



Michigan's Invasive Species Newsletter

Michigan's Invasive Species Program is cooperatively implemented by the Michigan Departments of Environmental Quality (MDEQ), Natural Resources (MDNR), and Agriculture and Rural Development (MDARD).



Invasive Species and the Organisms in Trade Pathway in Michigan

Today's world is more connected than ever considering the tangled web of global trades routes that crisscross the globe, so it's no wonder that many invasive species find their way here with the help of humans. Modern means of transportation bring goods, services, people, and invasive species to all reaches of the globe. Ballast water from ships is to blame for introducing many invasive organisms to Great Lakes waters. Some exotic pets and plants that escape into the wild adapt to local conditions. Insects arriving from abroad in wood packing materials and wood products have caused irreparable damage to native trees and forests.

The bottom line is that domestic and international commerce and trade can play

a large role in invasive species introduction and spread.

This issue of Michigan's Invasive Species Newsletter takes a closer look at some of the organisms and trade pathways that are important for protecting Michigan from the impacts of invasive species.



Global sea (top) and air (bottom) trade routes. Credit: Dominic Alves via Flickr

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Visit www.michigan.gov/invasives, click on the red envelope on the right hand side, enter your e-mail address, select "Invasive Species," and hit submit.



The Internet as a Pathway for Invasive Species

We've all been told to be careful about internet use to avoid computer viruses like worms or Trojan horses – but did you know that internet shopping can also introduce invasive species to Michigan? Going online to purchase plants for your yard, pond, or aquarium is a good way to find a wider selection, but sellers outside of the state may be unaware that certain species are prohibited or restricted in Michigan.

If you shop online for exotic plants, pets, or live food, you should be aware of state laws in place to prevent invasive species, and you should know which species these laws restrict.

Snakehead (family Channidae) – Federal and State Prohibited
Certain varieties of snakehead fish are a live food delicacy for some cultures and also prized by aquarium enthusiasts as predators with a unique look – their scaled, flattened heads and sharp teeth resemble a snake. Snakeheads can breathe air and use their fins to help “walk” short distances across land.

Natives of Africa and Asia, some varieties of snakehead can grow up to 3 feet long, which may have prompted unprepared owners to release them into the wild. To date, snakeheads have been found in 14 states including Maryland, Virginia, Florida and Hawaii.

Internet dealers offering snakeheads for sale are usually based in the U.K. or Asia and don't mention U.S. import bans. These vendors may prohibit shipping to a U.S. customer, but if not, it is up to the consumer to be aware of state and federal restrictions.

Yellow Floating Heart (*Nymphoides peltata*) – State Prohibited
Yellow floating heart, marketed as

a “hardy and persistent” “mini-lily” for pond gardening, has found its way into lakes and streams in 33 states. Native to Eastern Asian and the Mediterranean, this invasive aquatic plant can spread by plant fragments or seeds and cover the water's surface in a short time, shading out native plants and making boating and fishing difficult.

Yellow floating heart has been identified in private ponds in five locations in Michigan. It is likely that plants were installed before the species was restricted by state law in 1994. Landowners have cooperated in plant removal efforts to reduce the potential for spread to new locations through flooding or animal or human transportation.

Red Swamp Crayfish (*Procambarus clarkii*) – State Prohibited

Red swamp crayfish are of interest to both culinary and aquarium enthusiasts. The signature dish of Louisiana, red swamp crayfish are native to the southern U.S. but considered invasive just about everywhere else in the world because they aggressively prey on native crayfish, frogs and fish, and can cause significant shoreline erosion issues.

Red swamp crayfish are readily available online, where they can be bought and shipped live by the pound for crawfish boils or individually to add to a home or classroom aquarium. It may have been one or more of these sources that brought red swamp crayfish to Sunset Lake in Vicksburg, south of Kalamazoo, or to the Novi area, where multiple populations were discovered in 2017.

Because red swamp crayfish are prohibited in Michigan, it is illegal to buy, sell or possess them live. Knowledgeable dealers will only

offer red swamp crayfish in frozen or pre-cooked form to Michigan customers and will not ship them as pets. However, as with all restricted or prohibited species, it is also the consumer's responsibility to know the laws and be familiar with listed species.

