

Annual Invasive Species Report
Part 413 of PA 451 of 1994, MCL 324.41323
February 2014

The Michigan Department of Natural Resources (DNR) finalized this report to satisfy the requirements of Michigan's Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, MCL 324.41323. This report provides current information and recommendations on invasive species ("transgenic and nonnative organisms") throughout the state of Michigan. Part 413 was developed as a preventative measure to stop the introduction and further spread of invasive species in Michigan. Included in the legislation is a list of prohibited and restricted species. This list acts as a first line of prevention and awareness, with other supporting activities strengthening this effort. To continue these preventative efforts, the DNR recommends that the list of prohibited and restricted species be maintained and enforced. Collaboration between multiple state agencies and divisions allowed for the completion of this report.

The format for this report follows the order from MCL 324.41323. Per MCL 324.41323, the DNR shall make recommendations on all of the following:

Additions/deletions for prohibited and restricted species lists

The Aquatic Invasive Species (AIS) Advisory Council created by Part 414 of PA 451 of 1994, as amended, was charged with making recommendations on AIS issues. One recommendation was the harmonization of state and federal law by adding all organisms that are currently listed as Injurious Wildlife under the Lacey Act or as Aquatic Federal Noxious Weeds by the United States Department of Agriculture Animal Plant Health Inspection Service (USDA-APHIS) to Michigan's prohibited/restricted species lists under Part 413, if not already listed. The DNR and other Quality of Life departments concur with this recommendation.

In order to harmonize state and federal laws, Part 413 of PA 451 of 1994, Section 41302(2) should be amended to add language specifically recognizing federal listing as Injurious Wildlife under the Lacey Act or as Aquatic Federal Noxious Weeds by USDA-APHIS as a justification for placing organisms on Michigan's prohibited/restricted lists.

In 2013, the Council of Great Lakes Governors and the Premiers of Ontario and Quebec established a list of "*Least Wanted*" AIS. The DNR recommends adding the invasive species on the "*Least Wanted*" list to Part 413 as prohibited species, if not already listed. See Table 1 for a listing of animals the DNR recommends be listed as prohibited under Part 413.

Table 1. Animals the DNR recommends be listed as prohibited under Part 413

Common Name	Scientific Name	Council of Great Lakes Governors “Least Wanted” List	Species Listed as Injurious Wildlife Under the Lacey Act
Fish			
Walking catfish	Family Clariidae		X
Largescale silver carp	<i>Hypophthalmichthys harmandi</i>		X
Stone moroko	<i>Pseudorasbora parva</i>	X	
Zander	<i>Sander lucioperca</i>	X	
Wels catfish	<i>Silurus glanis</i>	X	
Crustaceans			
Killer shrimp	<i>Dikerogammarus villosus</i>	X	
Mitten crab	<i>Eriocheir sinensis</i>		X
Yabby crayfish	<i>Cherax destructor</i>	X	
Mollusks			
Golden mussel	<i>Linnoperna fortunei</i>	X	
Reptiles			
Brown tree snake	<i>Boiga irregularis</i>		X
Burmese python	<i>Python molurus bivittatus</i>		X
African python	<i>Python sp.</i>		X
Southern African python	<i>Python sp.</i>		X
Yellow anaconda	<i>Eunectes notaeus</i>		X

Rusty crayfish are currently listed under Part 413 as a prohibited species but are no longer considered isolated. The DNR recommends modifying the listing for rusty crayfish from a prohibited species to a restricted species. Further, the DNR recommends modifying the Invasive Species Order under the authority of Part 413 of PA 451 of 1994, Section 41302(3) for restricted species to allow for their limited possession for the purpose of destroying the organisms.

To better address the threats posed by terrestrial invasive species, the DNR recommends a process for assessing terrestrial invasive species for listing as prohibited or restricted under Part 413. This would help to create a comprehensive invasive species management program.

