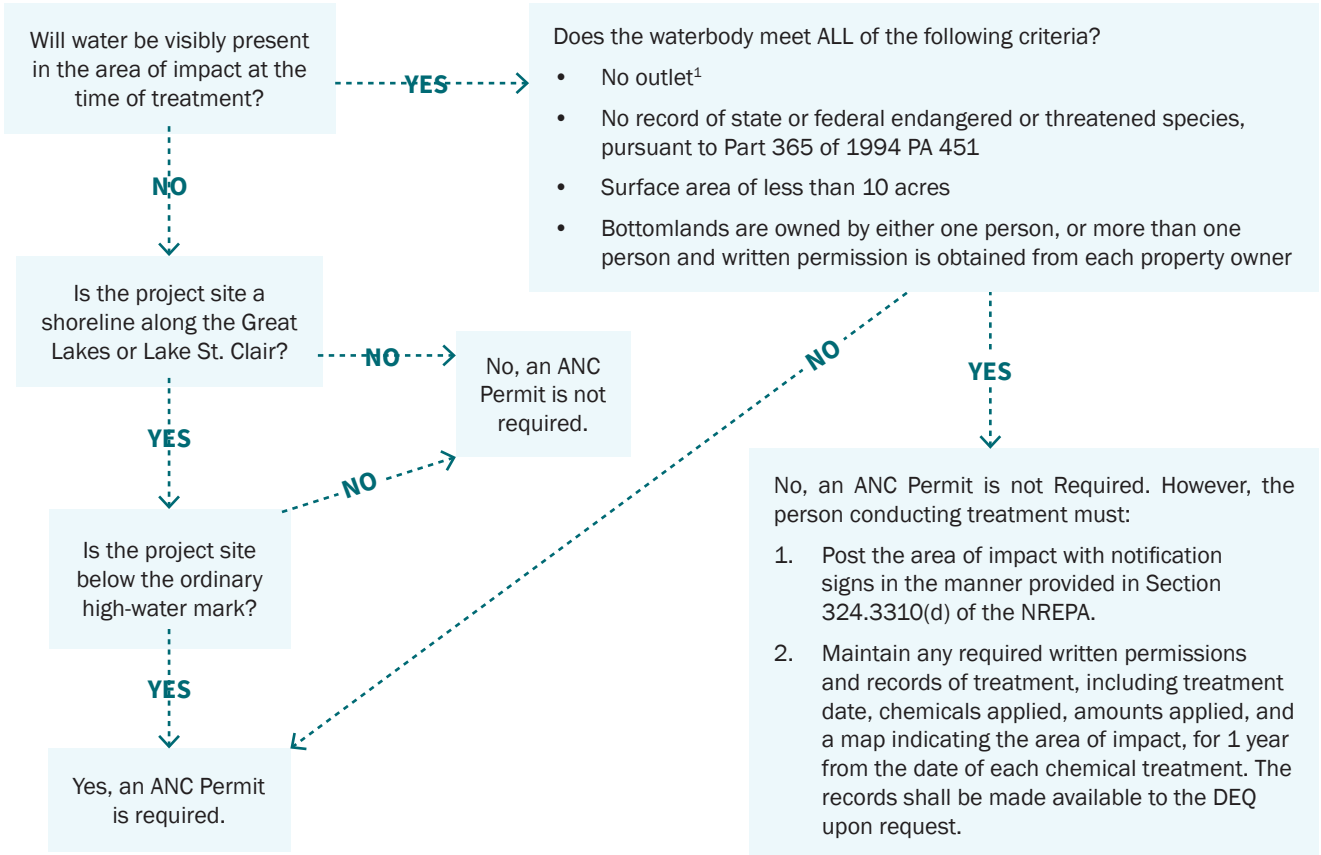
LARGE-SCALE PESTICIDE USE UNDER THE NPDES AND PART 31 OF THE NREPA

The DEQ is the regulatory authority which oversees the large-scale application of pesticides directly to, near, or over surface waters of the state. An NPDES Pesticide discharge permit is required for any applicator or entity, such as a lake management association, who applies pesticides to 80 acres or more of surface water in a calendar year. Also, a NPDES Pesticide discharge permit is required for any applicator who applies pesticides to 20 linear miles or more of shoreline and/or streambank in a calendar year. These threshold conditions for a NPDES Pesticide discharge permit are cumulative throughout a calendar year. Applicators who hold themselves out to the public as being in the business of applying pesticides shall obtain a NPDES Pesticide discharge permit if the above conditions are met in one calendar year. Additional information regarding the large-scale use and discharge of pesticides may be found at the DEQ Pesticide Control website.