State Law

Michigan's Natural Resources and Environmental Protection Act - NREPA (451 of 1994, as amended), Part 413 defines prohibited and restricted species in Michigan and limits the possession, import, or sale of such species. The Natural Resources Commission and the Commission of Agriculture and Rural Development have the power to amend the prohibited and restricted species lists through invasive species orders. The full text of NREPA and subsequent invasive species orders can be found at www.michigan.gov/invasives under the “Laws” tab. A list of Michigan's prohibited and restricted species can be found at the site under the “Species Profiles and Reporting” tab.



A shipment of live red swamp crayfish. Photo credit: MI DNR Law Enforcement Division

Invasive Species Laws Related to Organism in Trade and Commerce

Ever hear the story about pet alligators getting flushed down the toilet in New York City and surviving only to breed in the sewers? From what I hear that's just an urban legend. But there are plenty of real-life examples of plants and animals escaping captivity (intentionally or accidentally) and wreaking havoc. Efforts to prevent exotic species from being introduced or spread is often accomplished with laws and regulations. Here's a quick summary of Michigan and Federal laws with links to learn more. All links can also be found at: michigan.gov/invasives and selecting the "Laws" tab.

Domestic plants and animals – From sheep and soybeans to tropical fish and tulips, live exotic plants and animals are all around us. Most benefit humankind, but there are some that cause harm to the environment, economy, or human health. Plants and animals determined to have a high risk to cause harm may end up on a Federal or State prohibited species list. Being on a such a list may restrict buying, selling, trading, moving, or possessing them.

Federal laws include:

- **The Lacey Act** – Restricts the importation and movement of injurious species between states, districts, and territories without a permit.

- **The Plant Protection Act** - Allows the Secretary of Agriculture to regulate the movement of plants, plant products, and biological control organisms determined to be noxious.

State of Michigan Law includes: Transgenic and nonnative organisms ([Part 413](#)), [Species List](#), and [requirements and penalties for possession of prohibited species](#).

Don't move firewood – Bringing firewood to your campsite from home or getting free wood for your woodstove or fireplace from three counties away may seem like good ideas but moving untreated firewood long distances can spread pests and diseases. To protect trees the State of Michigan has several quarantines related to [moving untreated firewood](#). It is illegal to move untreated hardwood from the Lower Peninsula to the Upper Peninsula. Additionally, untreated hardwood firewood cannot be brought into Michigan from or through Ohio. The best practice is to [buy firewood](#) where you will burn it.

Recreational boating, waterfowl hunting, and water sports – Michigan has a wealth of water available for hunting, fishing, and recreation. When boats and gear are moved from one water body to another there is a risk of spreading invasive species. Michigan has laws

and regulations to minimize the risk of spreading invasive species. It is [illegal in Michigan](#) to place a boat, boating equipment, or a boat trailer in the water if aquatic plants are attached. Michigan Department of Natural Resources' [Fisheries Order 245](#) (Fish Disease Control) has several requirements that reduce the potential to spread invasive species; including, draining all bilges and live wells prior to leaving a water body and prohibiting the movement of fish (including baitfish) from one body of water to another.

Commercial Shipping – While most of us are not directly involved in Great Lakes shipping, with ocean-going or "Laker" vessels, it is still important to understand the role they can play in both introducing and spreading invasive species. According to the United States Environmental Protection Agency, approximately one third of the aquatic invasive species in the Great Lakes were introduced through ship ballast water. Michigan Law requires all vessels operating in the Great Lakes to [report their ballast water management practices](#) to the Department of Environmental Quality (DEQ) to ensure compliance. Additionally, all ocean-going vessels using Michigan ports must obtain a [permit](#) from the DEQ.



Resource Spotlight: AIS Decontamination Module

Are you someone who works, plays, or volunteers in lakes, rivers, streams, or wetlands? If so, visit Michigan.gov/Invasives and click the "Take Action" tab to find the newly released Aquatic Invasive Species Decontamination training module to learn steps to decontaminate your field equipment, gear and vehicles to reduce the risk of spreading invasive species.

