



RICK SNYDER  
GOVERNOR

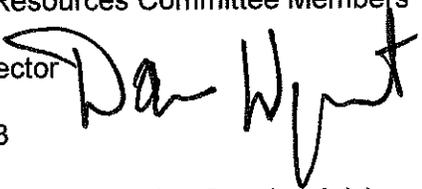
STATE OF MICHIGAN  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
LANSING



DAN WYANT  
DIRECTOR

VIA E-MAIL

TO: Governor Rick Snyder  
The Honorable Randy Richardville, Senate Majority Leader  
The Honorable Jase Bolger, Speaker of the House  
Senate Agriculture Committee Members  
Senate Economic Development Committee Members  
Senate Natural Resources, Environment, and Great Lakes Committee Members  
House Agriculture Committee Members  
House Commerce Committee Members  
House Natural Resources Committee Members

FROM: Dan Wyant, Director 

DATE: August 21, 2013

SUBJECT: Report on the Aquatic Invasive Species Advisory Council's Final Recommendations

In accordance with of Part 414, Aquatic Invasive Species Advisory Council, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, attached is the report of the Aquatic Invasive Species Advisory Council's final recommendations, including recommendations and updates on Michigan's State Management Plan, prevention of introduction and spread of aquatic invasive species through trade, draft next vessel general permit, and Phragmites control measures.

If you need further information, please contact Sarah LeSage, Aquatic Invasive Species Coordinator, Water Resources Division, Department of Environmental Quality (DEQ), at 517-241-7931; or you may contact me at 517-373-7917.

Attachment

cc/att: Ellen Jeffries, Director, Senate Fiscal Agency  
Mary Ann Cleary, Director, House Fiscal Agency  
John Nixon, Director, State Budget Office  
Dennis Muchmore, Governor's Office  
Dick Posthumus, Governor's Office  
Jacques McNeely, State Budget Office  
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Amy Epkey, DEQ  
Sarah LeSage, DEQ

**Michigan Aquatic Invasive Species Advisory Council**

**Final Report and Recommendations**

**August 21, 2013**

## EXECUTIVE SUMMARY

An invasive species is defined as a species that is not native and whose introduction causes, or is likely to cause, economic or environmental harm or harm to human health. Michigan's aquatic ecosystems are experiencing significant negative effects from aquatic invasive species (AIS) that are already present, and the state's waters are continually threatened by new invasions. The introduction of AIS into the Great Lakes and inland state waters is a source of biological pollution that has significant negative effects on natural resources, human health, recreational opportunities, and other human values throughout the state and region. AIS may compete with native species for food and habitat, and can directly or indirectly harm or displace native species, degrade habitat, and alter food webs and energy flow. AIS can also have significant economic effects on waterfront property values, tourism, utilities, and other industries<sup>1</sup>.

Many Great Lakes researchers and managers consider AIS the most important and immediate threat to Great Lakes ecosystems and their food webs, as well as a primary threat to native biodiversity<sup>2 3</sup>. In addition, AIS have serious economic effects in the form of losses (e.g., loss of recreational and commercial fishing opportunities and effects on waterfront property values and tourism) and costs of management and control (for industries, landowners, and local units of government).

A recent report that analyzed the economic effect of existing AIS on businesses and households in Great Lakes states notes that industries directly affected by AIS employ more than 125,000 people across the Great Lakes and that total costs exceed \$100,000,000 per year<sup>4</sup>. When economic losses from all AIS-caused environmental effects are summed, the total economic effect (damage and management/control costs) of AIS in the Great Lakes region is estimated to be as high as \$5.7 billion per year<sup>5</sup>.

The AIS Advisory Council was established per Part 414, Aquatic Invasive Species Advisory Council, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). Through this legislation, the Governor and Legislature directed the AIS Advisory Council to provide recommendations on several topics. These include:

- The state of Michigan's AIS State Management Plan (SMP), which was developed by the Michigan Department of Environmental Quality (MDEQ) in cooperation with the Michigan Department of Natural Resources (MDNR) and the Michigan Department of Agriculture and Rural Development (MDARD).

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<sup>1</sup> Lovell, S. J., S.F. Stone, and L. Fernandez. 2005. The Economic Impacts of Aquatic Invasive Species: A Review of the Literature. *Agricultural and Resource Economics Review*, 35(1): 195-208.

<sup>2</sup> Sala, O., F.S. Chapin, J.J. Armesto, E. Berlow, J. Bloomfield, R. Dirzo, E. Huber-Sanwald, L.F. Huenneke, R.B. Jackson, A. Kinzig, R. Leemans, D.M. Lodge, H.A. Mooney, M. Oesterheld, N.L. Poff, M.T. Sykes, B.H. Walker, M. Walker, and D.H. Wall. 2000. Biodiversity-global diversity scenarios for the year 2100. *Science*, Vol. 287, No. 5459, pp. 1770-1774.

<sup>3</sup> Dextrase, A. and N.E. Mandrak. 2005. Impacts of invasive alien species on freshwater fauna at risk in Canada. *Biol. Invasions*. 2005; 8:13–24.

<sup>4</sup> Rosaen, A.L., E.A. Grover, and C.W. Spencer. 2012. The Costs of Aquatic Invasive Species to the Great Lakes States. Anderson Economic Group LLC, 1555 Watertower Place, Suite 100, East Lansing, MI 48823. <http://www.AndersonEconomicGroup.com>

<sup>5</sup> Pimentel, D. 2005. Aquatic nuisance species in the New York State Canal and Hudson River Systems and the Great Lakes Basin: An economic and environmental assessment. *Environmental Management* 35(5): 692-701.

- Ballast water regulations, as ballast water discharges have been a key source of nonindigenous aquatic species to the Great Lakes basin.
- Organisms in trade, a group of diverse pathways that poses a significant threat to Michigan waters.
- The control and management of *Phragmites australis* (Phragmites), an invasive plant that negatively affects inland lakes and wetlands, as well as Great Lakes coastal areas.

The AIS Advisory Council was further tasked with recommending financial and other resources for implementing the recommendations. The AIS Advisory Council met regularly from spring 2012 to summer 2013. This report summarizes the highlights and recommendations from the AIS Advisory Council's deliberations pursuant to the statutory requirements. Background information on AIS issues in Michigan is available in Michigan's AIS SMP at [www.michigan.gov/aquaticinvasives](http://www.michigan.gov/aquaticinvasives).

### **State Management Plan Update**

The AIS Advisory Council submitted recommendations for changes to the definition of AIS to ensure consistency with the National Invasive Species Council language and recommendations expressing overall support of the AIS SMP with minor modifications to the MDEQ on July 18, 2012. All recommended changes were incorporated into the final AIS SMP, which was submitted to the federal Aquatic Nuisance Species Task Force on March 14, 2013.

### **Ballast Water**

The AIS Advisory Council submitted recommendations to the MDEQ on Michigan's Draft Vessel General Permit and Small Vessel General Permit Clean Water Act, Section 401 Water Quality Certification (401 Certification) on June 25, 2012. Several elements of the draft certification were supported without further modification. One key issue raised in the AIS Advisory Council recommendations was support for the development of a protective numeric water quality-based effluent limit for living organisms; however, the AIS Advisory Council could not come to consensus on the numeric value for such a limit. As a result, the MDEQ modified the draft 401 Certification from a numeric limit to a narrative standard in the final 401 Certification, which was submitted to the United States Environmental Protection Agency (USEPA) on September 27, 2012.

### **Organisms in Trade**

Aquatic plants and animals that have been introduced through channels of trade pose a significant threat to Michigan waters. For the most part, these organisms have been obtained deliberately, such as plants and animals popular for the aquarium, ornamental pond trade, or as culinary products. AIS can be introduced or dispersed into Michigan waters by the pet/aquaria and ornamental pond trade, or by aquaculture. Channels of trade include traditional sales to and through retail stores or markets, as well as increasing sales through the global Internet marketplace.

AIS can also be distributed unintentionally and unknowingly through sales of aquatic species as contaminant species associated with legitimately sold species, or through misidentification and unfamiliarity with a given species' common or scientific name. AIS obtained through trade find their way into lakes and streams through a variety of pathways. Although well intentioned,

uneducated consumers may purposefully release unwanted pets or plant species and associated pathogens, believing it is a humane action without knowing the damaging consequences to the environment.

It is clear that regulations and laws vary widely by each business sector and at the state and federal levels of government. State laws and regulations should be consolidated and streamlined to improve efficiency for industries and to provide better protection for the environment.

### Risk Assessment

The AIS Advisory Council was tasked with making recommendations on a risk assessment process to screen aquatic species proposed for trade to classify species as prohibited, permitted, and restricted.

The AIS Advisory Council recommends phasing in a new regulatory process for listing aquatic species authorized for live commercial importation and sale in Michigan. During the initial implementation phase and creation of an initial permitted species list, the MDARD and MDNR in cooperation with all regulated industries should be allotted 12 months in order to develop a list of all species that are currently in commercial trade in Michigan. The state regulating agencies should bear the cost and burden to evaluate species already in commercial trade in Michigan during the creation of the initial permitted species list. The AIS Advisory Council outlines a streamlined process (Type I evaluation) for evaluating species to create the initial permitted species list. The AIS Advisory Council also recommends a more detailed risk assessment process (Type II evaluation) for evaluating species with uncertain risk and for evaluating subsequent requests for species evaluation.

### Harmonizing Federal and State Law

The AIS Advisory Council believes given the federal government's interest in prohibiting the future introduction and spread of these species into more vulnerable ecosystems in the United States, that Michigan should be acting as a partner in that effort. The AIS Advisory Council recognizes that some of the plants and animals included on federal prohibited lists do not pose a significant risk to Michigan's ecology since there is little chance of them persisting long-term in the state's climate; however, the AIS Advisory Council recommends that all organisms currently listed as injurious wildlife under the federal Lacey Act of 1907 (Lacey Act) or as aquatic federal noxious weeds under the federal Plant Protection Act of 2000 (Plant Protection Act) should be added to Michigan's prohibited/restricted species lists under Part 413, Transgenic and Nonnative Organisms, of the NREPA, to provide national protection. Any new additions to the federal lists should trigger an automatic review for listing in Michigan. Section 41302(2) of Part 413 should be amended by adding language specifically recognizing federal listing as justification for placing organisms on Michigan's prohibited/restricted species list.

### Healthy Organisms Program

Current regulations regarding organisms in trade vary widely by each sector. For example, the aquaculture industry has relatively stringent regulations to minimize introductions of AIS, while the pet and aquarium industries remain unregulated and, potentially, significant AIS introduction threats. The AIS Advisory Council recommends establishment of a program for each business sector involved in the trade of aquatic species in order to close gaps through which AIS might

be introduced by standardizing regulatory requirements across business sectors. Specific recommendations were made for ornamental aquatic species retailers and wholesalers; bait retailers and wholesalers; aquaculture entities as defined in the Michigan Aquaculture Development Act, 1996 PA 199 (Michigan Aquaculture Development Act); and aquatic plant trade. Recommendations addressed licensing/registration and education on AIS.

### Education Program for Buyers and Sellers

Current national educational programs for buyers and sellers, such as Habitattitude and Stop Aquatic Hitchhikers, are underutilized in the state due to the lack of supporting regulation and funding. The AIS Advisory Council recommends the use of existing programs to the greatest extent possible and to expand on those programs when necessary. Initial education efforts should focus on pet and aquarium stores, aquatic plants sellers, and water garden suppliers. To ensure the successful development of an educational program, the inclusion of registration and licensing of the pet trade industry and funding of staff resources must be part of the AIS Program.

### Pure Michigan

The Pure Michigan campaign promotes Michigan's positive features to tourists and residents; therefore, careful consideration needs to be used when connecting the meaning of Invasive species to the campaign as to not be contradictory. To comply with the Pure Michigan brand standards, the AIS Advisory Council recommends working closely with the Michigan Economic Development Corporation. State agencies can utilize current efforts such as the MDEQ's "Keeping Pure Michigan Pure" slogan. To promote good stewardship practices, the AIS Advisory Council recommends partnering Pure Michigan with existing national campaigns such as Clean, Drain, Dry and Habitattitude.

### Collaborating With Other Great Lakes States and Canadian Provinces

Michigan's efforts to protect its economy and environment from AIS could be nullified if neighboring jurisdictions' programs are insufficient to prevent introduction and spread of harmful species. The Great Lakes states and provinces have acted as a region to protect against harmful diversions and water withdrawals. A similar effort could provide greater protection for Michigan's Great Lakes and inland water resources.

Unified action across the Great Lakes basin is needed to develop and deploy consistent AIS prevention, detection, control, and eradication strategies. Methods must be scientifically sound, economically feasible, collaborative, and effective.

The Council of Great Lakes Governors (CGLG) recently adopted a resolution and began an initiative to address AIS from multiple pathways. The AIS Advisory Council endorses the intent of the CGLG and recommends a process that could lead to a regional agreement (or series of agreements) whereby states and provinces work cooperatively to prevent trade of organisms that are or could become invasive.

### **Phragmites Control and Management**

The state of Michigan should support development and approval of long-term biological-based control (bio-control) for Phragmites. It is anticipated that bio-control agents will become available for use in approximately five years. Bio-controls offer the only viable option for

long-term management of Phragmites. Interim measures should be implemented until bio-control becomes readily available. Currently, the best known method for controlling Phragmites is to use a combination of chemical and mechanical control techniques. However, due to financial and ecological constraints, these measures should be focused on slowing the spread and protecting high quality resources from invasion. Funding by the state of Michigan is necessary for the development, distribution, and education on various control methods, and the economic and ecological impacts of Phragmites.

### **Funding**

The AIS Advisory Council's recommendations presented in this report in conjunction with the strategic actions contained in Michigan's recently updated AIS SMP are designed to reduce the costs and negative effects by preventing and managing AIS. A coordinated effort to implement elements of Michigan's AIS SMP is being successfully implemented by Michigan's AIS Core Team using federal grant funding. The AIS Advisory Council reviewed Michigan's current AIS Program and funding, as well as the programs in other states. The AIS Advisory Council recognizes that Michigan spends far less to combat AIS compared to key neighboring states. The AIS Advisory Council recommends continued implementation of the SMP and continued support for the AIS Core Team. To carry out these tasks, the AIS Advisory Council recommends state funding at \$4.1 million to \$5.9 million annually. The AIS Advisory Council recommends that the AIS Program be funded primarily through General Funds.

## 1 INTRODUCTION

Michigan's aquatic ecosystems are experiencing significant negative effects from AIS that are already present, and the state's waters are continually threatened by new invasions. The introduction of AIS into the Great Lakes and inland state waters is a source of biological pollution that has significant negative effects on natural resources, human health, recreational opportunities, and other human values throughout the state and region. AIS may compete with native species for food and habitat, and can directly or indirectly harm or displace native species, degrade habitat, and alter food webs and energy flow. AIS can also have significant economic effects on waterfront property values, tourism, utilities, and other industries<sup>6</sup>.

In response to continuing AIS issues, a Michigan AIS Advisory Council was established effective December 21, 2011, per Part 414 of the NREPA. Subsequently, Part 414 was amended on July 2, 2012, as part of legislation regarding shoreline maintenance along the Great Lakes.

The AIS Advisory Council was tasked with making recommendations regarding:

1. Michigan's comments on the 2011 draft USEPA Vessel General Permit and Michigan's 401 Certification of that permit.
2. The draft update of Michigan's AIS SMP.
3. The trade of living organisms:
  - The definition of AIS.
  - A risk assessment process to screen organisms.
  - Harmonizing federal and state law.
  - Establishing a program to certify disease/pest/contamination free.
  - An education program for safe usage of organisms.
  - Connecting AIS regulation and education to the Pure Michigan campaign.
  - Proposals for collaborating with other states and provinces.
4. Phragmites management and control.
5. Funding (sources/amounts) for implementation of the AIS SMP and funding to implement recommendations on organisms in trade.

Following AIS Advisory Council member appointments by the Governor, the Senate Majority Leader, and the Speaker of the House of Representatives, the AIS Advisory Council convened on April 6, 2012, for the first meeting (AIS Advisory Council member list is included in Appendix A). The AIS Advisory Council held 13 meetings from April 2012 to June 2013. These meetings were held in either in Lansing or Roscommon, Michigan, and were open to the public. In addition, meeting agendas and materials were posted at [www.michigan.gov/aquaticinvasives](http://www.michigan.gov/aquaticinvasives).

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<sup>6</sup> Lovell, S. J., S.F. Stone, and L. Fernandez. 2005. The Economic Impacts of Aquatic Invasive Species: A Review of the Literature. *Agricultural and Resource Economics Review*, 35(1): 195-208.

In order to meet the deadlines established in Part 414 of the NREPA, the AIS Advisory Council submitted recommendations on the MDEQ on Michigan's 401 Certification on June 25, 2012, and the draft AIS SMP on July 18, 2012. Recommendations on organisms in trade, Phragmites management and control, and funding are presented in this report for the first time. The following sections of this report summarize the AIS Advisory Council's activities and recommendations. Key supporting information is included in the appendices.