Status of various prohibited species and other problematic species

Table 2 at the end of this report shows the primary species of concern for Michigan that are currently listed as prohibited or restricted under Part 413. Additional laws and regulations pertain to broad taxa rather than individual species (e.g. stocking of spawn or fry of any fish species) but are not included here. The current distribution in Michigan, based on best available knowledge, is provided for each listed species. Note that some species in the tables are absent (or thus far undetected) in Michigan. This coarse-scale distribution is intended to provide a basic snapshot of where each species exists along the invasion curve. Some of these species are not

yet known to be present within the state, while others have been present in certain parts of the state for decades, causing significant ongoing management and control costs. In cases where distribution is listed as absent, this may mean a particular species is truly not present at all in Michigan or that no confirmed detections have been made.

Other problematic species

Mute swan (*Cygnus olor*) – Widespread

The DNR recommends continuing mute swan control efforts over the next two years to stabilize the population and recommends increasing control efforts over the next 3-20 years to significantly reduce mute swan numbers throughout Michigan. The DNR recommends that the mute swan population continue to be monitored and evaluated annually to determine the appropriate classification.

Red swamp crayfish (*Procambarus clarkii*) – Reported (not confirmed)

Currently the most widely introduced crayfish in the world, red swamp crayfish have had negative effects in the regions of invasion. Because of the potential harm this species could cause to Michigan's native ecosystems, the DNR recommends listing red swamp crayfish as prohibited under Part 413 of PA 451 of 1994, Section 41302(1).

Hemlock woolly adelgid (*Adelges tsugae*) (HWA) – Absent (isolated occurrences in the past)

HWA has been detected in five counties in Michigan since 2006 (Emmet County in 2006, Ottawa and Macomb Counties in 2010, Berrien County in 2012, and Allegan County in 2013). Michigan maintains an external quarantine for HWA.

Oak wilt (*Ceratocystis fagacearum*) – Widespread with isolated occurrences

Oak wilt is widespread in the southern Lower Peninsula, with spotty distribution in the northern Lower Peninsula and Upper Peninsula. Many treated areas in Menominee and Dickinson counties remain free of oak wilt. The DNR recommends review of movement restrictions on forest products to ensure that all prudent precautions are being taken to avoid spreading oak wilt via this vector, and to assess effectiveness and impacts of these restrictions.

Beech bark disease (*Neonectria sp.*) – Widespread

Since the discovery of beech bark disease in 2000, this invasive disease has spread through Michigan's forests, causing widespread mortality in beech trees. Much of this loss is in the eastern Upper Peninsula, where the beech resource has been greatly affected.

White-nose syndrome (WNS), (*Pseudogymnoascus destructans*) (*Pd*) – Absent as of 2012

The U.S. Fish and Wildlife Service (USFWS) estimated that WNS has killed more than 6.7 million bats in eastern North America since its first detection in 2006, with mortality in some infected hibernacula ranging between 90 to 100 percent. While neither WNS nor *Pd* (the fungus

that causes WNS) has been detected in Michigan, it is very close to our borders, having been confirmed in Ohio, Illinois, Indiana, Pennsylvania, and the Provinces of Quebec and Ontario.

Sea lamprey (*Petromyzon marinus*) – Widespread

Sea lamprey are established in Great Lakes waters and known to be harmful to native fish populations. The DNR recommends continued support of the USFWS Sea Lamprey Control Program.

Preventing the introduction of and controlling or eradicating invasive species

Preventing new introductions is the most cost-effective way to manage invasive species. Controlling the spread of existing invasions limits the damage they cause. Invasive species can be unintentionally spread by people, equipment, management practices, and through contaminated material such as fill or mulch. Every individual, business, and agency can play an important role in slowing the spread of invasive species. The DNR should identify effective and realistic practices that can be integrated into routine activities to limit the impact of invasive species. These guidelines or recommendations, often referred to as Best Management Practices (BMPs), can help individuals and organizations make the most efficient use of limited resources to combat invasive species. BMPs are a cost-effective means of preventing invasive species from arriving and establishing in Michigan or dispersing to new regions within the state.

A variety of other efforts are ongoing around the state of Michigan that are aimed at preventing new introductions of invasive species and controlling existing invasions. The following are summaries of the most relevant efforts:

Preventing Asian Carp in Michigan Waters

In 2013, the DNR Fisheries Division took multiple steps to increase awareness and evaluate protocols for preventing Asian carp in Michigan waters. The prevention of bighead and silver carps is a top priority, and Fisheries Division has continued to test locations at risk of invasion for the presence of Asian carp species. Specifically, environmental DNA (eDNA) sampling has continued, staff training has increased, and education and outreach materials have been developed and widely distributed.