BIOLOGICAL CONTROL

The use of biological pesticides is regulated under Part 31 of the NREPA and the NPDES Pesticide program. A permit is not required from the State of Michigan for certain methods of biological control, such as the introduction of Galerucella beetles for purple loosestrife control. However, the introduction of banned species (e.g., grass carp) to control plant growth is illegal in the State of Michigan. Contact your local Michigan Department of Natural Resources (MDNR) office for further information.

Do I need coverage under an Aquatic Nuisance Control (ANC) Permit to chemically treatment aquatic nuisance vegetation and/or algae?



Need Assistance? Contact Us.

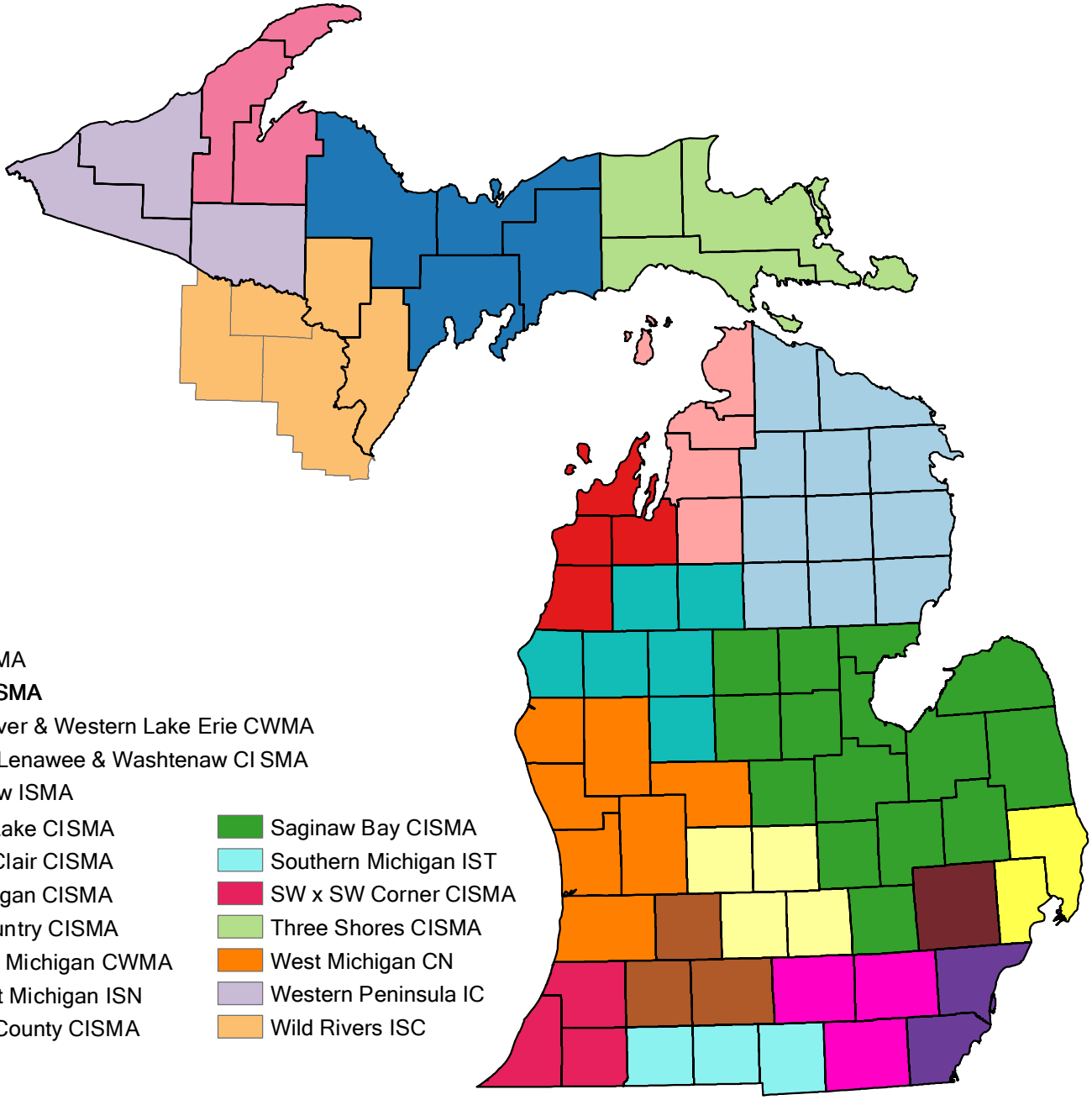
ANC staff members welcome any questions you may have. You may contact staff members by e-mail at *deq-wrd-anc@michigan.gov* or by telephone at 517-284-5593.