The AIS Advisory Council has been beneficial as a forum to exchange information and share different viewpoints on issues related to AIS. As a result, the AIS Advisory Council has been successful in building an understanding among a diverse group of partners and providing input for implementation of Michigan's AIS Program.

This report summarizes the highlights and recommendations from the AIS Advisory Council's deliberations pursuant to the statutory requirements. Background information on the AIS issues in Michigan is available in Michigan's AIS SMP at [www.michigan.gov/aquaticinvasives](http://www.michigan.gov/aquaticinvasives).

## **2 STATE MANAGEMENT PLAN UPDATE AND RECOMMENDATIONS**

### **2.1 STATUTORY CHARGE**

324.41407 Final update to plan; recommendations; report.

Sec. 41407. (1) Within 180 days after the effective date of the amendatory act that added this section or within 60 days of the issuance of a draft update to the Michigan aquatic invasive species management plan by the department of environmental quality, whichever is later, the council shall provide recommendations to the department of environmental quality on a final update to the plan. The final update shall address AIS prevention, AIS monitoring, and AIS control and eradication, including rapid response to new AIS infestations. In preparing the final update to the plan, the department of environmental quality shall consult with the advisory council.

(2) The council shall provide its recommendations under subsection (1) to the governor upon request. The recommendations are nonbinding and advisory in nature and may be used at the discretion of and in the manner determined by the governor. The recommendations shall be suitable for use by the executive branch in collaborating with other Great Lakes states and Canadian provinces to create or strengthen regional programs or coordinate state and provincial programs to achieve the purposes of this section.

(3) Within 60 days after the issuance of a final update to the aquatic invasive species management plan, the council shall submit a report with recommendations on the funding necessary to implement the plan and the method of providing that funding. The council shall submit the report to the governor, the senate majority leader, the speaker of the house of representatives, and the standing committees of the senate and house with primary responsibility for natural resources, conservation, agriculture, and commerce.

324.41409 Prevention of introduction and spread of AIS through trade; report; recommendations.

Sec. 41409. (2) In the report under subsection (1), the council shall make recommendations on all of the following:

(a) The definition of aquatic invasive species. Before making recommendations under this subdivision, the council shall consider and address issues related to the domestication and cultivation of and potential beneficial effects of nonnative species and consider the "Invasive Species Definition Clarification and Guidance White Paper" submitted by the definitions subcommittee of the national invasive species advisory committee (ISAC) and approved by ISAC on April 27, 2006.

### **2.2 BACKGROUND**

Michigan's comprehensive AIS SMP outlines new actions for implementation in addition to maintaining and enhancing existing efforts to adequately prevent the introduction of new AIS, prevent the dispersal of established AIS, detect and respond to new invaders, and manage and control AIS to minimize the harmful effects of AIS in Michigan waters, including the Great Lakes, connecting channels, rivers, streams, inland lakes, and wetlands. The AIS SMP identifies strategic actions in categories including legislative and policy, regulation (including compliance, enforcement, and inspection), information and education, research and monitoring, and early detection and rapid response (EDRR).

At the first AIS Advisory Council meeting held on April 6, 2012, the AIS Advisory Council received a draft version of the updated AIS SMP that was already posted for a public comment period beginning on March 23, 2012. Upon review of the draft AIS SMP and over the course of several meetings and discussions, the AIS Advisory Council decided that recommendations on the definition of AIS (included under Section 41409[2] of Part 414 of the NREPA) should be addressed in the AIS SMP. The AIS Advisory Council reviewed the "Invasive Species Definition Clarification and Guidance White Paper" submitted by the definitions subcommittee of the National Invasive Species Advisory Committee (ISAC) and approved by the ISAC on April 27, 2006.

The federal Aquatic Nuisance Species Task Force approved Michigan's Final AIS SMP on June 17, 2013. The final version incorporated changes to address all of the AIS Advisory Council's recommendations and is available at [www.michigan.gov/aquaticinvasives](http://www.michigan.gov/aquaticinvasives).

### **2.3 RECOMMENDATIONS ON THE DEFINITION OF AQUATIC INVASIVE SPECIES AND THE AQUATIC INVASIVE SPECIES STATE MANAGEMENT PLAN**

The AIS Advisory Council drafted updated text for the definition of AIS for the SMP that reflects the most widely used definition of invasive species that is derived directly from the National Invasive Species Council. The definition is as follows: "An invasive species is defined as a species that is not native and whose introduction causes, or is likely to cause, economic or environmental harm or harm to human health." The AIS Advisory Council, in consultation with key industry representatives, also reworked the examples used in the introduction section of the AIS SMP to closely follow the wording contained in "Invasive Species Definition Clarification and Guidance White Paper." The AIS Advisory Council came to a consensus agreement on this language and submitted recommendations to William Creal, Chief, Water Resources Division (WRD), MDEQ, on July 18, 2012 (Appendix B).

Additional recommendations included the recognition of overall support of the AIS SMP goals and need for additional language recognizing the costs to industries for the prevention, management, and control of AIS. These recommendations were also included in the July 18, 2012, submittal to William Creal, and are included in Appendix B.

### **3 BALLAST WATER**

#### **3.1 STATUTORY CHARGE**

324.41411 Draft next vessel general permit; development of recommendations by council.

Sec. 41411. The council shall develop recommendations regarding this state's comments on the draft next vessel general permit and certification response to the draft next vessel general permit under section 401 of title IV of the federal water pollution control act, 33 USC 1341, including a proposed ballast water treatment standard. The council shall provide its recommendations to the governor upon request. Such recommendations are nonbinding and advisory in nature and may be used at the discretion of and in the manner determined by the governor. The council's recommendations under this section shall be suitable for use by the executive branch in collaborating with other Great Lakes states to achieve a consistent position on the draft next vessel general permit. In developing its recommendations, the council shall regularly consult with the Great Lakes commission and the department of environmental quality, including the office of the Great Lakes.

#### **3.2 BACKGROUND**

Ballast water is taken on board large vessels to provide stability and balance during a voyage and during the loading/unloading of cargo. Oceangoing vessels (also known as Salties) that transit the Great Lakes through the St. Lawrence Seaway have the potential to introduce new AIS to the Great Lakes basin when ballast water contaminated with AIS taken on board from another region is discharged. Historically, a majority of the nonindigenous species that established populations in the Great Lakes during the period following expansion of the St. Lawrence Seaway (from 1959 onward) were introduced via ballast water discharges.

##### *Michigan's Comments on the USEPA's Next Draft Vessel General Permit*

The USEPA's next draft Vessel General Permit was released on November 30, 2011. Comments on the draft were due to the USEPA by February 21, 2012. Part 414 of the NREPA, which created the AIS Advisory Council, was signed and became effective on December 21, 2011, and appointments to the AIS Advisory Council by the Governor and the Legislature were not completed early enough to allow for convening the AIS Advisory Council, or to develop recommendations to meet the comment deadline. Due to these timing issues, the AIS Advisory Council focused efforts on making recommendations on the 401 Certification.

##### *Michigan's 401 Certification of the USEPA's Next Draft Vessel General Permit*

The first AIS Advisory Council meeting was convened on April 6, 2012. The original deadline set by the USEPA for the MDEQ to submit the 401 Certification was June 30, 2012. The AIS Advisory Council quickly learned about the complex ballast water regulatory framework via presentations from the MDEQ and the United States Coast Guard, multiple discussions during AIS Advisory Council meetings, and through the exchange of information in between meetings.

The AIS Advisory Council developed recommendations based on the draft version of the 401 Certification that was made available for public comment beginning May 7, 2012. AIS Advisory Council recommendations were submitted on June 25, 2012, to the MDEQ since the MDEQ is the agency responsible for issuing the 401 Certification.

### **3.3 RECOMMENDATIONS FOR MICHIGAN'S DRAFT VESSEL GENERAL PERMIT AND SMALL VESSEL GENERAL PERMIT CLEAN WATER ACT, SECTION 401 WATER QUALITY CERTIFICATION**

The MDEQ submitted the draft 401 Certification to the USEPA on May 7, 2012 (Appendix C). The AIS Advisory Council was able to review the draft 401 Certification and had the opportunity to provide recommendations. One key issue raised by the AIS Advisory Council was support for the development of a protective numeric water quality-based effluent limit for living organisms; however, the AIS Advisory Council could not come to consensus on the numeric value for such a limit. The AIS Advisory Council's detailed recommendations were submitted to William Creal, Chief, WRD, MDEQ, on June 25, 2012 (Appendix D). As a result of the AIS Advisory Council's recommendations, the MDEQ modified condition No. 3 from the draft 401 Certification from a numeric limit to a narrative standard and removed provision No. 7 regarding the future regulation of lakers (vessels that operate entirely within the Great Lakes). The final 401 Certification was submitted to the USEPA on September 27, 2012 (Appendix E).

## **4 ORGANISMS IN TRADE**

### **4.1 STATUTORY CHARGE**

324.41409 Prevention of introduction and spread of AIS through trade; report; recommendations.

Sec. 41409. (1) Within 240 days after the effective date of the amendatory act that added this section, the council shall submit a report with recommendations for legislation or rules to prevent the introduction and spread of AIS through trade. The council shall submit the report to the governor, the senate majority leader, the speaker of the house of representatives, and the standing committees of the senate and house with primary responsibility for natural resources, conservation, agriculture, and commerce. In preparing the report, the council shall review the AIS laws of this state and other jurisdictions, including the other Great Lakes states.

(2) In the report under subsection (1), the council shall make recommendations on all of the following:

(a) The definition of aquatic invasive species. Before making recommendations under this subdivision, the council shall consider and address issues related to the domestication and cultivation of and potential beneficial effects of nonnative species and consider the "Invasive Species Definition Clarification and Guidance White Paper" submitted by the definitions subcommittee of the national invasive species advisory committee (ISAC) and approved by ISAC on April 27, 2006.

(b) Risk assessment processes to screen aquatic species proposed for trade and to screen pathways of introduction and spread. The risk assessment processes shall consider potential net harm to public health and safety, the environment and natural resources, and the economy. The processes shall place the burden to demonstrate the harmlessness of an aquatic species or pathway on the importer or other person responsible for introduction or distribution. The risk assessment process for species shall classify species into 3 lists: "prohibited", "permitted", and "restricted".

(c) Harmonizing federal and state law so that aquatic species on federal lists of either prohibited or permitted species of plants and animals are placed on the appropriate lists of this state.

(d) Establishing a program for aquatic species in trade to certify that the organisms are free of disease, insect pests, and incidental contamination by other species.

(e) An education program on safe-usage practices directed to both buyers and sellers of aquatic species in trade.

(f) Connecting regulations and education on aquatic species in trade to the protection of this state's natural resources as a component of the pure Michigan tourism advertising campaign.

(g) Financial and other resources for implementing recommendations under this subsection.

(h) Proposals for collaborating with other Great Lakes states and Canadian provinces to create or strengthen regional programs or coordinate state and provincial programs to achieve the goals set forth in subsection (1).

(3) In preparing the report required by this section, the council shall consult with representatives of organizations and businesses that deal with organisms in trade, including the aquarium, bait, pet, water garden, horticulture, aquaculture, and shipping trades.

## 4.2 BACKGROUND

Aquatic plants and animals that have been introduced through channels of trade pose a significant threat to Michigan waters. For the most part, these organisms have been obtained deliberately, such as plants and animals popular for the aquarium, ornamental pond trade, or as culinary products. Channels of trade include traditional sales to and through retail stores or markets, as well as increasing sales through the global Internet marketplace. AIS can also be distributed unintentionally and unknowingly through sales of aquatic species as contaminant species associated with legitimately sold species, or through misidentification and unfamiliarity with a given species' common or scientific name. AIS obtained through trade find their way into lakes and streams through a variety of pathways. Although well intentioned, uneducated consumers may purposefully release unwanted pets or plant species and associated pathogens, believing it is a humane action without knowing the damaging consequences to the environment.

The deadline for the recommendations on organisms in trade was originally set for August 21, 2012. Due to the extensive complexities of the organisms in trade recommendations, the AIS Advisory Council submitted an August 17, 2012, letter to the Governor, Senate Majority Leader, and Speaker of the House of Representatives requesting an extension for submitting recommendations on organisms in trade. Over the course of the next year, the AIS Advisory Council created subgroups to address each objective and worked diligently on their recommendations. The following recommendations are presented for the first time in this report.

Extensive background readings and presentations from experts provided the foundation for the AIS Advisory Council's discussions and recommendations. In addition, a variety of stakeholders in the organisms in trade industry were invited to the October 25, 2012, AIS Advisory Council meeting to discuss their opinions and concerns in regard to state regulations, AIS vectors, education, and communication. Representatives from the bait, landscape and nursery, and pet trade industries, as well as a herpetology expert were present. In addition, AIS Advisory Council members representing the horticulture, aquaculture, and shipping industries were present for the discussion. Some common points of interest included an appreciation for appropriate and fairly applied regulation, concern over the lack of "box" stores regulation, and the importance of effective communication and education for all parties involved.

It is clear that regulations and laws vary widely by each business sector and at the state and federal levels of government. State laws and regulations should be consolidated and streamlined to improve efficiency for industries and to provide better protection for the environment.

For the purpose of the recommendations regarding organisms in trade, especially for the recommendations for harmonizing federal and state prohibited species lists, the AIS Advisory Council took into consideration the definition of aquatic species according to Sections 324.45101-324.49103, Aquatic Species, of the NREPA. Aquatic Species of the NREPA establishes regulations, as well as the MDNR director's authority, for fish, reptiles, amphibians, mollusks, crustaceans, and wigglers. Per Sections 324.47301a and 324.48702a of Aquatic Species of the NREPA: "Aquatic species' means fish, reptiles, mollusks, crustacea, minnows, wigglers, and amphibians of the class amphibia." Furthermore, Section 324.48701 of Aquatic Species of the NREPA provides the following definitions:

- (a) "Amphibian" means any frog, toad, or salamander of the class amphibia.
- (b) "Crustacea" means freshwater crayfish, shrimp, or prawn of the order decapoda.
- (h) "Mollusks" means any mollusk of the classes bivalvia and gastropoda.
- (n) "Reptiles" means any turtle, snake, or lizard of the class reptilia.

Section 324.48701 also defines "game fish" and "nongame fish" to include all types of fish while Section 324.48728 defines "wigglers" to include mayfly nymphs or any other aquatic insect nymphs or larvae.

For the purpose of the AIS Advisory Council's recommendations and this report, the organisms listed above, in addition to aquatic plants, are considered aquatic species.

## **4.3 RISK ASSESSMENT PROCESSES**

### **4.3.1 Statutory charge**

324.41409 Prevention of introduction and spread of AIS through trade; report; recommendations.

Sec. 41409. (2)(b) Risk assessment processes to screen aquatic species proposed for trade and to screen pathways of introduction and spread. The risk assessment processes shall consider potential net harm to public health and safety, the environment and natural resources, and the economy. The processes shall place the burden to demonstrate the harmlessness of an aquatic species or pathway on the importer or other person responsible for introduction or distribution. The risk assessment process for species shall classify species into 3 lists: "prohibited", "permitted", and "restricted."

### **4.3.2 General Considerations**

Risk assessment is used to determine the potential for a species to become invasive (i.e., to harm the environment, the economy, or human health). Risk assessment is an important screening process to aid in preventing the introduction of new AIS and limiting the spread of AIS, and should be used as the scientific foundation for regulations.

The creation and implementation of a permitted species list to regulate the commercial trade of live aquatic plants and animals is a new approach for most industries that, to this point, have only been subject to regulation via the Michigan prohibited/restricted species lists. Legislation to regulate permitted species is currently lacking, with the exception of the Michigan Aquaculture Development Act, which authorizes a list of approved aquaculture species. General types of allowable commercial live bait (e.g., native minnows, wigglers, and crayfish) are noted in Part 487, Sport Fishing, of the NREPA, but individual species are not listed. All industries (aquaculture, bait, horticulture, aquarium, live food markets, and Internet trade) and individuals are currently subject to laws regarding the possession and introduction of live prohibited and restricted species (Part 413 of the NREPA). Additionally, there are other state and federal regulations to determine a prohibited or restricted species (e.g., Insect Pest and Plant Disease Act, 1945 PA 72, as amended; Federal Noxious Weed List; United States Department of Agriculture's Animal and Plant Health Inspection Service reviews; and the Lacey Act).