Fisheries Division recommends the following for the prevention of Asian carp in Michigan waters:

1. Continue early detection sampling through the use of eDNA testing in locations on the high priority list, which was generated by Fisheries Division in 2012
2. Continue to increase staff training in methods that are effective at detecting and capturing Asian carp
3. Continue to evaluate response options and control technologies for use in the scenario that an Asian carp is reported

4. Support hydrologic separation in the Chicago Area Waterway System, which is the pathway with the highest risk for the spread of Asian carp

Early Detection and Rapid Response

The most effective and efficient means of reducing the impact of invasive species beyond prevention is to respond efficiently to new invasions or existing outlier populations. Even the best prevention program cannot keep all invasive species out, but a program that responds quickly, uses cost-effective methods, and engages key stakeholders will minimize the threat of invasions impacting Michigan.

The DNR Wildlife Division is currently leading a Great Lakes Restoration Initiative (GLRI) grant project for Early Detection and Rapid Response (EDRR) for aquatic invasive plants in Michigan. After three years, the EDRR program has verified 60 unique detections of six new high-threat aquatic invasive plant species in Michigan. Prioritized response efforts have occurred at 21 sites, with future actions planned. In 2013, reports of European frogbit in the northern Lower Peninsula and Upper Peninsula and one report of the first established site of parrot feather were received and prioritized for response. European frogbit had not been identified outside southeast Michigan, and parrot feather had not been detected in Michigan prior to the start of the EDRR program. Both are prohibited species and known to have detrimental impacts in other states. The DNR recommends continuing and expanding the state's capacity to respond to reports of new high-threat aquatic and terrestrial invasive species.

DNR Forest Resources Division has coordinated efforts with DNR Parks and Recreation Division to train park staff statewide to detect Asian longhorned beetle (ALB). While not yet identified in Michigan, ALB has been found in Illinois and Ohio, only a four-hour drive from Michigan's southern border. Campgrounds are of the greatest concern and pose the highest risk because ALB can easily be transported in firewood. Records of campground visits from infected zip codes were used to prioritize inspections at campgrounds, which are surveyed twice annually by trained park staff. The DNR also instituted a pheromone-trapping program for early detection of ALB in high-risk areas.

State Park Volunteer Steward Program

DNR Parks and Recreation Division, Stewardship Unit continues coordination of volunteer stewardship activities to augment control of invasive species at 17 state parks and recreation areas in the southern Lower Peninsula. In fiscal year 2013, over 1,400 volunteer stewards contributed close to 10,000 hours of service towards invasive species control and habitat restoration projects in forested dunes, prairie habitats (including globally imperiled lakeplain prairie), and globally imperiled fens. Projects include invasive species mapping, invasive species removal, monitoring of restoration sites, native seed collection, planting, and conducting forest health and rare animal surveys.

Phragmites Control

In 2013, the DNR controlled hundreds of acres of invasive Phragmites across dozens of state game areas, parks, and forests using ground and aerial herbicide treatments. Many treatments were conducted with neighboring landowners and partner organizations, such as Cooperative Weed Management Areas (CWMA) and Ducks Unlimited. Large-scale efforts were concentrated at Waterfowl Management Areas and southern state parks. New infestations were targeted in the northern Lower Peninsula and Upper Peninsula to limit the spread of this species in areas of the state that have lower populations of Phragmites.

The AIS Advisory Council, created by Part 414 of PA 451 of 1994, as amended, made extensive recommendations on the prevention of AIS through a variety of approaches. Of particular relevance to this report are several recommendations regarding management and control of the non-native genotype of Phragmites in Michigan. The final report from the AIS Advisory Council was submitted to the Governor and Legislature on August 21, 2013.

Prohibited Swine Control

Much of the time and money spent by the DNR on prohibited swine is currently attributed to implementation and enforcement of the Invasive Species Order. The DNR is taking steps to prevent the further introduction of prohibited swine by actively enforcing the Invasive Species Order.