Go Beyond Beauty: Committing to an Invasive Species-Free Landscape

It can often be intimidating to walk into a nursery when shopping for landscape plants. With a diverse selection of species and cultivars, usually featuring different names, it is easy to walk away with a plant that may not do well in your garden. On the flip side, it is also a remarkably simple feat to take home an invasive species. In 2010, the Northwest Michigan Invasive Species Network (ISN) compiled a list of the "Top Twenty Least Wanted Species" for northwest lower Michigan, and more than half of the plants featured are invasive ornamentals that can be purchased legally. ISN's *Go Beyond Beauty* program is a voluntary, grassroots effort to combat these harmful sales.

Go Beyond Beauty (GBB) was developed in 2013 as a direct response to the escape of invasive ornamental plants from gardens and landscaping projects. Beyond directly treating existing populations of invasives in northwest Michigan, another of ISN's goals is to prevent those populations from becoming established in the first place. Many times, infestations are a direct result of landscaped invasive species that have spread into nearby natural areas.

Local nurseries and landscapers who join GBB



make a commitment to stop the sale and use of the invasive ornamentals that are listed within the "Top 20". These include Japanese barberry, baby's breath, autumn olive, dame's rocket, blue lyme grass, and more. Not only are these businesses committing to not stock or use these species, but they often go a step further by encouraging the use of native plants as alternative options. ISN never shames businesses that are not a part of the program but does provide participants with additional publicity and outreach tools to spread the word regarding their involvement. Additionally, they receive beautiful signage for their establishment at no cost.

In 2017, the *Go Beyond Beauty* program was expanded to be as inclusive as possible. Not only can nurseries and landscapers continue to join but now, so can homeowners with personal gardens, other businesses, garden clubs, etc. Anyone who makes planting decisions and is willing to make the GBB commitment is welcome to participate. By lowering the demand for invasive species among the general population, the hope is to gradually transition these plants out of demand. This trend is already becoming popular as consumers are more aware of how important native plants are for pollinator health.

To date, just within ISN's service area of Benzie, Grand Traverse, Leelanau, and Manistee Counties, there are 40 businesses, groups, and individuals committed to not selling and/or using invasive species. *Go Beyond Beauty* events have resulted in the removal of hundreds of already landscaped Japanese barberry plants, and those numbers will grow as opportunities continue into the spring and summer of this year.

To learn more about the *Go Beyond Beauty* program, visit ISN's website, www.HabitatMatters.org, or contact Emily Cook at (231) 941-0960 x20 or ecook@gtcd.org.

DNR Law Enforcement Updates Efforts

The Michigan Department of Natural Resources Law Enforcement Division (LED) conducted 241 inspections on wholesale and retail bait dealers in late 2017 and early 2018. These inspections are part of LED's efforts to address known pathways of aquatic invasive species (AIS) into the Great Lakes Ecosystems. After having conducted these inspections for numerous years addressing AIS, officers are seeing an increased awareness on the part of the owner/operators to the need for AIS detection and prevention. However, LED continues to run into issues of some bait catchers not being current on their monthly catch reporting. During this period officers followed up on 27 delinquent reports. These delinquencies create an issue for officers to properly track bait back to its source if an AIS contamination is detected, thus potentially prolonging the contamination period.

Officers from LED have also been busy addressing known AIS pathways that have been restricted through previous prosecutions for the illegal transportation of AIS into Michigan. One such business, due to court order, is required to advise the State of Michigan when their live bait haulers will be entering Michigan along with an itinerary of all their stops. Officers recently



DNR LED inspecting baitfish

contacted this hauler during one of their scheduled stops in Michigan and conducted an inspection of the live specimens in their tanks. The hauler was found to be operating in compliance with Michigan law and the court order.

In addition to conducting inspections, LED has been active in responding to and following up on numerous AIS related complaints. One such complaint consisted of a wholesale bait dealer putting uncertified bait in holding ponds at his facility. The intermingling of uncertified bait with certified bait poses a very serious threat of disease transmission and potentially facilitates the spread of disease to the open waters of Michigan. Officers responded to the site and conducted

inspections of both ponds and records. Thankfully no violations were discovered at this time; however, close monitoring of this facility will continue to ensure proper compliance.