The commercial industry representatives involved in trade of aquatic species expressed support of the existing regulatory processes defined within Michigan and continuing under the prohibited/restricted species lists without being subject to a permitted species list as the preferred method of regulation. Industry representatives believe that permitted species list regulation would impose additional burdens and costs in order to comply. They expressed concern that this may place businesses subject to a Michigan permitted species list regulation at a competitive disadvantage if other states do not also follow the same standards. The AIS Advisory Council recognized and discussed these concerns at length, as well as the benefits of regulating under a permitted species list approach (e.g., adding clarity, adding an additional layer of protection, and being proactive in evaluating species), as requested within the legislative charge. The following recommendation under Section 4.3.3 reflects the legislative charge given to the AIS Advisory Council. The recommended process is science-based, designed to not disrupt ongoing commerce, and will provide a transparent risk assessment process before new aquatic species can be introduced into Michigan.

### 4.3.3 Recommendations

1. The AIS Advisory Council recommends legislation authorizing the state to establish and administer a permitted species list regulating the commercial sale of live aquatic species (see Section 4.2 for a list of organisms) to the public.
  - a. The AIS Advisory Council recommends that the director of the MDARD have the authority to place aquatic plants and insects on the permitted species list for commercial sale after completing the risk assessment process recommended below.
  - b. The AIS Advisory Council recommends that the director of the MDNR have the authority to place aquatic organisms other than aquatic plants and insects on the permitted species list for commercial sale after completing the risk assessment process recommended below.
2. The AIS Advisory Council recommends that the MDNR and MDARD review other states' prohibited, restricted, and permitted species lists, when appropriate, and subject them to the risk assessment process as described in this document to provide basinwide protection and a level economic playing field.
3. The AIS Advisory Council recommends the use of streamlined risk assessment processes whenever possible to facilitate timely decision-making, especially for organisms that likely pose low risk to cause environmental or ecological harm or harm to human health.
4. The AIS Advisory Council recommends the continued use of public input in the prohibited/restricted species listing process.
5. The AIS Advisory Council recommends that state regulatory and management agencies use these same risk assessment processes before they may bring any new aquatic species into the state for use/release in or on the waters or lands of Michigan.
6. The AIS Advisory Council recommends the definitions of "prohibited species" and "restricted species" in Part 413 of the NREPA be replaced and a definition of "permitted species" added. The AIS Advisory Council recommends the definitions of "permitted," "restricted," and "prohibited" be based on the acceptable public/private behavior, possession, or activities allowed with species listed under each label since the terms themselves are directly related to an understanding of acceptable conduct. The current definitions of "prohibited" and "restricted" in Part 413 are not related to acceptable conduct but instead are based on introduction and infestation range of a species in Michigan. The following definitions are recommended:
  - a. Permitted Species: A list of aquatic species authorized for live *commercial* importation and sale in Michigan without restriction. This list shall include species that are native to the state or that have been shown to pose no significant threat to harm Michigan's environment, economy, or human health. Aquatic organisms not included on the permitted species list may not be commercially imported, marketed, or sold live to the public in Michigan.
  - b. Prohibited Species: A list of aquatic species prohibited from any type of *live possession, transport, or sale in Michigan* except under permit issued by the MDNR director. Species on this list shall include nonnative or genetically modified aquatic

plant and animal species that cause harm to Michigan's or the nation's environment, economy, or human health or are likely to cause harm should they be introduced. Possession permits for species on this list are available but are limited to research or educational activities to improve AIS management and control.

- c. **Restricted Species:** A list of nonnative aquatic species that have established populations in Michigan and continue to harm the environment, economy, or human health. Restricted species may not be commercially marketed or sold live to the public within this state. They may not be purposefully stocked, planted, or introduced to any land or water within the state whether public or private. Restricted species may be subject to restricted/limited use and possession by the general public for other acceptable purposes as determined by the regulating agency. Examples include:
  - (1) An invasive plant or animal that is edible and recreational public harvest for the purpose of personal consumption is supported by the regulating state agency.
  - (2) An invasive plant or animal that has industrial commercial value and harvest/removal from the wild for designated commercial purposes is approved by the regulating state agency.

7. The AIS Advisory Council recommends populating the lists as follows:

a. Permitted Species List:

Consistent with the statutory charge identified in Section 4.3.1, the presumption in this process is no new aquatic species may enter the state for commercial marketing, sale, and distribution to the general public unless it has first been determined to not be an AIS threat. The industry, business, person, or state regulatory or management agency interested in initiating commercial trade of a species not listed on the permitted species list shall be responsible for petitioning the state to conduct a review of any desired additions to the permitted species list. The state will not be required to review any additional species for placement on the permitted species list that have not first been formally petitioned for listing by the regulated industry, business, or person. However, the state may conduct a risk assessment without petition.

The AIS Risk assessment determination process must be science-based. The component risk assessment models should be peer reviewed. The listing process for the permitted species list should provide an opportunity for public notice and input. There should also be a procedure for a person adversely affected by a decision on a petition to add a species to the permitted species list to appeal that decision. The risk assessment process should be designed to rapidly approve aquatic species for the permitted species list when there is reasonable evidence that the species in question does not pose an invasive risk.

- (1) Aquatic species that are native anywhere within the political boundaries of the state of Michigan will not be listed as invasive and shall be included on the permitted species list as described in recommendation 8, below.
  - (a) Other considerations including threatened and endangered species listing may preclude a native species from commercial trade but those considerations are not covered under this charge.

- (2) Nonnative aquatic species that are currently in commercial trade in Michigan shall be included on the permitted species list if it satisfies the screening risk assessment process described in recommendation 8, below.
  - (a) Species currently listed on the approved aquaculture list in the Michigan Aquaculture Development Act shall be added to the permitted species list without the need for further risk assessment review.
  - (b) Aquatic species that, at the time of the AIS Advisory Council's recommendation, are: (1) currently not in trade in Michigan or (2) unknown or unanticipated by state regulators may be added to the permitted species list upon evaluation using the risk assessment procedure described under recommendation 8, below.

b. Prohibited Species List:

- (1) Any species currently listed as prohibited or restricted under Part 413 of the NREPA shall be reviewed for appropriate listing as a prohibited species under the new definitions proposed under recommendation 6, above.
- (2) New species may be added to this list by the process established under Part 413 of the NREPA following a risk assessment that identifies a species as causing or likely to cause harm to the environment, economy, or human health.
  - (a) Animals listed under the Lacey Act or plants listed under the Plant Protection Act, also known as the Federal Noxious Weed List, will be reviewed for listing on the prohibited species list; i.e., Silver carp (*Hypophthalmichthys molitrix*) and Hydrilla (*Hydrilla verticillata*).
  - (b) Aquatic species that are likely to harm Michigan's environment, economy, or human health shall be reviewed for listing on the prohibited species list even if the organism is not currently on federal lists; i.e., grass carp (*Ctenopharyngodon idellus*) and bitterling (*Rhodeus sericeus*).
  - (c) Aquatic species that are naturalized in Michigan and the state has a vested interest in managing, controlling, or limiting their dispersal to additional waters may be reviewed for listing on the prohibited species list; i.e., Eurasian water milfoil (*Myriophyllum spicatum*) and quagga mussels (*Dreissena bugensis*).
  - (d) New species petitioned for inclusion on the permitted species list for which the risk assessment screening process indicated a high invasive species risk may be reviewed for listing on the prohibited species list.

c. Restricted Species List:

- (1) Any species currently listed as prohibited or restricted under Part 413 of the NREPA are to be reviewed for possible listing as restricted species under the new definitions listed under recommendation 6, above. The restricted species list shall be limited to only those invasive aquatic species that have established

populations in Michigan and have legitimate consumptive value by citizens of this state and whose consumptive activities will either aid in the management or control of that particular species and have been specifically authorized by either statutory language or order language by the regulating state agency.

8. Implementation Phase – Creating the First Permitted Species List:

a. During the implementation phase and creation of an initial permitted species list, the appropriate state agency, in cooperation with the commercial industries, should be allotted 12 months to develop a list of all species that are currently in commercial trade in Michigan. The state will then have 12 months to complete the following assessments on those species:

(1) Aquatic species that are native anywhere within the political boundaries of the state of Michigan will not be listed as invasive and shall be included on the permitted species list per the criteria listed below:

(a) In order to populate the permitted species list using this recommendation, the MDNR and the MDARD, in cooperation with commercial industries, shall develop a list of recognized native species currently in trade.

(b) Other considerations, including threatened and endangered species listing, may preclude a native species from commercial trade but those considerations are not covered under this charge.

(2) Type I Risk Assessment: Nonnative aquatic species already in trade shall be evaluated based on the following protocol:

(a) Aquatic species, excluding aquatic plants, that have been widely traded for more than five years and there is no evidence of causing harm to the environment, economy, or human health in the Great Lakes region, should be added to the permitted species list without further review (Figure 1).

(b) Aquatic species, excluding aquatic plants, that have been in trade less than five years or if there is evidence of causing harm to the environment, economy, or human health in the Great Lakes region (Figure 1), should be run through the Type II risk assessment described in recommendation 8(3). below.

(c) Due to the extensive licensing and regulatory relationship between the horticulture industry and the MDARD, the MDARD, in cooperation with the horticulture industry, will develop a list of aquatic plants currently in commercial trade in Michigan.

1) Any aquatic plants on the list shall be added to the permitted species list without the need for further risk assessment review.

2) Any aquatic plants that are not on the list should be run through the Type II assessment to determine listing as described in recommendation 8(3), below.

- (3) Type II Risk Assessment: Risk assessment screening is evolving, and future advances in scientific understanding and movement toward consistent regulation need to be considered. Therefore, the AIS Advisory Council recommends the two risk assessment processes recommended in this section be reviewed at the discretion of the MDARD and MDNR. Any modifications shall be made at the discretion of the Michigan Commission of Agriculture and Rural Development and the Natural Resources Commission.

Species shall be evaluated based on the following protocol (Figure 2):

- (a) Aquatic plants shall be evaluated under the following Weed Risk Assessment Model for the United States:
- 1) Plant Protection and Quarantine (PPQ) Weed Risk Assessment. United States Department of Agriculture's Plant Protection and Quarantine, Plant Epidemiology, and Risk Analysis Laboratory, Raleigh, North Carolina: [www.people.umass.edu/bethanyb/Koop et al 2011.pdf](http://www.people.umass.edu/bethanyb/Koop%20et%20al%202011.pdf)
    - a) The PPQ Weed Risk Assessment system is specific to an individual plant. Plant cultivars, varieties, and hybrids are genetically different from the parent(s) species and others within a species and may not exhibit the same reproductive, morphological, or physiological traits. The AIS Advisory Council recommends that plant cultivars, varieties, and hybrids should be assessed as individual plants.
- (b) Fish, reptiles, amphibians, mollusks, crustaceans, and aquatic insects shall be evaluated under the following risk assessment model developed by the United States Fish and Wildlife Service:
- 1) United States Fish and Wildlife Service, Aquatic Fisheries and Resources Program: Injurious Wildlife and Invasive Species Prevention/Keeping Risky Aquatic Species Out of the United States: [www.fws.gov/injuriouswildlife/Injurious\\_prevention.html](http://www.fws.gov/injuriouswildlife/Injurious_prevention.html)
- (4) In creating the initial permitted species list of aquatic species already in trade in Michigan, the AIS Advisory Council makes the following recommendations:
- (a) The state regulating agencies should bear the cost to evaluate species already in commercial trade in Michigan during the creation of the initial permitted species list.
  - (b) The commercial industry should be allowed to continue operating unimpeded with any species currently in commercial trade that has been properly petitioned for review and inclusion on the permitted species list while the state of Michigan conducts its review and finalizes the list.
  - (c) Any Michigan business or person involved in the commercialization or sale of an aquatic species that are in possession of an aquatic species that were not previously prohibited or restricted species under Part 413 of the NREPA, but did not pass the risk assessment review and were therefore

placed on the new prohibited/restricted species lists, should be compensated at fair market value by the state of Michigan for the loss of that species product they had in their possession at that time.

9. Adding Future Species to the Permitted Species List:

- a. After the initial establishment of a permitted species list, any aquatic species not listed on the permitted species list may not be imported, marketed, or sold live to the general public.
- b. Any business or person involved in the commercialization or sale of an aquatic species shall have the opportunity to petition the state to review and add a new species to the permitted species list for future commercialization and sale to the general public in Michigan. In petitioning the state for listing a new species, the AIS Advisory Council recommends the following:
  - (1) The petitioner shall bear the full responsibility to demonstrate the harmlessness of the species being petitioned following the Type II assessment process recommended by the AIS Advisory Council and described above in recommendation 8(3), above, and in Figure 2. The petitioner shall be responsible for providing background on the species that is requested by the state of Michigan in order to perform the Type II assessment. Any prior background materials generated as a result of a federal agency review and identified by the petitioner shall be considered by the state of Michigan.
  - (2) The petitioner shall pay a reasonable fee that does not exceed the administrative costs for the state of Michigan to review the petitioned species.

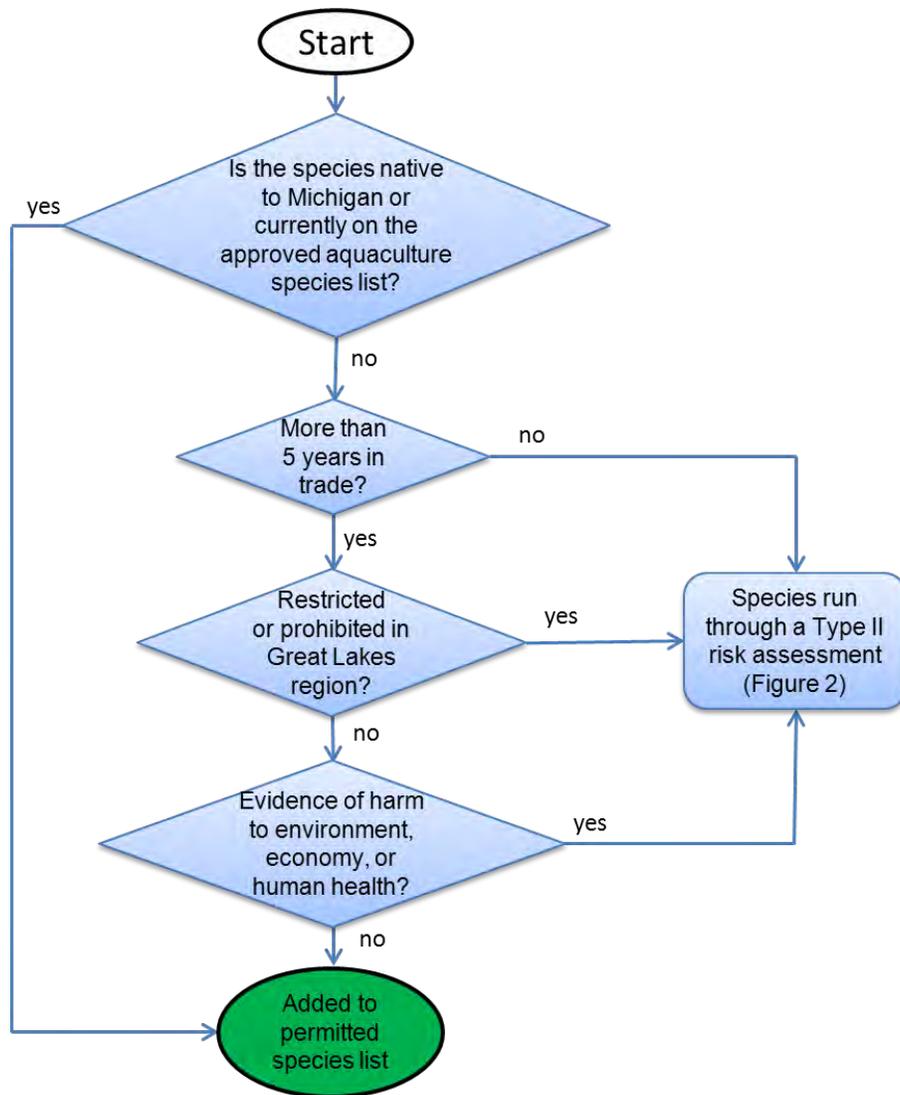


Figure 1. Implementation phase Type 1 risk assessment flow chart for organisms other than aquatic plants; see recommendations 8(2)(a) and 8(2)(b) above.