Current control and eradication efforts are ongoing within the DNR and sister agencies. In an effort to control and eradicate established wild populations of prohibited swine, a voluntary trapping program financed through Environmental Quality Incentive Program (EQIP) grants and the local Natural Resources Conservation Services (NRCS) offices was initiated in 2011 (MI-EQIP11-1). The landowner response was low, and the number of feral swine trapped was minimal. A partnership was formed between the Michigan Wildlife Conservancy (MWC), USDA-Wildlife Services, the Michigan Department of Agriculture and Rural Development (MDARD), and the DNR to provide traps and bait to landowners. The MWC created a statewide feral swine training and trapping program to educate people about the deleterious effects of feral swine and how to properly build and use a feral swine trap. This partnership is ongoing.

To address the wider feral swine problem in Michigan, new laws were passed in 2010 (PA 69, 70, and 71 of 2010) declaring feral swine a public nuisance and allowing hunters throughout Michigan to shoot feral swine opportunistically while out hunting other species. The law requires that the person have any valid hunting license or a concealed weapons permit. The DNR continues to distribute posters and magnets and attend outdoor shows to educate the public about prohibited swine and the feral swine shoot-on-sight law.

In October 2013, a research project involving the DNR, Michigan State University (MSU), USDA-Wildlife Services, and the University of Michigan-Flint commenced to advance understanding of the habitat, breeding ecology, and diseases of feral swine in Michigan to inform effective management.

Emerald Ash Borer Control

Since its identification in 2002, the emerald ash borer (EAB) has killed an estimated 50 million ash trees in the Lower Peninsula of Michigan and surrounding states. An EAB Response Project partnership consisting of staff from the DNR, MDARD, USDA, Michigan Technological University (MTU) and MSU has initiated a number of actions related to regulation, survey, control, restoration, and outreach:

- Michigan's EAB Interior State Quarantine was last revised on January 7, 2014.
- DNR Forest Resources Division foresters conduct harvest prescriptions to remove infected trees and replace them with a mix of desired species to ensure the productive regeneration of impacted stands.
- MDARD staff renews and issues intra-state compliance agreements (CAs) as necessary. A CA is a written agreement between a person moving or receiving regulated articles and MDARD. MDARD maintains approximately 125 CAs with receivers, brokers, and shippers and conducts compliance inspections with CA holders.
- MDARD staff writes phytosanitary certificates for ash lumber being shipped internationally.
- MDARD staff conducts random inspections for quarantine compliance at the intra-state quarantine boundary between the Lower Peninsula and the Upper Peninsula.
- In 2013, MDARD and MTU visually inspected ash at 209 sites throughout the non-quarantined counties of the Upper Peninsula. All sites were negative for EAB.
- DNR Parks and Recreation Division field staff continue to survey campground visitors to ensure compliance with the EAB quarantine.

The DNR recommends continued support of prevention, early detection and rapid response, regulatory efforts, and the release and establishment of biological organisms for long-term control if and when they become available.

Oak Wilt Control

DNR Forest Resources Division and Parks and Recreation Division work collaboratively to identify and treat outbreaks of oak wilt. Several state parks and recreation areas were treated with a vibratory plow blade to stop the below-ground spread of oak wilt and to reduce the potential for standing dead trees in campgrounds and day-use areas. Oak wilt infestations have been treated and are being monitored at several state parks.

Restoration/remediation of damaged habitats

The DNR engages in many large-scale restoration projects using a variety of tools to repair damaged habitats once invasive species are controlled. The DNR recommends continuing the use of prescribed fire and water control structures to guard against future re-invasions. Where regeneration cannot be attained with restoration techniques, the reintroduction of native species should be enlisted. The DNR recommends continuing to support the replacement of important forest species affected by invasive species. This includes harvest prescriptions, which remove most of the affected species within an area and replace them with a desired mix of productive species.

The DNR recommends continuing management efforts to support native fish populations in areas affected by invasive species. An example of this is the stocking of lake trout in the Great Lakes where these populations have been negatively influenced by the invasive sea lamprey and alewife.

Where habitats are disturbed, additional resources should be developed and promoted to assist businesses, government, and landowners in obtaining materials to promote the growth of native species and minimize the likelihood of invasion. Weed free mulch, fill, and gravel are requested by many entities, yet no sources exist in Michigan. The DNR recommends that the State of Michigan promote the production and use of Michigan-grown weed seed-free products. Similarly Michigan should promote the use of weed seed-free fill dirt and gravel for projects on state and private land to minimize the spread of invasive plant species such as Phragmites, spotted knapweed, and Japanese knotweed.