[1]*"Outlet" means any natural or artificially created watercourse or structure which allows passage of water out of a waterbody into other surface waters of the state, in an intermittent or continuous flow.*

Local AIS Resources and Expertise

COOPERATIVE INVASIVE SPECIES MANAGEMENT AREAS

Cooperative invasive species management areas, or CISMAs, are partnerships of local organizations, agencies, and businesses concerned about invasive species issues in their local region. CISMAs work across boundaries, sharing resources and expertise to effectively manage invasive species. If you have an invasive species on your property or want to learn more about invasive species issue in your area, your local CISMA can help. CISMAs offer a variety of resources that may include educational materials, training, species identification, reporting, treatment assistance, and local invasive species expertise. Find a CISMA near you at www.*michiganinvasives.org.*



Note: CISMAs include CNs, CWMAs, ICs, ISCs, ISMAs, ISNs, and ISTs.

CN: Conservation Network
CWMA: Cooperative Weed Management Area
IC: Invasives Coalition
ISC: Invasive Species Coalition
ISMA: Invasive Species Management Area
ISN: Invasive Species Network
IST: Invasive Species Team

For more information on your local CISMA, visit the Michigan Invasive Species Coalition's website at www.michiganinvasives.org.

Updated May 30, 2018 | Michigan Invasive Species Coalition

Appendix A: Related Programs

CLEAN BOATS, CLEAN WATERS

A program that empowers lakefront property owners with the knowledge and materials to train local volunteers to deliver AIS prevention messaging to boaters and anglers at boating access sites. You can become a Clean Boats, Clean Waters trainer or simply learn how to bring this important messaging to your local boating access site.

www.micbcw.org

EXOTIC AQUATIC PLANT WATCH

A Cooperative Lakes Monitoring Program (CLMP) that teaches volunteers how to detect, monitor and respond to invasive aquatic plants in lakes. Trainings are offered yearly along with online resources, videos and in-person site visits from aquatic invasive plant experts.

micorps.net/lake-monitoring/clmp.documents

MICHIGAN NATURAL SHORELINE PARTNERSHIP

A program that offers information on how to protect your lakefront property through healthy shoreline erosion protection and landscaping.

www.mishorelinepartnership.org

MOBILE BOAT WASH OUTREACH

Free onsite mobile boat washing and AIS outreach to boaters and anglers offered through the DEQ, Michigan State University and the U.S. Forest Service.

Visit www.facebook.com/MobileBoatWash or call DEQ's Environmental Assistance Center at 800-662-9278 for more information.

AQUATIC INVASIVE SPECIES LANDING BLITZ

Sign up your local boating access site for a free statewide summer outreach event focused on raising awareness and preventing the spread of AIS through recreational boating and related activities.

For more information about the AIS Landing Blitz, visit www.michigan.gov/invasives ***and watch the "Spotlight" section for updates and announcements. Alternatively, call the DEQ's Environmental Assistance Center at 800-662-9278.***

For more information, visit *www.michigan.gov/invasives*

Environmental Assistance Center: 800-662-9278

09/2018