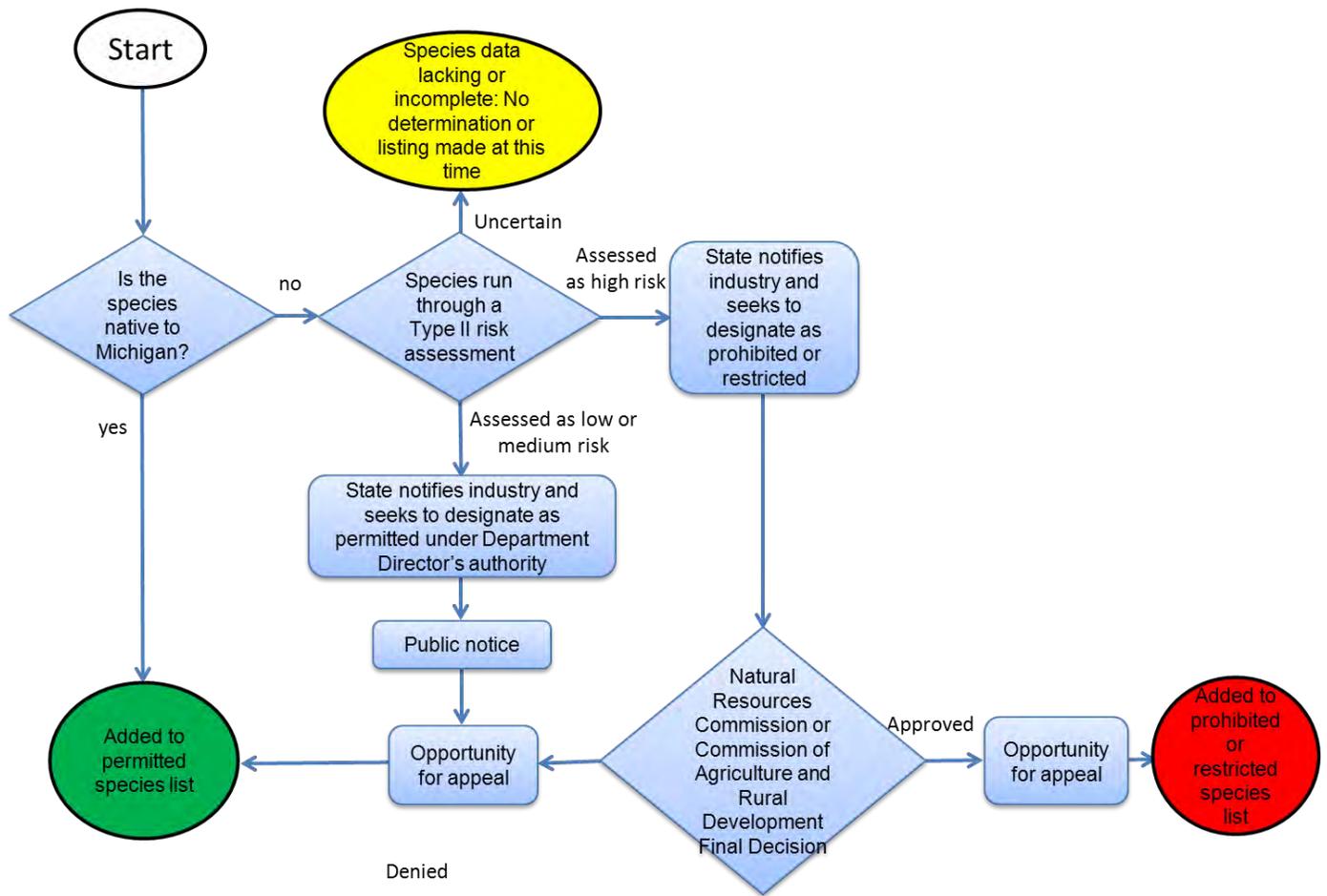


Figure 2. Type II risk assessment flow chart; see recommendation 8(3) above.

## **4.4 HARMONIZING FEDERAL AND STATE LAW FOR PROHIBITED SPECIES**

### **4.4.1 Statutory Charge**

324.41409 Prevention of introduction and spread of AIS through trade; report; recommendations.

Sec. 41409(2)(c) Harmonizing federal and state law so that aquatic species on federal lists of either prohibited or permitted species of plants and animals are placed on the appropriate lists of this state.

### **4.4.2 Background**

The AIS Advisory Council believes that given Michigan's central place in the Great Lakes region, the state should not only be a regional but also a national leader in the fight against AIS. As such, it is important for Michigan to establish its state regulations with state, as well as national, interests in mind and to harmonize state law with federal law for prohibited species. Harmonization of state and federal laws would also facilitate cooperative enforcement efforts.

The AIS Advisory Council began discussing harmonizing federal and state law on April 26, 2012. The AIS Advisory Council was given numerous presentations on current federal and state listed species, as well as the time line for listing a species at the state level. After much discussion, the AIS Advisory Council came to a consensus on recommendations.

### **4.4.3 Recommendations**

The AIS Advisory Council recommends all organisms that are currently listed as injurious wildlife under the Lacey Act or as aquatic federal noxious weeds under the Plant Protection Act should be added to Michigan's prohibited/restricted species lists under Part 413 of the NREPA if not already listed. See Appendix F and Appendix G for additional information regarding justifications and species-specific analyses.

The AIS Advisory Council recommends in the future any new organisms listed under the Lacey Act or as aquatic federal noxious weeds under the Plant Protection Act should automatically trigger a review for listing in Michigan as either prohibited or restricted under Part 413 of the NREPA following the protocol, public notification requirements, and time line established in Part 413.

The AIS Advisory Council recommends Section 41302(2) of Part 413 of the NREPA be amended by adding language specifically recognizing federal listing as injurious wildlife under the Lacey Act or as aquatic federal noxious weed under the Plant Protection Act as a justification for placing organisms on Michigan's prohibited/restricted lists. Proposed language is included in Appendix H.

The AIS Advisory Council recommends adding language to Section 41302(2) of Part 413 of the NREPA to identify Michigan's leadership role in the Great Lakes region in preventing new introductions of AIS.

## **4.5 HEALTHY ORGANISMS**

### **4.5.1 Statutory charge**

324.41409 Prevention of introduction and spread of AIS through trade; report; recommendations.

Sec. 41409(2)(d) Establishing a program for aquatic species in trade to certify that the organisms are free of disease, insect pests, and incidental contamination by other species.

### **4.5.2 Background**

The AIS Advisory Council reviewed current regulations for organisms in trade and in consultation with a panel of individuals conducting business within the trade of organisms, determined that current regulations vary widely by each sector. For example, the aquaculture industry has relatively stringent regulations to minimize introductions of AIS, while the pet and aquarium industries remain unregulated and, potentially, pose significant AIS introduction threats. The following recommendations are intended to standardize regulatory requirements across business sectors while closing gaps through which AIS might be introduced.

### **4.5.3 Recommendations**

Due to the difficulty of listing all potential diseases or pests and the prohibitive costs of proving that an organism is entirely "free" of disease, the AIS Advisory Council recommends that a disease, insect pest, and incidental organism contamination certification program be based on established lists of specified agents. In developing a certification program, it is recommended that, where applicable, format and regulatory response model others already in place. For example, the Michigan Reportable Animal Disease List specifies diseases and conditions required to be reported to state animal health officials. All listings describe actions to be taken by officials; these actions vary from simply recording the fact that a disease has been diagnosed to triggering extensive, multiagency control and eradication efforts.

The AIS Advisory Council recommends that licensing should be required through statute similar to other existing licensing programs, with provisions for enforcement including fines and license revocation in accordance with the Administrative Procedures Act, 1969 PA 306, as amended. Licensing provides a means of identifying entities in these business sectors, facilitating communication and education. It also is a means to securing funding necessary for conducting the program. Under current staffing and funding levels, the listed state agencies will not be able to take on these additional responsibilities. Funding, through General Fund dollars or license fees, will be necessary for these changes to be implemented.

The AIS Advisory Council recommends that a program be established for each business sector involved in the trade of aquatic species as described below. For definitions of ornamental aquatic species retailer and wholesaler, and hazards analysis and critical control point, refer to Appendix I.

1. Ornamental aquatic species retailers:
  - a. Establish a licensing program with annual renewal required (MDARD).
  - b. Education on Hazards Analysis and Critical Control Point (HACCP) systems at wholesale level, other invasive prevention methodologies, and programs.

- c. Promote seller participation in a program, such as Habitattitude, that allows return or provides guidance for alternative disposal of unwanted organisms. Educate consumers on the potential detrimental effects of release of aquatic organisms into the environment.
2. Ornamental aquatic species wholesalers:
    - a. Establish a licensing program with annual renewal required (MDARD).
    - b. Required HACCP program:
      - (1) Prohibited species should be specified.
      - (2) Training - recertification, as part of licensing, should be required.
    - c. Third party or state audit system.
  3. Bait retailers:
    - a. Current licensing program with annual renewal required (MDNR).
    - b. Education:
      - (1) Don't Dump Your Bait promotion.
      - (2) Information on HACCP (no program required as HACCP impacts are delivered at the wholesale level; this recommendation is for providing education about that requirement and about HACCP in general).
      - (3) Identification and disposal of unknown species.
  4. Bait wholesalers:
    - a. Licensing (currently required); annual renewal required (MDNR).
    - b. Required HACCP program:
      - (1) Permitted species should be specified.
      - (2) Training - recertification should be required.
    - c. Third party or state audit system.
  5. Aquaculture entities as defined in the Michigan Aquaculture Development Act:
    - a. Current licensing program with annual renewal required (MDARD).
    - b. HACCP program requirement:
      - (1) Permitted species should be specified.
      - (2) Training - recertification should be required.
    - c. Third party or state audit system.
  6. Aquatic plant trade (e.g., water gardens):
    - a. Licensing/registration (businesses engaged in aquatic plant trade only and nurseries selling aquatic plants); annual renewal required (MDARD). Note: nurseries are already required to be licensed under MDARD; the AIS Advisory Council recommends this be an additional component of the nursery license for those nurseries engaged in aquatic plant trade at no additional charge.
    - b. Required HACCP program:
      - (1) Training - recertification should be required.
    - c. Education of consumers.
    - d. Third party or state audit system.

The AIS Advisory Council recommends MDARD or MDNR as indicated above should be the primary contact department to maintain registry/licensee lists and licensing requirements. The MDARD or MDNR, respectively, shall provide educational and outreach materials to the specific trade groups.

The AIS Advisory Council recommends HACCP programs be developed specifically by and for the individual trade entity, by state agencies, or combinations. Alternatively, HACCP programs may be developed by industry organizations as models available for adoption. HACCP programs should be designed to optimize identification and exclusion of disease, pests, and contamination by other species, within the processing and marketing system. State agency review and approval of proposed HACCP programs will be required to ensure these objectives are included and met.

The AIS Advisory Council recommends education programs to be developed through commercial vendors or in-house, and should include modules for both the business personnel and their customers. Established national programs, such as Habitattitude and Don't Dump Your Bait, should be utilized and promoted. These and additional education-related recommendations are included in Section 4.6.

The AIS Advisory Council recommends training programs for HACCP and education programs may be developed by state agencies, Michigan State University (MSU), Michigan Sea Grant, etc. Online options should be available. Recertification should be required at regular intervals (three to five years).

## **4.6 EDUCATION PROGRAM FOR BUYERS AND SELLERS**

### **4.6.1 Statutory Charge**

324.41409 Prevention of introduction and spread of AIS through trade; report; recommendations.

Sec. 41409. (2)(e) An education program on safe-usage practices directed to both buyers and sellers of aquatic species in trade.

### **4.6.2 Background**

The AIS Advisory Council discussed the need and potential focus areas for developing an education program for buyers and sellers of aquatic species in trade. In addition to presentations and discussions at the AIS Advisory Council's meetings, a work group was developed to review existing materials and to draft the AIS Advisory Council recommendations. The work group found that several existing programs (e.g., Habitattitude) are available to assist in the development of an education program. Currently, these programs are underutilized in Michigan due to the lack of supporting regulation and funding. Therefore, the focus of the following recommendations is to utilize the existing programs to the greatest extent possible and to expand on those programs when necessary. To ensure the successful development of an education program, the inclusion of registration and licensing of the pet trade industry and funding of staff resources must be part of an integrated AIS management program.

### **4.6.3 Recommendations**

The AIS Advisory Council recommends prioritizing educational efforts with the initial focus on pet and aquarium, aquatic plant and water garden retailers, wholesalers, and other suppliers.

The AIS Advisory Council recommends developing and implementing a statewide strategy to promote, using partners such as MSU Extension, conservation districts, and Michigan Sea Grant, safe usage practices for buyers and sellers, and utilize and build on existing guidelines outlining safe usage practices such as those developed and adopted by the federal Aquatic Nuisance Species Task Force.

The AIS Advisory Council recommends implementing a statewide strategy to facilitate voluntary participation of sellers in existing programs, such as Habitattitude, AIS HACCP, Protect Your Waters – Stop Aquatic Hitchhikers, or other similar AIS outreach campaigns (this is for pet and aquarium stores, aquatic plants sellers, and water gardens suppliers).

The AIS Advisory Council recommends applying education and outreach efforts consistently across different marketplaces, including brick and mortar stores, Internet-based sellers, trade shows, and others. State agencies should develop strategies for education and outreach targeted at potential threats from Internet trade of AIS, based on the results of the Great Lakes Commission's Internet trade in AIS study.

The AIS Advisory Council recommends supporting the expansion of education and outreach efforts across the entire Great Lakes region with the goal of developing partnerships, leveraging resources, and promoting consistent strategies and messaging. This effort could be led by the Great Lakes Commission with assistance from the Great Lakes Panel on Aquatic Nuisance Species.

The AIS Advisory Council recommends implementing surveys or other accepted methods to assess the effectiveness of outreach and education activities in collaboration with the aforementioned partner agencies.

The AIS Advisory Council recommends working with partners currently engaged in implementing the AIS HACCP program to expand its application to all potential sellers of AIS.

## **4.7 CONNECTING REGULATIONS TO THE PURE MICHIGAN CAMPAIGN**

### **4.7.1 Statutory Charge**

324.41409 Prevention of introduction and spread of AIS through trade; report; recommendations.

Sec. 41409. (2)(f) Connecting regulations and education on aquatic species in trade to the protection of this state's natural resources as a component of the pure Michigan tourism advertising campaign.

### **4.7.2 Background**

On February 8, 2013, the AIS Advisory Council was joined by Kelly Wolgamott, Director of Marketing and Advertising, Michigan Economic Development Corporation, for a presentation and discussion on collaborating AIS education and awareness with the Pure Michigan campaign.

### **4.7.3 Recommendations**

The AIS Advisory Council recommends that, as the Pure Michigan campaign promotes Michigan's positive features to tourists and residents, careful consideration needs to be used when connecting the meaning of invasive species to the campaign as to not be contradictory. The AIS Advisory Council discussed the idea of an "AIS Free" label for Michigan grown products; however, the AIS Advisory Council expressed concerns about retaining the Pure Michigan brand integrity and believed that such a label would be counterintuitive to the campaign objectives.

The AIS Advisory Council recommends that the marketing professionals of the MDEQ work with their counterparts at the MDNR and MDARD to utilize the existing framework for use of the Pure Michigan brand by a state agency. The framework for state agencies to utilize the Pure Michigan campaign is already in place and would allow the agencies to focus on efforts such as the MDEQ's "Keeping Pure Michigan Pure" slogan.

The AIS Advisory Council recommends partnering Pure Michigan with existing national campaigns such as Clean, Drain, Dry and Habitattitude in addition to providing educational handouts at Michigan Welcome Centers in order to educate and promote good stewardship practices among residents and tourists.

The AIS Advisory Council recommends working closely with the Michigan Economic Development Corporation to ensure that the proposal complies with Pure Michigan brand standards.

## **4.8 PROPOSALS FOR COLLABORATING WITH GREAT LAKES STATES AND CANADIAN PROVINCES TO REDUCE AQUATIC INVASIVE SPECIES RISKS FROM ORGANISMS IN TRADE**

### **4.8.1 Statutory Charge**

324.41409 Prevention of introduction and spread of AIS through trade; report; recommendations.

Sec. 41409. (2)(h) Proposals for collaborating with other Great Lakes states and Canadian provinces to create or strengthen regional programs or coordinate state and provincial programs to achieve the goals set forth in subsection (1).

Note that the charge is in the context of collaborating with Great Lakes states on more effective programs to reduce introduction and spread of species in trade.

### **4.8.2 Background**

By their nature, AIS do not respect state or provincial boundaries. Efforts of one jurisdiction are of limited effectiveness when invaders easily move across boundaries. Swift, unified action across the Great Lakes basin is needed to develop and deploy consistent AIS prevention, detection, control, and eradication strategies. Methods must be scientifically sound, economically feasible, collaborative, and effective. Only AIS strategies that are adopted across the entire Great Lakes basin will be successful in protecting the region's businesses, economies, and natural resources.

In June 2013 the CGLG met on Mackinac Island and adopted a resolution on invasive species. The CGLG released a list of "least wanted species" and pledged that states and provinces would work to restrict or prohibit those species. The AIS Advisory Council has reviewed this list and recommends that additional action is needed to prohibit trade of the following species:

- Northern snakehead
- Stone moroko
- Zander
- Wels catfish
- Killer shrimp
- Yabby (crayfish)
- Golden mussel
- Water soldier

The CGLG further pledged to take a number of specific steps, including:

- Regional collaboration to unify state and provincial regulations and plans regarding organisms in trade, transport, and EDRR.