Prioritizing efforts to prevent NREPA Part 413 violations

It is the goal of the DNR and MDARD to prevent the introduction of prohibited invasive species through education, detection, and interdiction. This proactive effort is ongoing and being accomplished through outreach and increased inspections of businesses associated with invasive species by both departments.

DNR Law Enforcement Division (LED) leads this effort with education of law enforcement agencies, user groups, and business owners. In addition, this effort is being accomplished through vigorous investigation of information cultivated regarding the illegal possession, transportation, or commercialization of prohibited species. These efforts of outreach, education, and enforcement are critical to preventing the introduction of invasive species. The DNR recommends that these efforts are continued in order to protect Michigan's citizens, resources, and economy.

In FY 2013, MDARD conducted targeted site visits for the purpose of ensuring compliance with NREPA Part 413. These sites consisted of firms which had potential to sell aquatic plants on a wholesale or retail basis, including plant growers, plant dealers, home improvement chain stores, and pet stores. Site visits were conducted statewide at 176 locations. The majority of firms with aquatic plants in stock were in compliance with NREPA.

Two firms carried plant species which were positively identified as species prohibited under NREPA Part 413. Species encountered included *Egeria densa* (Brazilian elodea) and *Myriophyllum aquaticum* (parrot feather). MDARD issued destruction orders for the prohibited species at the two sites indicated. These examples illustrate tangible efforts being undertaken to prevent the introduction of prohibited invasive species and the importance of monitoring businesses for compliance with Part 413.

State department responsibilities and sharing information

The DNR and MDARD share responsibility for enforcement of violations under Part 413 and adding or deleting from the list of prohibited or restricted species. In general, the DNR is responsible for conserving, protecting, and managing the use and enjoyment of the state's natural resources, with a focus on fisheries, wildlife, parks and recreation, forests, mineral and fire management, land and facilities, and law enforcement. In particular, the DNR's Fisheries and Wildlife Divisions are leading response activities for several priority invasive plants and animals. DNR's Forest Resources Division actively works to prevent and control invasions of non-native insects and diseases that impact forest resources and habitat. In general, MDARD protects the food, agricultural, environmental, and economic interests of the citizens of Michigan and is positioned to provide expertise on emergency response. In particular, MDARD is involved in eradication of invasive insect species brought in through channels of trade. MDARD collaborates with DNR to ensure that infestations do not spread into nearby natural areas and forested areas. MDARD also monitors NREPA Part 413 compliance at nursery stock sales locations and at pet and aquarium shops.

Educating citizens about prevention/control/eradication

In an effort to educate citizens and provide outreach about invasive species prevention and control, the following press releases were issued by DNR or MDARD during 2013:

- DNR Responds to New Aquatic Invasive Plant - Parrot Feather (Dec. 20, 2013)
- Michigan DNR Fighting Frog-bit: Response to New Invasive Species Under Way in Alpena, Bay and Chippewa Counties (Nov. 5, 2013)
- Anglers Beware: Invasive Crayfish Being Used as Bait in Michigan (July 25, 2013)
- Gypsy moth caterpillars making life challenging for Michigan residents (July 11, 2013)
- DNR: Tamarack mortality a growing concern in the U.P. (May 28, 2013)
- Michigan's Hemlock Trees Face Big Threat from a Tiny Insect (May 20, 2013)

- DNR makes effort to utilize at-risk resources with ash and beech salvage (May 16, 2013)
- DNR advises caution to prevent spread of oak wilt disease (April 15, 2013)
- DNR releases update on health of Michigan's forest land (Feb. 5, 2013)

In addition to these press releases, social media is often utilized to inform the public about invasive species issues. Examples include Facebook and Twitter messages about forest pests:

- Gypsy moth warning (July 11, 2013)
- Don't move firewood (May 23, 2013)
- Department of Environmental Quality's (DEQ's) AIS of the Week

Examples of other outreach efforts include the following:

- The DNR has continued to place 'Stop Aquatic Hitchhikers' signs at state boat launches and access sites.
- A series of Best Control Practice (BCP) guides have been produced, which aid citizens in understanding the mechanisms of spread and strategies to control nine terrestrial and aquatic plant species. Additional BCPs are under development.
- The DNR held a training session for 50 DNR staff, DEQ staff and community partners. The day-long session covered topics including prevention, detection, and control in an effort to aid staff and citizen groups in adapting better methods for invasive species management.
- The DNR gave presentations for community members to spread awareness of invasive species issues and to promote understanding of how to prevent further spread and future introductions.
- The DNR coordinated volunteer forest health trainings. Over 40 volunteers in the southern Lower Peninsula assisted in early detection efforts of ALB and oak wilt at state parks and recreation areas, surveying approximately 300 acres of campground and 2,500 campsites.
- YouTube videos on the identification of priority AIS and best practices for managing these AIS were produced. Additional videos are under development.
- A Phragmites control guide was developed to serve as the State of Michigan's primary printed material specific to Phragmites and is distributed to partners, stakeholders, and any other interested parties. Revised regularly, an updated edition will be available in 2014.
- The DNR designed, purchased, and installed 57 boot brush stations in 18 state parks and recreation areas across the Upper and Lower Peninsulas, which serve as a critical means of prevention, early detection, and education to protect against the detrimental effects of invasive species.

The DNR recommends the continuation of these outreach activities to increase awareness of the detrimental impacts of invasive species and the various ways to prevent their spread.

A Phragmites Treatment/Management Prioritization Tool was developed and is available online to help management groups prioritize the treatment and management of invasive Phragmites in Michigan. This tool provides guidance to regional and state land managers with limited funding and resources to determine which Phragmites populations to target in their management areas.

Simplifying citizen access to state government for compliance with NREPA Part 413

In efforts to reach a larger audience and to better communicate information related to invasive species, several improvements to the DNR's invasive species website were implemented (www.michigan.gov/invasivespecies). In an effort to simplify citizen access to information and increase compliance with NREPA Part 413, the website maintains an "Invasive Species Laws" page that shows both state and federal laws, including NREPA Part 413 and descriptions and photos of prohibited and restricted species. The prohibited and restricted species information is updated routinely as the status of species changes. A "Report an Invasive" page provides information on identification and proper protocols for reporting occurrences of invasive species.

Additionally, the DNR maintains separate websites for high-threat invasive species, including mute swans, Asian carp, and feral swine in Michigan. These sites simplify citizen access to information on the history and current state of these invasive species in Michigan and provide links to the current laws and regulations pertaining to these animals. Similarly, MDARD has a website specific to emerald ash borer.

The Michigan DEQ recently updated its AIS website with new information in an easy-to-read format for citizens (www.michigan.gov/aquaticinvasives). There is a direct link for citizens to access information on laws, policies, and legislation concerning AIS. The website specifically directs citizens to information on compliance with NREPA Part 413.

To better communicate information regarding the status and distribution of invasive species to the public, the DNR is supporting the Midwest Invasive Species Information Network (MISIN), a regional database managed by Michigan State University. This database is available to agencies, partners, and the public for crowdsourcing data on invasive species locations (www.misin.msu.edu). MISIN provides the ability for agencies to bulk load data at the end of a collection period. It also allows partners and citizens to use smartphone apps for both the iPhone and Android. An early alert system was launched in 2013 to allow the State to be immediately notified of any watch list species reported in MISIN.

Legislation and funding to carry out the recommendations of the DNR and otherwise further the purpose of Part 413

Historically, invasive species activities have been limited or sporadic in Michigan largely due to inadequate funding. This deficiency in funding has restricted what the State of Michigan has

been able to accomplish to address invasive species strategically, holistically, and long-term. It should also be recognized that there are significant costs to partners, including other agencies, industries, and citizens, to prevent and manage invasive species. In 2010, the State of Michigan received a significant influx of funding from a federal Great Lakes Restoration Initiative (GLRI) grant to address priority AIS actions. However, this funding is short-term and focused specifically on aquatic species. A reliable long-term funding source is needed. The DNR recommends funding commensurate with the effort needed to fully implement a comprehensive program that addresses aquatic and terrestrial invasive species. This funding should support the work of all three Quality of Life departments by building field technical support for local units and supplying resources to on-the-ground efforts and local partners.