LED was also active in following up on complaints from the public regarding suspicious activities within the pet trade industry. One such complaint was that of an aquatic pet store in the Metro Detroit area offering for sale suspect amphibians and turtles. Officers initially conducted covert inspections of the aquatic pets being sold and later returned in an overt capacity to review records. It was discovered the store was indeed operating in compliance with state and federal regulations. However, stemming from this complaint officers developed a lead to a retail source outside of Michigan that was offering for sale crayfish for educational purposes. It was suspected that these crayfish may have been red swamp crayfish. An officer from LED contacted the company and purchased the suspect crayfish. Upon receiving them, it was discovered they were not of the red swamp variety.

For more information about DNR LED inspection efforts, contact Michael Feagan at FeaganM@michigan.gov.



Twelve New Online Training Modules Added to MISIN

Midwest Invasive Species Information Network (MISIN)

Educational Module and Assessment

Red swamp crayfish

Procambarus clarkii



The Midwest Invasive Species Information Network (MISIN) website (www.misin.msu.edu) features 12 new online training modules on Michigan's prohibited and restricted aquatic plant and animal species. The training modules cover the basic identification characteristics of invasive species including their general size and shape, impact to the environment, and the habitat you are most likely going to find them in. Modules take between 10-15 minutes to complete per species and end with a short ten question quiz. These training modules are designed to enhance the identification and reporting abilities of researchers, industry partners, and citizens.

With the addition of these training modules, MISIN now

includes 78 online trainings on terrestrial and aquatic plants and animals. The new modules include six invertebrate and plant species: red swamp crayfish, rusty crayfish, New Zealand mudsnail, African oxygen weed, giant salvinia and starry stonewort. And six fish species: bitterling, ide, rudd, stone moroko, tench and wels catfish. These species are legally designated by the State of Michigan and it is unlawful to possess, introduce, import, sell or offer these species for sale as a live organism, except under certain circumstances. A list of current prohibited and restricted species can be found on the State of Michigan invasive species webpage.

These new modules were developed by the Reduce

Invasive Pet and Plant Escapes (RIPPLE) program. A partnership between Michigan State University Extension and the State of Michigan, [RIPPLE](#) educates retailers and consumers with aquariums and water gardens about proper handling and disposal of plants and animals to prevent their introduction into the wild. These modules will be integrated into RIPPLE training programs offered to retailers and organizations in the aquarium and water garden trade, and retailers will be encouraged to utilize the training modules when training new staff.

For more information about RIPPLE, contact Paige Filice at Filicepa@msu.edu

Species Spotlight: Spotted Lanternfly (*Lycorma delicatula*)

Organisms in trade (OIT) pathways pose a serious risk for the release or escape of invasive species. Typically, when referring to an OIT it is the organisms themselves, whether they be fish, plants, snails, crayfish, or insects, that are actually 'in trade' that are of concern. Organisms, if removed from trade, or prevented from entering trade, would reduce the risk of them being introduced into the environment.

But sometimes, it isn't the organism that is in trade that is of concern but rather the organisms that get moved as a result of trade that are of concern. Take the emerald ash borer (EAB) for example. It wasn't the movement of what was inside the solid wooden packing material that EAB hitched a ride in that was the problem. It was the movement of EAB infested solid wooden packing material that was the problem. It's not the firewood that is in trade that is the problem. It's the oak wilt fungus spores hitching a ride on that firewood that is the problem. It wasn't the products in trade that the ship was loaded with that were the problem it's that the ship released its contaminated ballast water that was the problem. Given that perspective, the OIT pathway takes on a whole new dimension.

The spotted lanternfly (SLF), *Lycorma delicatula*, is an



invasive plant hopper native to China, Vietnam, and India. The SLF was first discovered in Berks County in SE Pennsylvania in 2014. PA currently has 13 counties quarantined. The insect has also been found in VA and evidence of it has been reported in NY and DE. If it were to make its way to Michigan, this insect has the potential to create significant damage to trees, shrubs, and agricultural crops. How could this insect get to Michigan? Through trade including the movement of just about anything that is smooth enough for the female SLF to lay her eggs on. If pallets, vehicles or trailers in the infested areas of the eastern U.S. sit still long enough they could have eggs laid on them and then be transported here to Michigan where the eggs could hatch.

More than 70 species of plants

are known to be hosts of the SLF. Adult and nymph SLFs feed by sucking sap from their hosts. The wounds they cause ooze and give off a foul odor. This weakens the plants leaving them susceptible to secondary pests. Tree of heaven, its preferred host, can die 2-4 years after first being attacked.