The CGLG reconstituted an Aquatic Invasive Species Task Force (Task Force) to prevent the introduction of new AIS, facilitate coordinated detection and response actions, and minimize the harmful effects of AIS already present in the region and to prevent the spread to inland waters. Many of the specific actions pledged by the CGLG, notably in the areas of education, reinforce the recommendations of the AIS Advisory Council. For example, the CGLG stressed the importance of:

- An effort to harmonize state and federal ballast water regulations.
- A collaborative mutual aid agreement between states and provinces to enable sharing of staff, expertise, and resources to facilitate effective response actions to the least wanted AIS in shared waters.
- The launch of a public information campaign about the threat posed by the least wanted AIS and steps that citizens can take to join the fight against them.
- A united call on Congress and federal agencies to prohibit the transfer of the least wanted AIS across state lines.
- Advocacy for the development of funding of national plans to block the least wanted.

The following is a proposal for a process that could lead to a regional agreement whereby states and provinces work cooperatively through the Task Force to prevent trade of organisms that are or could become invasive. The process can be expanded to include the full range of AIS issues assigned to the Task Force.

#### **4.8.3 Recommendations**

The AIS Advisory Council commends the CGLG for their leadership on these issues. The AIS Advisory Council recommends to the Governor of Michigan, who serves as cochair of the CGLG, that the Task Force be populated with high level officials representing the governors and premiers who can carry out the recommendations of the CGLG and steps regarding organisms in trade.

The AIS Advisory Council recommends a work group consisting of government officials who are considered experts/practitioners in the issue areas be composed to support the work of the Task Force. The work group will focus on the suite of science and policy issues necessary to arrive at a common approach to prevent trade in invasive organisms.

The AIS Advisory Council recommends that a targeted convening be planned for each pathway of focus: pets, aquariums, water gardens, etc. The targeted convening will elicit ideas and information, individually and through calls and workshops, from experts from industry, government agencies, universities, nongovernmental organizations, and other constituencies and practitioners to help define the issues and identify opportunities for regional agreement. Information developed through the targeted convenings will be documented in white papers that will form the basis of discussion with the work group, and ultimately the Task Force. Targeted convenings will incorporate stakeholder involvement.

The AIS Advisory Council recommends an entity or agency serve as the secretariat, managing and convening the governing structure of this AIS initiative, working with the Task Force to integrate activities with existing regional meetings and functions, including the Great Lakes Panel on Aquatic Nuisance Species. This agency or entity would have responsibility for all Task Force logistics including scheduling meetings; identifying meeting locations; contracting for meeting space, audio visual equipment, etc.; participant travel; meeting materials; questions from the public; conference call lines; etc. The agency or entity will have responsibility for outreach and communication with the public.

The AIS Advisory Council recommends an organization(s) should serve as the information leader in partnership with the secretariat, designing and implementing the facilitated information management and technical teamwork (topic teams), tasks and stakeholder involvement, as well as research to inform deliberations as needed.

The AIS Advisory Council recommends a facilitator or team should be included to lead negotiations on controversial aspects of agreement.

The AIS Advisory Council recommends stakeholders, including industry, nongovernmental organizations, and others, be engaged throughout the process. Stakeholders would take part in the targeted convenings and participate as observers at meetings of the Task Force and work group.

## **5 PHRAGMITES CONTROL AND MANAGEMENT**

### **5.1 STATUTORY CHARGE**

324.41412 Phragmites australis control measures; review and recommendations.

Sec. 41412. The council shall review and provide recommendations on Phragmites australis control measures to the department and to the standing committees of the senate and house of representatives with primary jurisdiction relating to natural resources and the environment

### **5.2 BACKGROUND**

Per Senate Bill 1052, the AIS Advisory Council received an additional assignment to provide recommendations on Phragmites control measures. The AIS Advisory Council was tasked to review, determine suitable control practices (chemical treatment, mowing, etc.), and provide management recommendations. The AIS Advisory Council referred to the already printed educational guide, *A Guide to the Control and Management of Invasive Phragmites and A Landowner's Guide to Phragmites Control*. The AIS Advisory Council was also given numerous presentations on the background of Phragmites, an overview of control and permitting processes, and future management possibilities.

### **5.3 RECOMMENDATIONS**

The AIS Advisory Council recognizes that Phragmites has both native and nonnative genotypes in Michigan. The following recommendations are in regards to management and control of the nonnative genotype that has become a significant invader of a variety of ecologically diverse habitats throughout the state of Michigan.

#### **1. Preservation of Native Genotype:**

The AIS Advisory Council recommends that, when possible, proper care is taken to minimize the impacts to the native genotype.

#### **2. Long-Term Phragmites Management and Control Strategy:**

The AIS Advisory Council recommends that the state of Michigan support development (e.g., research funding) and approval of long-term bio-control for Phragmites. Currently, there are three promising bio-control agents being developed. These agents include: (1) insects, (2) fungi, and (3) gene disruption technologies. It is anticipated that bio-control agents will start to become available for use in approximately five years. Due to the size and complexity of ecological systems that have been invaded by Phragmites in Michigan and throughout the Great Lakes basin, bio-control offers the only viable option for long-term management of Phragmites. Once bio-controls become commercially available, the AIS Advisory Council recommends that the state of Michigan support, through a grant program, distribution and application of approved bio-controls.

#### **3. Interim Phragmites Management Strategy:**

The AIS Advisory Council recommends that interim measures be implemented until bio-control becomes available for widespread use. Prior to the development and approval of bio-controls, the best known method for controlling Phragmites is to use a combination

of chemical (e.g., glyphosate) and mechanical (e.g., mowing or burning) control techniques outlined in the publication, *A Guide to the Control and Management of Invasive Phragmites*. Improper control methods that do not use a combination of chemical and mechanical techniques will decrease the chance of success and may increase the spread of Phragmites. However, due to financial and ecological restraints, these interim measures for managing Phragmites should be focused on slowing the spread and protecting high quality resources from invasion. To help focus control efforts and to improve the likelihood of success, the Phragmites Treatment/Management Prioritization Tool should be used as a planning tool by groups interested in managing Phragmites (Appendix J). The tool prioritizes management to areas where control may contain the spread (i.e., leading edges of the infestation), important ecological sites (e.g., high biological diversity), and areas with high likelihood of success (e.g., small infestations). Interim control measures should be encouraged by education of property owners (e.g., proper timing of control techniques, proper chemical application rates, etc.) and maintaining a simplified regulatory process for individuals and groups conducting Phragmites control.

4. Education and Outreach on Impacts of Phragmites and Control Techniques:

The AIS Advisory Council recommends that the state of Michigan financially support development, distribution, and education on various control methods and the economic and ecological impacts of Phragmites. Dedicated staff should be available to assist landowners with questions, producing educational material, and conducting multimedia outreach campaigns regarding Phragmites control.

5. Development and Support for Research:

The AIS Advisory Council recommends that the state of Michigan develop and implement a strategy to identify impacts and success of Phragmites management techniques, including both chemical and mechanical methods. For example, it is recognized that little is known about the potential benefits or detriments of mowing Phragmites without any other treatment. Although initial research indicates that the abundance of Phragmites may increase under certain mowing strategies, more research is needed in terms of timing of mowing (e.g., before flower production) and mowing frequency (e.g., several times a year or every few years). Since mowing along the Great Lakes shorelines (except the St. Clair Flats) does not require a permit, it is expected that landowners may see mowing as a reasonable Phragmites control technique. Without further research of this activity and a better understanding of the impacts of mowing, landowners may be inadvertently causing an increase in the spread of Phragmites.

The AIS Advisory Council recommends that the state of Michigan financially support research on the impacts of interim control techniques, with a high priority for research on the benefits and detriments of mowing of Phragmites.

6. Development and Support of an Invasive Species Control Grant Program:

The AIS Advisory Council recommends that the state of Michigan develop, as a pilot program, a cost-share grant program to encourage cooperative efforts to manage and control invasive species. This pilot program shall be focused on controlling Phragmites until the long-term management and control strategy can be implemented (i.e., when a bio-control becomes commercially available). The pilot program should be developed with

the potential to establish a permanent grant program that can be expanded to other high priority invasive species in the future. Currently, there are significant partnerships (e.g., Stewardship Clusters and Cooperative Weed Management Areas) interested in invasive species control, and a grant program to support these partnerships can have a positive impact on minimizing the spread of invasive species, especially when species are detected early and proper management is quickly implemented. Phragmites should be identified as one of several priority species for any grant program for control since we have proven control techniques and a proposed management strategy (i.e., Phragmites Treatment/Management Prioritization Tool) to identify areas that have the highest likelihood for success.

7. Framework for Phragmites Management:

To assist Phragmites control efforts at local, state, and federal levels, the Great Lakes Commission developed the *Strategic Framework for Coordinated Management and Control of Invasive Phragmites in Michigan*. The AIS Advisory Council recommends that this document be used as a guidance and planning document for Phragmites control throughout the state of Michigan. Furthermore, it is recommended that state agencies consider implementing any relevant strategic actions and continue to promote the framework to other groups and organizations conducting Phragmites control and management.

## 6 FUNDING

### 6.1 STATUTORY CHARGE

324.41407 Final update to plan; recommendations; report.

Sec. 41407. (3) Within 60 days after the issuance of a final update to the aquatic invasive species management plan, the council shall submit a report with recommendations on the funding necessary to implement the plan and the method of providing that funding. The council shall submit the report to the governor, the senate majority leader, the speaker of the house of representatives, and the standing committees of the senate and house with primary responsibility for natural resources, conservation, agriculture, and commerce.

324.41409 Prevention of introduction and spread of AIS through trade; report; recommendations.

Sec. 41409. (1) Within 240 days after the effective date of the amendatory act that added this section, the council shall submit a report with recommendations for legislation or rules to prevent the introduction and spread of AIS through trade. The council shall submit the report to the governor, the senate majority leader, the speaker of the house of representatives, and the standing committees of the senate and house with primary responsibility for natural resources, conservation, agriculture, and commerce. In preparing the report, the council shall review the AIS laws of this state and other jurisdictions, including the other Great Lakes states.

(2) In the report under subsection (1), the council shall make recommendations on all of the following:

(g) Financial and other resources for implementing recommendations under this subsection.

### 6.2 BACKGROUND

Many Great Lakes researchers and managers consider AIS the most important and immediate threat to Great Lakes ecosystems and their food webs, as well as a primary threat to native biodiversity<sup>7</sup> <sup>8</sup>. In addition, AIS have serious economic effects in the form of losses (e.g., loss of recreational and commercial fishing opportunities and effects on waterfront property values and tourism) and costs of management and control (for industries, landowners, and local units of government).

A recent report that analyzed the economic effect of existing AIS on businesses and households in Great Lakes states notes that industries directly affected by AIS employ more than 125,000 people across the Great Lakes and that total costs exceed \$100,000,000 per year<sup>9</sup>. When

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<sup>7</sup> Sala, O., F.S. Chapin, J.J. Armesto, E. Berlow, J. Bloomfield, R. Dirzo, E. Huber-Sanwald, L.F. Huenneke, R.B. Jackson, A. Kinzig, R. Leemans, D.M. Lodge, H.A. Mooney, M. Oesterheld, N.L. Poff, M.T. Sykes, B.H. Walker, M. Walker, and D.H. Wall. 2000. Biodiversity-global diversity scenarios for the year 2100. *Science*, Vol. 287, No. 5459, pp. 1770-1774.

<sup>8</sup> Dextrase A. and N.E. Mandrak. 2005. Impacts of invasive alien species on freshwater fauna at risk in Canada. *Biol. Invasions*. 2005; 8:13-24.

<sup>9</sup> Rosaen, A.L., E.A. Grover, and C.W. Spencer. 2012. The Costs of Aquatic Invasive Species to the Great Lakes States. Anderson Economic Group LLC, 1555 Watertower Place, Suite 100, East Lansing, MI 48823. <http://www.AndersonEconomicGroup.com>.

economic losses from all AIS-caused environmental effects are summed, the total economic effect (damage and management/control costs) of AIS in the Great Lakes region is estimated to be as high as \$5.7 billion per year<sup>10</sup>.

Funding for implementation of AIS Advisory Council recommendations and the AIS SMP were integrated with many other topics of discussion. To provide the basis for funding recommendations, the AIS Advisory Council requested the following information:

1. An overview of other state's funding levels and sources.
2. A case study of Minnesota's AIS funding level, sources, and program spending.
3. A report summarizing Michigan's past and present funding levels, funding sources, and AIS Program activities (for full report see Appendix K).

Funding levels in other states range from approximately \$1 million to \$39 million per year. California was at the upper end of the range due to fees on shipping and ballast water discharge permits. A variety of funding sources are used by other states, including federal grant funds, state general funds, sales/gas taxes, and user fees (permits, boater registration, and fishing license) based funding. Minnesota was funded at approximately \$7.5 million in 2012 through federal funding, state general funds, a surcharge on watercraft licenses (\$5 every 3 years), and other one-time state funding. Minnesota's major spending categories in 2011 were inspections/enforcement (43%), management and control (28%), state and regional coordination (14%), education/public awareness (9%), and administration (6%).

Historically, Michigan's AIS Program has received minimal funding to implement Michigan's AIS SMP. Beginning in late 2010, the state of Michigan received a significant increase in funding from a federal Great Lakes Restoration Initiative grant to address priority AIS actions. This new funding initiated a surge in AIS-related activities by the MDEQ, MDNR, and MDARD; however, this grant funding is short-term and a reliable long-term funding source is needed.

The AIS Advisory Council recognizes the efforts of Michigan's AIS Core Team that was established in 2010 and the need to continue and enhance these efforts. The AIS Core Team is composed of representatives from each of the state agencies with environmental or natural resource responsibilities: MDEQ's WRD and Office of the Great Lakes (OGL); MDNR's Fisheries Division (FD), Wildlife Division (WLD), Parks and Recreation Division (PRD), and Law Enforcement Division (LED); MDARD's Pesticide and Plant Pest Management Division (PPPMD) and Animal Industry Division (AID); and Michigan Department of Transportation's (MDOT) Project Planning Division. The AIS Core Team has been tremendously successful in developing and coordinating AIS activities for Michigan.

### **6.3 RECOMMENDATIONS**

1. Michigan's AIS Core Team updated the AIS SMP and is currently coordinating implementation of the plan. Some of the AIS Advisory Council's recommendations included in the organisms in trade section (Section 4) could be implemented by the AIS Core Team given long-term funding (e.g., expansion of education and outreach efforts). Other elements of these recommendations would require additional staff and resources to develop new programs (e.g., certification and inspection programs). Therefore, the AIS

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<sup>10</sup> Pimentel, D. 2005. Aquatic nuisance species in the New York State Canal and Hudson River Systems and the Great Lakes Basin: An economic and environmental assessment. *Environmental Management* 35(5): 692-701.

Advisory Council has consolidated the funding recommendations per Sections 324.41407(3) and 324.41409(2)(g) of Part 414 of the NREPA into one funding recommendation.

The AIS Advisory Council recommends continued implementation of the AIS SMP and implementation of the AIS Advisory Council's recommendations by the responsible state agencies with coordination via the AIS Core Team. To carry out these tasks, the AIS Advisory Council recommends a stable source of state funding at \$4.1 million to \$5.9 million annually. Funding needs to be responsive to yearly fluctuations as emerging issues arise and costs increase. Allocation of funding to staff and projects is detailed in Table 1. In addition to MDEQ, MDNR, and MDARD staff, the AIS Advisory Council recognizes the need for continued collaboration with the Michigan Department of Attorney General (MDAG) and the MDOT. As such, the AIS Advisory Council recommends funding to support staff in these departments.

2. The AIS Advisory Council recommends that any additional federal funding should be allocated to AIS-related projects rather than supporting additional staff to implement the AIS SMP.
3. The AIS Advisory Council recognizes that new funding sources for the AIS Program are preferable rather than reallocating existing funding away from other programs. AIS affect all Michigan residents through multiple modes, including diminished recreational or tourism opportunities or increased utility costs. For this reason, all Michigan citizen's benefit from implementation of the AIS Program. The AIS Advisory Council recommends that the AIS Program be funded through General Funds.
4. Even though the AIS Advisory Council recommends that the AIS Program be funded through General Funds, data regarding willingness to pay have been collected and should be noted. In 2003 Michigan conducted a survey of boaters in Michigan on AIS. Among other things, it was determined that approximately three-quarters of all boaters (72%) would be willing to pay from \$1 to more than \$10 more for boater registration if the funds went to prevent the spread of AIS and reduce their effects. In 2012 a similar survey was conducted and respondents were asked their willingness to pay more for an annual boating license to support boater education and outreach programs aimed at stopping the spread of AIS. Results from this survey estimated that average boaters are willing to pay \$20.50 more for boater education and outreach programs.