Currently NREPA Part 413, Section 41303(1)(d), MCL 324.41303 allows a permit to be issued for possession of a prohibited or restricted species for education or research purposes. MDARD has received at least one request for possession of a plant species for consumptive purposes and has also had inquiries regarding permit requirements for activities which would involve utilization of a restricted plant species for purposes other than education or research, such as for composting or for use as a biofuel. The utilization of restricted species for purposes beyond education and research has potential to help foster the development of business opportunities and provide an avenue for disposal of large volumes of plant material in a manner which would have positive environmental effects. The DNR recommends that MCL 324.41303 be amended to expand the use of permits to include consumptive purposes, such as harvesting for biofuel, composting, and culinary uses, where the process is controlled in a manner which renders the organism nonviable.

Other matters that the DNR considers pertinent to the purpose of NREPA Part 413

The AIS Core Team collaborated on a comprehensive update of Michigan's AIS State Management Plan, which was approved by the federal government on June 17, 2013. The updated AIS State Management Plan outlines strategic actions to prevent, detect, and manage AIS using a vector and pathway approach. In addition, the AIS Core Team completed an interdepartmental procedure addressing response actions for new AIS.

The AIS Core Team continues to implement priority strategic actions from the AIS State Management Plan, several of which are highlighted in this report and include early detection and response actions, increased education and outreach, and management and control. The AIS State Management Plan and additional information concerning the AIS Core Team are available at www.michigan.gov/aquaticinvasives.

Table 2. Species listed as prohibited or restricted under Part 413

Species	Part 413 Status	Distribution in Michigan	Comments
Plants			
African oxygen weed (<i>Lagarosiphon major</i>)	P	Absent	
Brazilian waterweed (<i>Egeria densa</i>)	P	Absent	Isolated populations in IL, IN, MN and OH
Curly leaf pondweed (<i>Potamogeton crispus</i>)	R	Widespread	Common, especially in the Lower Peninsula
Cylindro (<i>Cylindrospermopsis raciborskii</i>)	P	Isolated	Recorded in several drowned river mouths in the Lake Michigan Basin
Eurasian watermilfoil (<i>Myriophyllum spicatum</i>)	R	Widespread	Common, especially in the Lower Peninsula
European frogbit (<i>Hydrocharis morsus-ranae</i>)	P	Locally Abundant	Locally abundant in SE Lower Peninsula Three new potential outlier locations detected in 2013 (Saginaw Bay, Alpena, Munuscong Bay)
Fanwort (<i>Cabomba caroliniana</i>)	P	Locally Abundant	Recorded in sixteen lakes in Lower Peninsula; present in IL, IN, OH and ONT
Flowering rush (<i>Butomus umbellatus</i>)	R	Locally Abundant	Two dozen observations confirmed in southeast Michigan, both inland and coastal; also identified in IN, IL, MN, OH, WI and ONT
Giant hogweed (<i>Heracleum mantegazzianum</i>)	P	Isolated	Found scattered throughout the Lower Peninsula and western Upper Peninsula; some occurrences have been controlled
Giant salvinia (<i>Salvinia molesta, auriculata, bilboia or herzogii</i>)	P	Absent	
Hydrilla or waterthyme (<i>Hydrilla verticillata</i>)	P	Absent	Isolated populations in IN, WI and OH
Japanese knotweed (<i>Fallopia Japonica</i>)	P	Widespread	Scattered throughout Lower and Upper Peninsulas
Parrot Feather (<i>Myriophyllum aquaticum</i>)	P	Isolated	New location (Wayne County) detected and treated 2013 Isolated populations in IL, IN, NY, OH and PA
Phragmites or common reed (<i>Phragmites australis</i>)	R	Widespread	Common and established in coastal and inland areas of southern Lower Peninsula; somewhat less abundant from south to north; common in western UP and southern LP along Lake Michigan shoreline Often confused with native subspecies, or found intermixed
Purple loosestrife (<i>Lythrum salicaria</i>)	R	Widespread	Biological control is reducing population statewide
Starry stonewort (<i>Nitellopsis obtusa</i>)	P	Locally Abundant	Recorded in over one hundred inland waterbodies, mostly in Lower Peninsula
Water chestnut (<i>Trapa natans</i>)	P	Absent	Observations in NY and PA
Yellow floating heart (<i>Nymphoides peltata</i>)	P	Absent	Isolated populations in IL, IN, OH, WI and ONT
Insects			
Asian longhorned beetle (<i>Anoplophora glabripennis</i>)	P	Absent	Not detected in Michigan. ALB infestations are currently active in NY, MA, OH and Ontario. ALB has been eradicated from IL and NJ
Emerald ash borer (<i>Agrilus planipennis</i>)	P	Widespread	Widespread throughout Lower Peninsula; isolated or patchy distribution across Upper Peninsula
Mammals			
Feral Swine (<i>Sus scrofa Linnaeus</i>)	P	Widespread	Currently found in 76 of 83 counties in Michigan
Nutria (<i>Myocastor coypus</i>)	P	Absent	Farmed in Michigan in the 1930's; accidentally released but did not survive