SLF, once it becomes established in an area, creates a significant nuisance that people have to deal with. When they feed, SLFs excrete large amounts of a sticky substance called honeydew. The honeydew will coat anything under a tree that is being fed on. Cars, decks, patios, furniture, etc. A black 'sooty' mold will then grow in the honeydew turning everything, including the tree itself, black.

If SLF arrives in Michigan, it will be important to detect it as early as possible. If you see suspect egg masses, or other signs and symptoms, do not disturb them. Take photos if possible, note the location and report it.

If you see suspect adults or immature stages, take pictures, record the location, try to collect them in a jar and report it.

Phone: 800-292-3939

Email: MDA-info@michigan.gov

Online: www.misin.msu.edu

Compliance Inspections for Plant Nurseries and Sellers Help find Invasive Species

There are a lot of firms in Michigan that sell plants to the gardening public and some of those plants are aquatic species. During 2017, the Michigan Department of Agriculture and Rural Development (MDARD) licensed 3,862 nursery stock dealers – firms that buy and sell hardy plants. In addition, MDARD licensed 1,315 growers – people that primarily grow nursery stock for sale. Michigan's nursery inspection law requires MDARD to inspect hardy nursery stock at these firms for presence of insect pests and diseases. In the past few years MDARD has also added in a component to those inspections to make sure that any aquatic plant species offered for sale are compliant with Michigan's Natural Resources and Environmental Protection Act (NREPA) Part 413. In other words, that the plants are not invasive prohibited or restricted species. Prior to the Part 413 additions, MDARD's primary experience with aquatic plants was occasional collaborative activities with the U.S. Department of Agriculture when some of the aquatic federal listed noxious weeds were brought through interstate commerce into Michigan.

MDARD now checks all growers and dealers during the inspections for presence of aquatic plants; and, when found, makes sure that the aquatic plants are not any of the prohibited or restricted invasive species. Due to the requirements of the nursery law, MDARD inspects all growers annually. Dealer inspections are conducted once every two years for firms with higher

pest risk and less frequently at low risk firms. Last year MDARD conducted inspections at all 1,315 growers and at 1,033 dealers.

During 2017 the majority of firms that sold aquatic plants were in compliance. Violative aquatic plants were noted at 7 firms. The main species encountered, removed from sale and ordered destroyed in 2017 was invasive *Myriophyllum aquaticum*, parrot feather. That particular species has been the NREPA-regulated aquatic plant species most commonly encountered by MDARD during the last 8 years. The sources tend to be out of state firms. Invoices in 2017 showed sources in North Carolina and Mississippi. MDARD also contacted a Craigslist seller who was advertising parrot feather, invasive yellow floating heart and invasive European frogbit. The Craigslist location was not determined as the vendor removed the ad after staff contacted them by email.

One of the things that has complicated MDARD's staff monitoring compliance with NREPA Part 413 is improper labeling. This occasionally occurs with other nursery stock where plants are mislabeled and sold as one variety or species and they turn out to be another. The most common mislabeling in aquatic plants seen by MDARD staff is with

Myriophyllum aquaticum, parrot feather. One frequent mislabeling is *M. brasiliensis*. This appears to be a trade name misspelling of the species name *M. brasiliense* that was used in the 1800's and some firms have continued to use it. The botanical naming record shows that botanists have been naming and renaming *M. aquaticum* for a long time. *M. aquaticum* comes from a description by Verdcourt in 1973. The species was originally described as *Enydria aquatica* in an 1829 published work by José Mariano da Conceição Velloso which predates the *M. brasiliense* description in 1830. In MDARD staff's professional opinion, if the label lists any of the synonyms, misspelled or otherwise, it is technically mislabeled and is in fact *M. aquaticum*.

The following is the history of the description of *M. aquaticum*:

Enydria aquatica Vellozo, Fl. Flumin. 57. 1829 ("1825").

Myriophyllum brasiliense Cambessedes, in A. Saint-Hilaire, Fl. Bras. Merid. 2: 252. 1830.

Myriophyllum proserpinacoides Gillies ex Hooker & Arnott, Bot. Misc. 3: 313. 1833.