**Table 1. Recommended funding allocation to implement Michigan's AIS SMP and AIS Advisory Council's recommendations.**

<b>AIS Program Staffing (AIS Core Team)</b>	<b>FTEs</b>	<b>Explanation</b>	<b>Amount</b>
MDEQ (WRD, OGL)	5	Coordinate policies (e.g., AIS SMP) and legislation to reduce the impacts of AIS. Develop education and outreach materials. Monitoring.	
MDNR (WLD, PRD, LED, FD)	4	Develop risk assessment, EDRR, park user education, and fish inspections.	
MDARD (PPPMD, AID)	3	Aquatic plant inspections and certification/licensing of pet shops.	
MDOT	0.5	Right-of-way mapping and treatment of AIS.	
MDAG	0.5	Legal assistance in developing legislation and other policy. Implementation and enforcement.	
<b>Total Staffing Cost (FTE Cost = \$142,500)</b>			<b>\$1.9 million</b>
<b>AIS Projects</b>			
Prevention		Examples: Education and outreach (e.g., staff boat launches and purchase boat washes, brochures, Public Service Announcement, develop best management practices, billboards, training, organisms in trade prevention activities, etc.).	\$400,000 – \$2,150,000
Monitoring		Examples: Develop and implement statewide AIS monitoring and mapping strategy, including comprehensive eDNA monitoring program.	\$400,000
EDRR		Examples: Necessary equipment and other resources to respond to new AIS.	\$400,000
Management, Control, and Research		Examples: On-the-ground management and control grants. Grants awarded based on state priority AIS species and approved management plans, including state lands.	\$500,000
		Examples: Research is needed to develop identification (e.g., eDNA markers), prevention techniques (e.g., ballast water treatment), and control strategies for many priority AIS.	\$500,000
<b>Total Project Cost</b>			<b>\$2.2 – \$4.0 million</b>
<b>Total Program Costs</b>			<b>\$4.1 – \$5.9 million</b>

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Aquatic Invasive Species Advisory Council Recommendations on  
Michigan's Aquatic Invasive Species State Management Plan Update

Submitted to William Creal, Chief  
Water Resources Division  
Department of Environmental Quality  
July 18, 2012

The Aquatic Invasive Species (AIS) Advisory Council met on June 21, 2012, to discuss Michigan's draft Aquatic Invasive Species State Management Plan Update. Fourteen of the 19 voting members participated in the discussion (12 in person and 2 via phone) and reached consensus on the following recommendations. Following the meeting, all council members had the opportunity to review the recommendations prior to submission. These recommendations are provided pursuant to Section 41407 Final Update to Plan; recommendations; report, of Part 414, Aquatic Invasive Species Advisory Council, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

- The AIS Advisory Council reviewed, discussed, and provided edits to the definition of AIS contained in the introduction and revised text provided to the council on June 20, 2012. The text immediately following the definition was revised to reflect the information contained in the "Invasive Species Definition Clarification and Guidance White Paper Submitted by the Definitions Subcommittee of the Invasive Species Advisory Committee (ISAC) approved by ISAC on April 27, 2006)."<sup>1</sup> Revised text is attached. The council also briefly discussed the terms "aquatic" and "non-native," but did not have recommendations for modifications in the SMP. The AIS Advisory Council recommends the changes to the definition and following text be carried out through the rest of the SMP. In particular, the word "societal" should be removed or language should be revised. In addition, the list of taxa covered by the plan, section 1.1 Purpose of the Plan, should be consistent with statute administered by the Department of Natural Resources (e.g. language such as "fish, reptiles, amphibians, mollusks, and crustaceans").
- The AIS Advisory Council supports the 4 goals of the AIS SMP as written. The AIS Advisory Council recommends the departments interact with appropriate partners, including affected industries, in the implementation of the SMP.
- The AIS Advisory Council recommends the SMP authors review examples given throughout the SMP and ensure fair treatment of industries used in examples.
- The AIS Advisory Council recommends the addition of language to the SMP to recognize the costs to partners, including industries, for the prevention and management and control of AIS. Specifically, a clarifying statement should be added to the implementation table.

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<sup>1</sup> [http://www.invasivespecies.gov/global/ISAC/ISAC\\_whitepapers.html](http://www.invasivespecies.gov/global/ISAC/ISAC_whitepapers.html)

Changes to definition/introduction section of AIS for SMP  
based on AIS Advisory Council discussion on June 21, 2012

Michigan's aquatic ecosystems are experiencing significant negative effects from AIS that are already present and the state's waters and are continually threatened by new invasions. AIS may also be known as nonindigenous, nonnative, nuisance, exotic, or alien species; however, these terms have slightly different meanings and care should be taken to use terms appropriately.

The most widely used definition of invasive species that is derived directly from the National Invasive Species Council is as follows:

"An invasive species is defined as a species that is not native and whose introduction causes, or is likely to cause, economic or environmental harm or harm to human health."

The introduction of AIS into the Great Lakes and inland state waters is a source of biological pollution that has significant negative effects on natural resources, human health, recreational opportunities, and other human values throughout the state and region. For example, AIS may:

- Directly outcompete native species for resources like food and habitat causing displacement or reduced populations of native species to the point of biological significance.
- Affect the composition and structure of aquatic communities and cause cascading changes throughout aquatic foodwebs resulting in indirect negative effects.
- Degrade habitat and negatively impact wildlife and water quality.
- Decrease sportfishing opportunities and therefore have negative economic effects on recreation and tourism industries.
- Degrade shorelines and wetlands for human use and therefore have negative economic effects on recreation and tourism industries (e.g. zebra mussels fouling beaches and Phragmites decreasing hunting and fishing opportunities).
- Negatively affect human and wildlife health (e.g. zebra mussels linked to botulism).
- Decrease property values (e.g. Phragmites blocking views).
- Alter wildfire frequency and intensity causing negative ecological effects and increased cost in fire management and damages (e.g. Phragmites).
- Negatively affect commercially valuable species.
- Increase costs to utilities and municipalities (e.g. control of zebra mussels water intakes).

It should be recognized that many non-native species are not invasive species and support human livelihoods or a preferred quality of life. These species are not considered AIS; therefore, they are not covered by this plan.

Further guidance, clarification, and examples regarding the nuances of the definition the term invasive species are provided in an Invasive Species Advisory Council white paper (ISAC 2006). This white paper is intended for policy interpretation; regulatory decisions may benefit from a formal risk assessment process.



RICK SNYDER  
GOVERNOR

STATE OF MICHIGAN  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
LANSING



DAN WYANT  
DIRECTOR

DRAFT

May 7, 2012

Ms. Tinka G. Hyde, Director  
Water Division  
United States Environmental Protection Agency  
Region 5  
77 West Jackson Boulevard (W-15J)  
Chicago, Illinois 60604-3507

Dear Ms. Hyde:

SUBJECT: Vessel General Permit and Small Vessel General Permit  
Clean Water Act, Section 401 Water Quality Certification  
Coastal Zone Management Act, Federal Consistency Certification

The following is in response to your December 28, 2011, letter to Ms. Sarah LeSage, Aquatic Invasive Species Program Coordinator, Water Resources Division, Michigan Department of Environmental Quality (MDEQ).

In that letter, the United States Environmental Protection Agency (USEPA) requested the MDEQ to make a determination regarding certification under Section 401 of the federal Clean Water Act (CWA) for the draft National Pollutant Discharge Elimination System Vessel General Permit for Discharges Incidental to the Normal Operation of Vessels (VGP) and the Small Vessel General Permit for Discharges Incidental to the Normal Operation of Vessels Less than 79 Feet (sVGP), which were published in the *Federal Register* on December 8, 2011. The USEPA requested that any condition(s) more stringent than those contained in the draft permits that are necessary to meet the requirements of state law be included in the certification.

As you are aware, the MDEQ provided comments on the draft VGP and sVGP to the USEPA on February 21, 2012, explaining the MDEQ's view that discharges authorized by the draft permit, as proposed, would not meet Michigan Water Quality Standards. We understand that the USEPA is reviewing all comments submitted on the draft VGP and sVGP. We sincerely hope that the final permit to be issued by the USEPA by November 30, 2012, will be modified to address the concerns raised by Michigan and others. If the USEPA nonetheless were to issue the final permit with the conditions proposed in the draft permit, Michigan could certify that the discharges authorized under such a permit meet Michigan Water Quality Standards only if the conditions outlined below are met.

The MDEQ certifies that discharges from vessels covered by the USEPA's VGP and sVGP will comply with the applicable provisions of Title 33 of the United States Code, Sections 1311, 1312, 1313, 1316, 1317, and 1341, (CWA, Sections 208e, 301, 302, 303, 306, 307, and 401), and that permittees and their activities will not contravene applicable limitations, standards, and other appropriate requirements of state law, provided the conditions set forth in this letter, the VGP, and the sVGP, (Docket I.D. Nos. EPA-HQ-OW-2011-0141 and EPA-HQ-OW-2011-0150, available at [link no longer valid, removed 11/6/2017](#)) are met.

Ms. Tinka G. Hyde  
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May 7, 2012

### Certification Conditions for the VGP

1. Oceangoing vessels covered by the VGP are prohibited from discharging ballast water in Michigan's waters unless the vessel has obtained a Certificate of Coverage under the Ballast Water Control General Permit (Permit No. MIG140000) or an Individual Permit from the MDEQ and is in full compliance with the discharge limitations, monitoring requirements, and other conditions set forth in that General Permit or Individual Permit. (Section 3112[6] of Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended [NREPA])
2. Ballast Water Exchange and Saltwater flushing:
  - (A) All vessels covered by the VGP whose voyages originate from outside the exclusive economic zone (EEZ) and enters Michigan waters with ballast onboard, shall conduct ballast water exchange at least 200 nautical miles (nm) from any shore and in waters beyond the EEZ. Such vessels that carry only residual amounts of ballast water and/or sediments shall conduct saltwater flushing of their ballast tanks, at least 200 nm from any shore and in waters beyond the EEZ. (Section 3103a of Part 31 of the NREPA)

Ballast water exchange is defined as at least 1 empty and refill cycle of each ballast tank that contains ballast water, resulting in a salinity level of at least 30 parts per thousand (ppt). If the master of the vessel determines that such exchange is impracticable, a sufficient number of flow-through exchanges of ballast water may be conducted to achieve replacement of at least 95 percent of ballast water in ballast tanks of the vessel, resulting in a salinity level of at least 30 ppt.

Saltwater flushing is defined as the addition of ocean water to ballast water tanks, the mixing of the flushwater with residual water and sediment through the motion of the vessel, and the discharge of the mixed water, such that the resulting residual water has a salinity level of at least 30 ppt.

All vessels entering Michigan waters must maintain the ability to measure salinity levels in each ballast tank onboard the vessel so that salinities of at least 30 ppt can be ensured.

- (B) Condition 2(A) does not apply to vessels that:
  - (i) Carry only permanent ballast water, all of which is in sealed tanks that are not subject to discharge, or
  - (ii) Have the capacity to carry no more than 8 cubic meters of ballast water, or
  - (iii) Use only water from a United States public water system or Canadian drinking water system as ballast water, or
  - (iv) Meet the discharge limitations for living organisms set forth in Condition 3(A).
- (C) Condition 2(A) does not apply if the master of the vessel determines that compliance with this condition would threaten the safety or stability of the vessel, its crew, or its passengers because of adverse weather, equipment failure, or any other relevant condition. If a vessel is unable to conduct ballast water exchange or flushing due to serious safety concerns as specified above, the operator of a vessel shall take

Ms. Tinka G. Hyde  
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responsible measures to avoid discharge of organisms in ballast water and shall inform the MDEQ in writing of the measures taken.

3. Discharge limitations for living organisms (Section 3103a of Part 31 of the NREPA):

- (A) By no later than January 1, 2026, each vessel covered by the VGP whose voyage originates from outside the EEZ and enters Michigan waters with ballast onboard, shall have a ballast water treatment system that meets the following discharge limitations:

Discharge limitation for living organisms that are greater than 50 micrometers in minimum dimension: Any ballast water discharged shall contain 0.1 or fewer living organisms per cubic meter.

Discharge limitation for living organisms that are equal to or less than 50 micrometers in minimum dimension and equal to or greater than 10 micrometers in minimum dimension: Any ballast water discharged shall contain 0.1 or fewer living organisms per milliliter.

- (B) Condition 3(A) does not apply to vessels that:
- (i) Carry only permanent ballast water, all of which is in sealed tanks that are not subject to discharge, or
  - (ii) Have the capacity to carry no more than 8 cubic meters of ballast water, or
  - (iii) Use only water from a United States public water system or Canadian drinking water system as ballast water.
- (C) Any vessel that utilizes a ballast water treatment system by December 31, 2016, that is consistent with the technologies identified in Michigan's Ballast Water Control General Permit (Permit No. MIG140000) or an alternative technology that has been approved by the MDEQ, is not required to meet the discharge limitations set forth in Condition 3(A) until the functional life of that ballast water treatment system has expired or the life of the vessel has expired, whichever is earlier. These vessels must continue ballast water exchange and saltwater flushing as described in Condition 2 unless it is demonstrated to the MDEQ that the discharge limitations set forth in Condition 3(A) are met.
- (D) No extensions will be made to the January 1, 2026, implementation date unless an entity covered by the VGP makes a request to the MDEQ and can provide sufficient justification for such a request. Any such extension request shall state and demonstrate that:
- (i) There is no technology or a shortage in supply of technology necessary to meet the discharge limitations set forth in this condition, or a vessel-specific engineering constraint, or other factor related to the availability and installation of technology beyond the vessel owner's/operator's control that delays the technology being available and installed in time to comply with the discharge limitations;
  - (ii) The lack or inadequate supply of technology or installation constraint is the only reason the January 1, 2026, implementation date cannot be met; and

Ms. Tinka G. Hyde  
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May 7, 2012

- (iii) The vessel has exhausted all other options to comply with the discharge limitations. Any extension request must be made no later than June 30, 2024, and the extension request shall indicate when the vessel will come into compliance with the discharge limitations.
4. Monitoring (Part 21 Rules, Wastewater Discharge Permits, promulgated under Part 31 of the NREPA):
  - (A) After December 31, 2016, the owner/operator of any vessel covered by the VGP whose voyages originate from outside the EEZ that discharges ballast water to Michigan waters, shall monitor ballast water discharged from their vessel at least once each year for living organisms greater than 50 micrometers in minimum dimension and living organisms equal to or less than 50 micrometers in minimum dimension and equal to or greater than 10 micrometers in minimum dimension; and submit a report summarizing the discharge monitoring results collected for the above live organism size categories to the MDEQ no later than December 31 of each year. The ballast water discharge samples shall be collected and analyzed consistent with protocols established by the MDEQ. If the MDEQ fails to establish protocols, then the requirements set forth in this condition will be waived.
  - (B) Any vessel that utilizes a ballast water treatment system by December 31, 2016, that is consistent with the technologies identified in Michigan's Ballast Water Control General Permit (Permit No. MIG140000) or an alternative technology that has been approved by the MDEQ, is not required to meet the monitoring requirements set forth in Condition 4(A) until the functional life of that ballast water treatment system has expired or the life of the vessel has expired, whichever is earlier.
5. The owners/operators of vessels required to utilize a ballast water treatment system shall allow the MDEQ reasonable entry onto the vessel for inspection, access to records, and collection of a ballast water discharge sample(s) for determining compliance with this Certification and applicable laws. (R 323.2149 of the Part 21 Rules of the NREPA)
6. Nonoceangoing vessels covered by the VGP that operate ballast water treatment systems are prohibited from discharging ballast water in Michigan waters with total residual chlorine concentrations above 38 micrograms per liter ( $\mu\text{g/L}$ ) when the ballast water discharge duration exceeds 160 minutes, or above 200 ( $\mu\text{g/L}$ ) when the ballast water discharge duration is less than or equal to 160 minutes. (R 323.1057 of the Part 4 Rules, Water Quality Standards, promulgated under Part 31 of the NREPA)
7. The MDEQ reserves the right to modify this Certification, after appropriate public notice, to require nonoceangoing vessels covered by the VGP to install and operate ballast water treatment systems to prevent the discharge of aquatic invasive species to Michigan waters, if a determination is made by the MDEQ director that such ballast water treatment systems are necessary, available, and cost effective. (Part 31 of the NREPA)

#### Certification Conditions for the VGP and sVGP

8. Discharges of blackwater and graywater from vessels covered by the VGP or sVGP are prohibited to Michigan waters. (Part 95, Watercraft Pollution Control, of the NREPA)

DRAFT

Ms. Tinka G. Hyde

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May 7, 2012

9. Vessel owners/operators shall immediately notify the MDEQ whenever they become aware that a discharge from their vessel causes or contributes to an exceedance of an applicable state water quality standard. (Part 21 Rules of the NREPA)
10. Nothing in this Certification diminishes, negates, or precludes the state of Michigan from bringing civil and/or criminal actions for violations of state law and/or issued state permits. (Part 31 of the NREPA)
11. Each condition in the proposed VGP and sVGP cannot be made less stringent without potentially violating the requirements of state law, including water quality standards. (Part 31 of the NREPA)
12. If the MDEQ determines that vessel discharges covered by this Certification can no longer comply with Section 401 of the CWA or state laws and regulations, then the MDEQ may revoke or modify this Certification after appropriate public notice. (CWA, Section 401)

In response to your December 28, 2011, and March 7, 2012, letters to Mr. Chris Antieau, Great Lakes Shorelands Unit, Water Resources Division, MDEQ, requesting Coastal Zone Management Act, PL 92-583, as amended, consistency determination, staff of the MDEQ reviewed the VGP and sVGP for consistency with Michigan's Coastal Management Program (MCMP), as required by the Coastal Zone Management Act. A determination of consistency with MCMP requires evaluation of a permit to determine if it will have an adverse impact on coastal land or water uses or coastal resources. In this case, obtaining a Section 401 Water Quality Certification is required to be compliant with MCMP and to obtain the Federal Consistency Certification for the draft VGP and sVGP. As long as all Conditions set forth above as part of the Section 401 Water Quality Certification are fully complied with, the draft VGP and sVGP are consistent with MCMP.