Species	Part 413 Status	Distribution in Michigan	Comments
Fish			
Bighead carp (<i>Hypophthalmichthys nobilis</i>)	P	Absent	Not detected in Michigan waters
Bitterling (<i>Rhodeus sericeus</i>)	P	Absent	
Black carp (<i>Mylopharyngodon piceus</i>)	P	Absent	
Eurasian ruffe (<i>Gymnocephalus cernuus</i>)	P	Locally Abundant	Patchy distribution in Great Lakes; absent in inland waters
Grass carp (<i>Ctenopharyngodon idellus</i>)	P	Isolated	Suspected limited natural reproduction in Lake Erie Isolated detections have been reported in the St. Joseph and Kalamazoo rivers
Ide (<i>Leuciscus idus</i>)	P	Absent	
Japanese weatherfish (<i>Misgurnus anguillicaudatus</i>)	P	Isolated	Single breeding population in the Shiawassee River
Round goby (<i>Neogobius melanostomus</i>)	P	Widespread	Widespread and established in Lakes Michigan, Huron and Erie; isolated collection in Lake Superior near Marquette; isolated but established populations in inland waters
Rudd (<i>Scardinius erythrophthalmus</i>)	P	Absent	Isolated collections on the Ontario side of Lake St. Clair
Silver carp (<i>Hypophthalmichthys molitrix</i>)	P	Absent	Not detected in Michigan waters
Snakehead (Family Channidae)	P	Absent	
Tench (<i>Tinca tinca</i>)	P	Absent	
Tube-nose goby (<i>Proterorhinus marmoratus</i>)	P	Isolated	Isolated, established populations in the St. Clair River, Lake St. Clair, Detroit River and western Lake Erie
Mollusks			
Brown garden snail (<i>Helix aspersa</i>)	P	Absent	Two MI detections in the past /both eradicated
Carthusian snail (<i>Monacha cartusiana</i>)	P	Locally Abundant	Wayne County
Giant African snail (<i>Achatina fulica</i>)	P	Absent	
Girdled snail (<i>Hygromia cinctella</i>)	P	Locally Abundant	Wayne County
Heath snail (<i>Xerolenta obvia</i>)	P	Locally Abundant	Lapeer County/SE MI
New Zealand mudsnail (<i>Potamopyrgus antipodarum</i>)	P	Isolated	Established in Lake Ontario and Lake Erie, and at least present in Lake Superior
Wrinkled dune snail (<i>Candidula intersecta</i>)	P	Locally Abundant	Wayne County
Quagga mussel (<i>Dreissena bugensis</i>)	R	Widespread	Found in all of the Great lakes, although limited in Lake Superior; isolated inland occurrence in the Great Lakes basin, including a single confirmation from Michigan's Upper Peninsula
Zebra mussel (<i>Dreissena polymorpha</i>)	R	Widespread	Widespread in inland and Great Lakes waters of the Lower Peninsula; patchy distribution in inland waters of the Upper Peninsula and Lake Superior
Birds			
Eurasian collared dove (<i>Streptopelia decaocto</i>)	P	Isolated	First observed in MI in 2002, has since been documented in Kalamazoo, Traverse, Berrien, Alger, and Mason Counties.
Crustaceans			
Rusty crayfish (<i>Orconectes rusticus</i>)	P	Widespread	Widespread and breeding in inland waters