Myriophyllum aquaticum (Vell.) Verdc. (1973)

(continued on next page)

Compliance Inspections for Plant Nurseries and Sellers Help find Invasive Species, *cont.*

Besides mislabeling, MDARD has also seen plants incorrectly invoiced as simply *Myriophyllum* spp. In those instances, the plants could be one of two NREPA regulated species, *M. aquaticum* or *M. spicatum* (Eurasian watermilfoil) and are subject to immediate restriction.

MDARD continues to provide refresher training to existing staff pertaining to AIS issues and regularly incorporates AIS as part of new employee training. Mislabeling issues are a primary part of the training, along with protocol on how to collect samples of suspect material and submit it through the MDARD Geagley Laboratory for sending out for expert positive identification if needed.

For more information, contact about MDARD's compliance inspections, contact Mike Bryan at bryanm@michinga.gov



Invasive Parrot Feather (*Myriophyllum aquaticum*) mislabeled as *M. brasiliense*



Aquatic Invasive Species Awareness Week in Michigan

July 1 through 7, 2018 is AIS Awareness Week in Michigan and is highlighted by the 5th annual AIS Landing Blitz. The AIS Landing Blitz is an opportunity for boaters and anglers to learn about simple steps they can take to prevent the introduction and spread of AIS at boat landings across the state. To learn more or find a landing blitz event in your area,

visit www.michigan.gov/invasive-species
or contact Kevin Walters at waltersk3@michigan.gov.

Protecting Michigan Resources through Quarantine

Plant pest quarantines are a tool used to protect resources in natural and managed ecosystems from being attacked by pests and diseases. Plant Pest Acts typically give authority to a governmental entity to regulate the movement of plants and plant products through quarantines to prevent artificial introduction or to limit spread of agricultural or silvicultural pests. Such quarantines may restrict the production, movement, or existence of plants and plant products or other articles which could result in the introduction or spread of the pest.

Michigan's first plant pest law was Act 379 of 1875 and it authorized townships to appoint a commissioner to deal with a disease of peaches called peach yellows. In 1931 the authority to implement quarantines against pests found in other states was given to the Michigan Department of Agriculture in the Insect Pests and Plant Diseases Act, Act 189 of 1931. This type of quarantine is called an exterior quarantine. A few years later, Act 72 of 1945 gave authority to implement an interior quarantine when a pest or disease is established in the state but in limited distribution i.e. interior quarantine.

Currently Michigan has six active quarantines:

Exterior quarantines –regulate incoming shipments

- 1) Balsam Woolly Adelgid. Implemented in 2014. Regulates plants and plant parts of true fir species.
- 2) Blueberry Scorch, Shock, and Sheep Pen Hill Disease Viruses. Implemented in 2002. Revised in 2016. Regulates blueberry and cranberry plants.

Hemlock woolly adelgid, Elizabeth Willhite, USDA Forest Service



- 3) Hemlock Woolly Adelgid (Exterior). Implemented in 2001. Revised 2002, 2008 and 2014. Regulates hemlock plants and plant parts.

- 4) Thousand Cankers Disease of Walnut. Implemented in 2010. Revised in 2017. Regulates Walnut species plants and plant parts.

Interior Quarantines –regulate movement within the state

- 5) Emerald Ash Borer. Implemented in 2002. Multiple revisions 2003-2016. Regulates ash plants and plant parts.
- 6) Hemlock Woolly Adelgid (Interior) Implemented in 2017. Regulates hemlock in Allegan, Muskegon, Oceana and Ottawa Counties.

Exemptions and Special Programs – a quarantine lists what commodities are regulated, i.e. those that pose

risk of moving the pest. The quarantine also lists items that are exempt, compliance programs, and treatments to mitigate the risk. One example is in the HWA Interior Quarantine. Regulated articles include hemlock nursery stock and hemlock forest products bearing twigs and needles, such as branches and boughs. Hemlock logs, lumber and firewood may be conditionally exempt if they are devoid of twigs and needles – the one spot on the hemlock where this pest attaches and lives. To safely facilitate trade, MDARD developed the HWA Nursery Program which allows movement of hemlock nursery stock utilizing a systems approach based on inspections, scouting, pesticide treatments, employee training and recordkeeping.

For more information:
www.michigan.gov/pestquarantines