The contact point for consultation, submittals, and approvals as referred to in this Certification is:

Chief, Water Resources Division  
MDEQ  
P.O. Box 30458  
Lansing, Michigan 48909-7958  
Phone: 517-335-4176

The MDEQ reserves the right to challenge the USEPA's VGP and sVGP.

Should you require further information regarding this Certification, please contact Ms. LeSage at 517-241-7931, or you may contact me.

Sincerely,

William Creal, Chief  
Water Resources Division  
517-335-4176

cc: Mr. Dan Wyant, Director, MDEQ

Ms. Tinka G. Hyde

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May 7, 2012

Mr. Jim Sygo, Deputy Director, MDEQ

Ms. Sarah LeSage, MDEQ

Mr. Chris Antieau, MDEQ

Aquatic Invasive Species Advisory Council Recommendations on  
Michigan's Draft Vessel General Permit and Small Vessel General Permit  
Clean Water Act Section 401 Water Quality Certification

Submitted to William Creal, Chief  
Water Resources Division  
Department of Environmental Quality  
June 25, 2012

The Aquatic Invasive Species (AIS) Advisory Council met on June 6, 2012, to discuss Michigan's draft Vessel General Permit and Small Vessel General Permit Clean Water Act Section 401 Water Quality Certification (attached). Thirteen of the 19 voting members participated in the discussion and reached consensus on the following recommendations. Following the meeting, all council members had the opportunity to review the recommendations. These recommendations are provided pursuant to Section 41411 Draft next vessel general permit; development of recommendations by council, of Part 414, Aquatic Invasive Species Advisory Council, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

- The AIS Advisory Council supports condition #1 as written. This condition indicates that a vessel owner operator must obtain a state permit, which is required by state law. This condition should be included in the Section 401 Certification to provide clarity for industry.
  - Brad Williams noted an exception at the meeting, but did not provide additional language.
  - Joel Brammeier provided the following clarification: "The Alliance for the Great Lakes supports the inclusion of condition #1. However, we also note that the current Michigan general permit is insufficient on its own to prevent invasion."
- The AIS Advisory Council supports condition #2 regarding ballast water exchange and saltwater flushing as written.
- The AIS Advisory Council could not reach consensus regarding the details of condition #3; however, the AIS Advisory Council supports preventing AIS in the Great Lakes and has the following general recommendations regarding ballast water discharge limitations for living organisms:
  - The AIS Advisory recommends the Governor and Legislature communicate to the United States Environmental Protection Agency that the agency should develop a protective numeric water quality-based effluent limit for living organisms in ballast water discharges to level the economic playing field and eliminate patchwork regulations.
  - The AIS Advisory Council supports the concept of creating incentives to reward early implementation of ballast water treatment technology.
    - Joel Brammeier provided the following clarification: "The Alliance for the Great Lakes supports the creation of incentives for early adoption of ballast water treatment technology. However, the proposed Michigan Section 401 certification exempts early adopters from additional requirements "until the functional life of that ballast water treatment system has expired or the life of the vessel has expired, whichever is earlier." A vessel that takes advantage of this provision may be allowed

to operate treatment that is not protective against invasion for many years or even decades despite the availability of more effective technologies. In addition, a vessel that operates such technology is likely to be noncompliant with a water quality-based effluent limitation that would prevent new invasions. The provision should be structured so that “early adopters” ultimately come into compliance with a protective water-quality based effluent limit.”

- The AIS Advisory Council recommends the Department of Environmental Quality consult with an advisory council when developing subsequent state permits for ballast water discharges and Section 401 Certifications.
- The AIS Advisory Council supports condition #4 regarding monitoring for living organisms.
  - Joel Brammeier provided the following clarification: “The Alliance for the Great Lakes is concerned that the monitoring requirements in the certification will not provide sufficient data on which to base an enforcement decision.”
- The AIS Advisory Council briefly discussed condition #7 regarding nonocean-going vessels and could not reach consensus on recommendations.



RICK SNYDER  
GOVERNOR

STATE OF MICHIGAN  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
LANSING

Appendix E



DAN WYANT  
DIRECTOR

September 27, 2012

VIA E-MAIL AND U.S. MAIL

Ms. Tinka G. Hyde, Director  
Water Division  
United States Environmental Protection Agency  
Region 5  
77 West Jackson Boulevard (W-15J)  
Chicago, Illinois 60604-3507

Dear Ms. Hyde:

SUBJECT: Vessel General Permit and Small Vessel General Permit  
Clean Water Act, Section 401 Water Quality Certification

The following is in response to your December 28, 2011, letter to Ms. Sarah LeSage, Aquatic Invasive Species Program Coordinator, Water Resources Division, Michigan Department of Environmental Quality (MDEQ).

In that letter, the United States Environmental Protection Agency (USEPA) requested that the MDEQ make a determination regarding certification under Section 401 of the federal Clean Water Act (CWA) for the draft National Pollutant Discharge Elimination System Vessel General Permit for Discharges Incidental to the Normal Operation of Vessels (VGP) and the Small Vessel General Permit for Discharges Incidental to the Normal Operation of Vessels Less than 79 Feet (sVGP). These draft permits were published in the *Federal Register* on December 8, 2011. The USEPA requested that Michigan include in its certification any condition(s) more stringent than those contained in the draft permits that are necessary to meet the requirements of state law.

As you are aware, the MDEQ provided comments on the draft VGP and sVGP to the USEPA on February 21, 2012 (enclosed), explaining the MDEQ's position that discharges authorized by the draft permit, as proposed, would not meet Michigan Water Quality Standards. If the USEPA issues the final permit with the conditions proposed in the draft permit, Michigan certifies the discharges authorized under such a permit meet Michigan Water Quality Standards only if the conditions outlined below are met. Should the USEPA make significant modifications from the draft VGP to the final VGP that would affect Michigan's water quality, we reserve the right to modify this certification.

The MDEQ certifies discharges from vessels covered by the USEPA's VGP and sVGP will comply with the applicable provisions of Title 33 of the United States Code, Sections 1311, 1312, 1313, 1316, 1317, and 1341 (CWA, Sections 208e, 301, 302, 303, 306, 307, and 401), and that permittees and their activities will not contravene applicable limitations, standards, and other appropriate requirements of state law, provided the conditions set forth in this letter, the VGP, and the sVGP (Docket I.D. Nos. EPA-HQ-OW-2011-0141 and EPA-HQ-OW-2011-0150, available at <http://cfpub.epa.gov/npdcs/vessels/vgpermit.cfm>) are met.

Ms. Tinka G. Hyde  
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September 27, 2012

Certification Conditions for the VGP

1. Oceangoing vessels (a vessel that operates on the Great Lakes or the St. Lawrence waterway after operating in waters outside the Great Lakes or the St. Lawrence waterway) covered by the VGP are prohibited from discharging ballast water in Michigan's waters unless the vessel has obtained a Certificate of Coverage under the Ballast Water Control General Permit (Permit No. MIG140000) or an Individual Permit from the MDEQ and is in full compliance with the discharge limitations, monitoring requirements, and other conditions set forth in that General Permit or Individual Permit. (Section 3112[6] of Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended [NREPA])

2. Ballast Water Exchange and Saltwater Flushing:

(A) All vessels covered by the VGP whose voyages originate from outside the exclusive economic zone (EEZ) and enter Michigan waters with ballast onboard, shall conduct ballast water exchange at least 200 nautical miles (nm) from any shore and in waters beyond the EEZ. Such vessels that carry only residual amounts of ballast water and/or sediments shall conduct saltwater flushing of their ballast tanks, at least 200 nm from any shore and in waters beyond the EEZ. (Section 3103a of Part 31 of the NREPA)

Ballast water exchange is defined as at least 1 empty and refill cycle of each ballast tank that contains ballast water, resulting in a salinity level of at least 30 parts per thousand (ppt). If the master of the vessel determines that such exchange is impracticable, a sufficient number of flow-through exchanges of ballast water may be conducted to achieve replacement of at least 95 percent of ballast water in ballast tanks of the vessel, resulting in a salinity level of at least 30 ppt.

Saltwater flushing is defined as the addition of ocean water to ballast water tanks, the mixing of the flushwater with residual water and sediment through the motion of the vessel, and the discharge of the mixed water, such that the resulting residual water has a salinity level of at least 30 ppt.

All vessels entering Michigan waters must maintain the ability to measure salinity levels in each ballast tank onboard the vessel so that salinities of at least 30 ppt can be ensured.

(B) Condition 2(A) does not apply to vessels that:

- (i) Carry only permanent ballast water, all of which is in sealed tanks that are not subject to discharge, or
- (ii) Use only water from a United States public water system or Canadian drinking water system as ballast water.

(C) Condition 2(A) does not apply if the master of the vessel determines that compliance with this condition would threaten the safety or stability of the vessel, its crew, or its passengers because of adverse weather, equipment failure, or any other relevant condition. If a vessel is unable to conduct ballast water exchange or flushing due to

Ms. Tinka G. Hyde  
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September 27, 2012

serious safety concerns as specified above, the operator of a vessel shall take reasonable measures to avoid discharge of organisms in ballast water and shall inform the MDEQ in writing of the measures taken.

3. Discharge limitations for living organisms for vessels whose voyage originates outside the EEZ (Sections 3103a and 3109 of Part 31 of the NREPA):
  - (A) Ballast water discharges from vessels whose voyage originates outside the EEZ may contain biological pollutants in the form of aquatic invasive species. Ballast water discharges to Michigan waters must be controlled to a level sufficient to prevent aquatic invasive species. These pollutants must not be discharged at a level that is, or may become, injurious to any of the following: to the public health, safety, or welfare; to domestic, commercial, industrial, agricultural, recreational, or other uses that are being made, or may be made, of such waters; to the value or utility of riparian lands; to livestock, wild animals, birds, fish, aquatic life, or plants or to their growth or propagation; or to the value of fish and game.
  - (B) Any vessel utilizing a ballast water treatment system by December 31, 2014, consistent with the technologies identified in Michigan's Ballast Water Control General Permit (Permit No. MIG140000) or an alternative technology approved by the MDEQ, will not be required to meet any future numeric water quality-based effluent limits (WQBEL) for living organisms that may be set forth in a subsequent Section 401 certification until the functional life of that ballast water treatment system has expired or the life of the vessel has expired, whichever is earlier. These vessels must continue ballast water exchange and saltwater flushing as described in Condition 2 unless it is demonstrated to the MDEQ that numeric WQBELs adopted after the date of this certification for living organisms are met.
4. Live Organism Monitoring (R 323.2154(2)(c) of the Part 21 Rules, Wastewater Discharge Permits, promulgated under Part 31 of the NREPA):
  - (A) The owner/operator of any vessel covered by the VGP whose voyages originate from outside the EEZ that discharges ballast water to Michigan waters, shall monitor ballast water discharged from their vessel at least once each year for living organisms greater than 50 micrometers in minimum dimension, and living organisms equal to or less than 50 micrometers in minimum dimension and equal to or greater than 10 micrometers in minimum dimension; and submit a report summarizing the discharge monitoring results collected for the above live organism size categories to the MDEQ no later than December 31 of each year. The ballast water discharge samples shall be collected and analyzed consistent with protocols established by the MDEQ. If the MDEQ fails to establish protocols, then the requirements set forth in this condition will be waived.
5. The owners/operators of vessels required to utilize a ballast water treatment system shall allow the MDEQ reasonable entry onto the vessel for inspection, access to records, and collection of a ballast water discharge sample(s) for determining compliance with this certification and applicable laws. (R 323.2149(1)(c) and R 323.2189 of the Part 21 Rules of the NREPA)

Ms. Tinka G. Hyde  
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September 27, 2012

6. Nonoceangoing vessels covered by the VGP operating ballast water treatment systems are prohibited from discharging ballast water in Michigan waters with total residual chlorine concentrations above 38 micrograms per liter ( $\mu\text{g/L}$ ) when the ballast water discharge duration exceeds 160 minutes, or above 200  $\mu\text{g/L}$  when the ballast water discharge duration is less than or equal to 160 minutes. (R 323.1057 of the Part 4 Rules, Water Quality Standards, promulgated under Part 31 of the NREPA)

Certification Conditions for the VGP and sVGP

7. Discharges of blackwater and graywater from vessels covered by the VGP or sVGP are prohibited to Michigan waters. (Part 95, Watercraft Pollution Control, of the NREPA)
8. Vessel owners/operators shall immediately notify the MDEQ whenever they become aware that a discharge from their vessel causes or contributes to an exceedance of an applicable state water quality standard. (R 323.2189 of the Part 21 Rules of the NREPA)
9. Nothing in this Certification diminishes, negates, or precludes the State of Michigan from bringing civil and/or criminal actions for violations of state law and/or issued state permits. (Part 31 of the NREPA)
10. Each condition in the proposed VGP and sVGP cannot be made less stringent without potentially violating the requirements of state law, including water quality standards. (Part 31 of the NREPA)
11. If the MDEQ determines that vessel discharges covered by this certification can no longer comply with Section 401 of the CWA or state laws and regulations, then the MDEQ may revoke or modify this certification after appropriate public notice. (CWA, Section 401)
12. All discharges to Michigan waters from vessels covered by the USEPA's VGP are prohibited from causing or contributing to exceedances of the Michigan Water Quality Standards (Part 4 Rules, Water Quality Standards, promulgated under Part 31 of the NREPA).

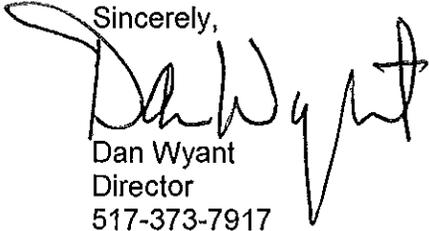
The contact point for consultation, submittals, and approvals as referred to in this certification is:

Chief, Water Resources Division  
Michigan Department of Environmental Quality  
P.O. Box 30458  
Lansing, Michigan 48909-7958  
Phone: 517-335-4176

The MDEQ reserves the right to challenge the USEPA's VGP and sVGP.

Ms. Tinka G. Hyde  
Page 5  
September 27, 2012

Should you require further information regarding this certification, please contact Ms. LeSage at 517-241-7931; Mr. William Creal, Chief, Water Resources Division, at 517-335-4176; or you may contact me.

Sincerely,  
  
Dan Wyant  
Director  
517-373-7917

Enclosure

cc/enc: Mr. Jim Sygo, Deputy Director, MDEQ  
Ms. Madhu R. Anderson, Director of Policy, MDEQ  
Mr. Jim Goodheart, Senior Policy Advisor, MDEQ  
Mr. William Creal, MDEQ  
Ms. Sarah LeSage, MDEQ  
Mr. Chris Antieau, MDEQ

## Michigan Department of Environmental Quality

Enclosure to September 27, 2012, Certification Letter to the  
United States Environmental Protection Agency

This supplemental information is provided to the United States Environmental Protection Agency (USEPA) in addition to the Clean Water Act Section 401 Certification Letter dated September 27, 2012, issued by the Michigan Department of Environmental Quality (MDEQ). As described in the MDEQ's comment letter dated February 21, 2012, we recommend the USEPA develop protective numeric water quality-based effluent limits (WQBELs) to apply across the Great Lakes basin. Suggested approaches for WQBEL development are reiterated below.

The ballast water permitting strategy proposed by the USEPA in the draft Vessel General Permit (VGP2) and further described in the associated VGP2 Fact Sheet requires select covered existing vessels to treat their ballast water discharges with an EPA-ETV approved ballast water management system (BWMS) and meet the International Maritime Organization's (IMO) D-2 standard (IMO discharge standard for live organisms) by their first drydocking after 2014 or 2016, depending on size class. New vessels constructed after January 1, 2012, are required to treat their ballast water discharges with an EPA-ETV approved BWMS and meet the IMO D-2 standard upon delivery. Certain vessels entering the Great Lakes would be required to continue ballast water exchange/saltwater flushing in combination with an approved BWMS.

The IMO D-2 standard is considered a BPT/BAT treatment technology-based effluent limitation by the USEPA, not a WQBEL. According to the VGP2 Fact Sheet, the USEPA determined it is infeasible to calculate numeric WQBELs for ballast water because "at this time the lack of available data and information prevents a precise quantification of the invasion risk associated with ballast water discharges." Section 1.9.1 (Modification of the VGP) of the draft VGP2 indicates the USEPA will consider modifying the permit after the "scientific understanding of ... invasion biology has evolved such that new information would have justified the application of significantly more stringent effluent limitations ... had this been understood at the time of permit issuance..." The National Research Council (NRC) Committee's report indicates a 10-15 year time horizon will be required to obtain the experimental and field data needed to parameterize and ground-truth the risk/release models. This time period is too lengthy.

As presented in Lee et al. (2010<sup>1</sup>) it is possible to generate ballast water WQBELs that are "protective of the environment under most situations by making conservative assumptions, using safety factors similar to those used in ecological risk assessments for pollutants, and/or by setting the standards based on the upper confidence limits of predictions of invasions." Historically, the USEPA has applied such conservative approaches to derive water quality standards/limits for heavy metals and organic chemicals when perfect toxicological datasets were lacking.

Numeric WQBELs more stringent than IMO D-2 are justified when combined with a reasonable and fair compliance schedule, and provides the following two processes for the USEPA to consider to produce protective ballast water WQBELs for live organisms in the >50 micrometers ( $\mu\text{m}$ ) size category:

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<sup>1</sup> Lee II, H., et al., 2010. Density Matters: Review of Approaches to Setting Organism-Based Ballast Water Discharge Standards. U.S. EPA, Office of Research and Development, National Health and Environmental Effects Research Laboratory, Western Ecological Division.

1. The first ballast water WQBEL derivation approach is based on the predicted probability of establishment ( $P(E_{upper,high})$ ) determined by Bailey et al. (2009<sup>2</sup>) for the parthenogenetic water flea (*Daphnia retrocurva*) in enclosures given inoculum densities of 1-10 individuals/m<sup>3</sup>. Probabilities of establishment based on the upper projection trajectories ( $P(E_{upper,low})$ ) for *D. retrocurva* were predicted by Bailey et al. (2009) to be slightly greater than 0.1 and 0.25 for inoculum densities of 1 individual/m<sup>3</sup> and 10 individuals/m<sup>3</sup>, respectively. The MDEQ considers any ballast water discharge limitation predicted using upper projection trajectory data to result in probabilities of establishment >0.01 for high risk (for invasion) species such as *D. retrocurva* to be unacceptable and not adequately protective of United States waters. To ensure probabilities of establishment >0.01 for such high risk (for invasion), species introduced to United States waters via the ballast water vector under favorable physical, chemical, and biological conditions, an inoculum density (or ballast water WQBEL) of 0.1 individual/m<sup>3</sup> is needed.
2. The second ballast water WQBEL derivation procedure is based on the Per Capita Invasion Probabilities (PCIP) approach described in Chapter VIII of Lee et al. (2010). The PCIP is defined by the authors as the "per year probability that an individual nonnative propagule discharged from ballast water will become established as a new nonindigenous species in a specified waterbody." The PCIP is calculated as:

$$\text{Equation 1. } PCIP = N_h / (D_h * C_h)$$

Where:

PCIP = per capita invasion probability (new invading species \* organism<sup>-1</sup>)

$N_h$  = historical annual invasion rate of potential ballast-associated invaders for a waterbody (new invading species \* year<sup>-1</sup>)

$D_h$  = historic annual foreign ballast discharge rate into a waterbody (m<sup>3</sup> year<sup>-1</sup>)

$C_h$  = historic concentration of organisms in ballast water discharged into a waterbody (organisms \* m<sup>-3</sup>)

After the PCIP is calculated, the number of new, unique invaders per year for a given ballast water organism concentration and ballast water volume can be predicted as:

$$\text{Equation 2. } N_p = PCIP * D_p * C_p$$

Where:

$N_p$  = predicted annual invasion rate of potential ballast-associated invaders for a waterbody (new invading species \* year<sup>-1</sup>)

$D_p$  = predicted annual foreign ballast discharge rate into a waterbody (m<sup>3</sup> year<sup>-1</sup>)

$C_p$  = predicted concentration of organisms in ballast water discharged into a waterbody (organisms \* m<sup>-3</sup>)

Ballast water discharge limitations can be generated for an individual waterbody (or coasts) by rearranging the above equation to calculate the organism concentration in ballast water ( $C_p$ ) associated with predicted ballast water volume ( $D_p$ ), acceptable risk represented by the number of new invaders per year ( $N_p$ ), the PCIP for the waterbody (or coast), and a safety factor:

$$\text{Equation 3. } C_p = N_p / (D_p * PCIP * \text{Safety Factor})$$

<sup>2</sup> Bailey, S.A., L.A. Velez-Espino, O.E. Johannsson, M.A. Koops, C.J. Wiley. 2009. Estimating establishment probabilities of Cladocera introduced at low density: an evaluation of the proposed ballast water discharge standards. Can. J. Fish. Aquat. Sci. 66:261-276.

Selection of the specific values to use for  $N_p$ , the PCIP and Safety Factor in the above equation are risk management decisions that need to be made by the permitting authority after consideration of stakeholder input. Michigan considers the following values appropriate for  $N_p$ , PCIP, and the Safety Factor:

$$N_p = 1 \times 10^{-3} \text{ invaders/yr.}$$

$$\text{PCIP} = \text{Upper 95\% Confidence Interval}$$

$$\text{Safety Factor} = 10$$

Michigan also supports doubling the current foreign ballast discharge rate into a waterbody for use as  $D_p$  in the above equation.

Using information presented in Table 12, Chapter VIII, of Lee et al. (2010), ballast water discharge limitations calculated using Equation 3 for the East Coast, Gulf Coast, Pacific Coast, and Great Lakes are shown below:

$$\text{East Coast } C_p = (1 \times 10^{-3} \text{ invaders/yr}) / (14,815,664 \text{ m}^3/\text{yr} * 4.64\text{E-}11 * 10)$$

$$= 0.145 \text{ organisms/m}^3$$

$$\text{Gulf Coast } C_p = (1 \times 10^{-3} \text{ invaders/yr}) / (39,210,680 \text{ m}^3/\text{yr} * 7.67\text{E-}12 * 10)$$

$$= 0.332 \text{ organisms/m}^3$$

$$\text{Pacific Coast } C_p = (1 \times 10^{-3} \text{ invaders/yr}) / (29,576,738 \text{ m}^3/\text{yr} * 3.83\text{E-}11 * 10)$$

$$= 0.088 \text{ organisms/m}^3$$

$$\text{Great Lakes } C_p = (1 \times 10^{-3} \text{ invaders/yr}) / (2,790,922 \text{ m}^3/\text{yr} * 9.10\text{E-}11 * 10)$$

$$= 0.39 \text{ organisms/m}^3$$

The median PCIP (rather than the upper 95% confidence interval PCIP) was used above to calculate the ballast water discharge limitation for the Great Lakes because individual ship records were not available in 1991 to support the generation of PCIP distributions. Consequently, Lee et al. (2010) were forced to use the mean ballast water organism concentration from the IMO baseline study (4640/m<sup>3</sup>, MEPC, 2003) to calculate the PCIP (median) for the Great Lakes. As explained in Lee et al. (2010), "because the distribution of organism concentrations in ballast water is highly skewed, the mean concentration may over or underestimate the true propagule pressure depending upon the concentrations in the specific set of ships discharging within the waterbody."

Michigan recognizes the need to include a single ballast water WQBEL for live organisms in the >50  $\mu\text{m}$  size category in the VGP2 that is applicable to all waters of the United States. Based on the above ballast water discharge limitations generated using the PCIP approach for the East, Gulf, and Pacific Coasts and the Great Lakes, it is apparent that selection of 0.1 organisms/m<sup>3</sup> (0.088 organisms/m<sup>3</sup> for the Pacific Coast rounded to 0.1 organisms/m<sup>3</sup>) as the ballast water WQBEL for live organisms in the >50  $\mu\text{m}$  size category would protect all United States waters from aquatic invasive species.



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Fish, mollusks, crustaceans, amphibians, and reptiles currently listed as injurious wildlife under the Lacy Act by the Federal Government that are not listed in Michigan under Part 413 of NREPA

Prepared for the AIS Advisory Council on 8-16-12  
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by

Thomas M. Goniea, DNR Biologist/Council Member

### Overall Discussion

All species listed below are currently listed under the Federal Lacy Act prohibiting their importation into the country or across state lines, but are not listed in Michigan as either restricted or prohibited under Part 413. The council realizes that the animals below do not pose a significant risk to Michigan's ecology since there is little chance of them persisting long term in the state's climate. However the council believes given the federal government's interest in prohibiting the future introduction and spread of these species into more vulnerable ecosystems in the U.S., that Michigan should be acting as a partner in that effort. Allowing the commercial sale and private possession of these species within the state borders only provides a loophole to federal regulation and a potential source for their illegal interstate movement. The council believes in the fight against invasive species that it is imperative for each state in the nation to think beyond its own self-interests and take a national perspective when considering invasive species laws. The regulatory decisions by one state can negatively affect others.

Example: For a long time several southern states had minimal laws concerning the trade of spotted turtles which are threatened or endangered throughout much of their North American range. As a result it was common for poachers to raid threatened populations in the northern states and smuggle protected turtles into the pet trade through those southern states. In recent years one of those states of greatest concern has passed tougher reptile regulations.

The council believes that given Michigan's central place in the Great Lakes region, the state should not only be a regional but also a national leader in the fight against Aquatic Invasive Species. As such it is important for Michigan to establish its state regulations with state as well as national interests in mind. Therefore the council recommends that state law be amended to prohibit the live possession, transport, or sale, of all species currently listed as injurious wildlife by the federal government within state borders regardless of the direct threat or lack thereof to state resources. Future wildlife species listed by the federal government under the Lacy Act should automatically result in review and listing in Michigan following the Natural Resource Commission procedures in Part 413.

**Individual Species listed under the Federal Lacey Act that are not currently listed in Michigan under Part 413 of NREPA**

Chinese Mitten Crab, Family *Eriocheir (sinensis)*

3 species

**Description:** Chinese mitten crabs spend most of their life in fresh water rivers, but they must return to saltwater to breed. During their fourth or fifth year in late summer, the crustaceans migrate downstream, and attain sexual maturity in the tidal estuaries. After mating, the females continue seaward and overwinter in deeper waters. They return to brackish water in the spring to hatch their eggs. After larval development, the juvenile crabs gradually move upstream into fresh water (sometimes 100s of miles inland), thus completing the life cycle. Federally listed under the Lacey Act in 1989.

**Recommendation:** The Chinese mitten crab should be added to Part 413 as a Prohibited Species. While this species is believed to be unable to establish populations in Michigan because of its obligation to breed in saltwater, it spends its first 4 years living in freshwater rivers and if released at the right life state could have a short term effect on state freshwater resources. Since it is listed as injurious wildlife by the Federal Government and illegal to transport across state lines, the council believes that Michigan state law should be written to reflect and support federal efforts to prevent the spread or further introduction of this species throughout the United States. Michigan law should not be used to provide a safe haven to potentially possess or breed this species. Finally, it is not believed that this species has any current place in the Michigan economy so listing under Part 413 by the state should be of little to no immediate consequence.

Walking Catfish, Family *Clariidae*

100 species

**Description:** The walking catfish is a native of Southeast Asia including Malaysia, Thailand, Eastern India, Sri Lanka, Bangladesh, Burma, Indonesia, Singapore and Brunei. Walking catfish thrive in stagnant, frequently hypoxic waters, and are often found in muddy ponds, canals, ditches and similar habitats. The species spends most of its time on, or right above, the bottom surface, with occasional trips to the surface to gulp air. This catfish is a tropical species and prefers a water temperature in the range of 10–28 °C (50–82 °F). In the United States it is an invasive species at the federal level, with populations now established in Florida and reported sightings in California, Georgia, and Nevada. It is thought that the aquarium trade is the likely vector for this species movement into North America. Federally listed under the Lacey Act in 1970.

**Recommendation:** The family of walking catfish should be added to Part 413 as a Prohibited Species. Since it is listed as injurious wildlife by the Federal Government and illegal to transport across state lines, the council believes that Michigan state law should be written to reflect and support federal efforts to prevent the spread of this species throughout the more vulnerable areas of the United States. Michigan law should not be used to provide a safe haven to potentially commercially possess or breed this species. It is not known what place, if any, this species has in the Michigan ornamental fish trade

however public vetting during the listing process would allow for any industry concerns to be brought forward. Currently, due to listing at the federal level all interstate transportation of this species is illegal and therefore any commercial activity would have to be solely contained in Michigan to be legal.

Brown Tree Snake, *Boiga irregularis*

**Description:** Native to Australia and the South Pacific this species was accidentally introduced to US military installations on Guam shortly after WWII. It was then responsible for extirpating most of the island's native vertebrate species. Afterward it was accidentally introduced to Hawaii and has had a similar effect there. This is definitely a tropical snake that would not survive through the Michigan winter and does not pose any threat of establishing a permanent population here. Federally listed under the Lacey Act in 1990.

**Recommendation:** The brown tree snake should be listed as prohibited in Michigan simply due to their federal listing status. Since it is listed as injurious wildlife by the Federal Government and illegal to transport across state lines, the council believes that Michigan state law should be written to reflect and support federal efforts to prevent the spread of this species throughout the more vulnerable areas of the United States. Michigan law should not be used to provide a safe haven to potentially possess or breed this species. It is not believed that this species has any current place in the Michigan economy so listing under Part 413 by the state should be of little to no immediate consequence.

Burmese Python, *Python molurus*

Northern African Python, *Python sebae*

Southern African Python, *Python natalensis*

Yellow Anaconda, *Eunectes notaeus*

**Description:** These four constrictor species were added to the Federal Lacey Act in 2012 due to the devastating effects they are having in the Florida Everglades. They are all tropical snake species with even Florida winters pushing the northern boundary of their suitable habitat. These species would not be able to survive the Michigan winter and pose no threat to establish populations in this state. Up until the federal listing this year, these species have had a role in the U.S. reptile trade. Because of their recent listing, it is now illegal to import them into the U.S. or to transport across state lines. Private possession and sale is still allowed under federal law as long as that activity is legal in the state where it is taking place and the private pet owner does not transport the animal across state lines. Legal sale in Michigan under federal law requires that any snakes of these species must have been born and bred in Michigan for exclusive use in Michigan. It is safe to assume that these snakes are currently in private ownership in Michigan and may be being bred in state for sale in the local pet trade, but the extent that the Michigan trade has persisted after federal listing is unknown. A call to Preuss Pets in Lansing (Mid Michigan's largest reptile dealer) on 7-24-2012 revealed that by their own choice, they had stopped selling these four species about 10 years ago. Their reptile curator informed the DNR's representative on the council that the Michigan reptile industry did not have any type of organization/association that represents the interests of the industry and that each dealer/breeder acts independent of all others.

**Recommendation:** As with the other animals on this list, these four snakes are also listed as injurious wildlife by the federal government, however unlike to the others, private ownership and commercial sale is likely occurring in Michigan. Still the council feels that it is important to treat these snakes similarly to other species on this list. Since they are listed as injurious wildlife by the Federal Government and illegal to transport across state lines, the council believes that Michigan state law should be written to reflect and support federal efforts to prevent the spread of these species throughout the more vulnerable areas of the United States. Michigan law should not be used to provide a safe haven to potentially possess or breed these species. We recommend the following: 1) These four species should be placed on the prohibited species list. 2) Going forward these species should not be legal to sell or purchase in Michigan. 3) Pet shops with these species in inventory should be allotted 3-6 months to sell or dispose of what is in stock. 4) Individual citizens with these animals already in possession should be provided a 6-12 month period to register them with the state and receive an authorizing permit to possess the specimen(s) until death. 5) All registered snakes should to be PIT tagged with the identifying number recorded by the state and listed on the possession permit.

NOTE: At present, no amphibian or mollusk species are listed at the federal level which is not also listed at the state level.

## Harmonizing Federal and State Prohibited Aquatic Plant Species Lists

### Background

Under the Natural Resource and Environmental Protection Act (NREPA), Part 413, Sec. 41409 the Aquatic Invasive Species (AIS) Advisory Council is charged with harmonizing federal and state law so that aquatic species on federal lists are placed on the appropriate lists of this state. The current listing of Michigan's NREPA regulated aquatic plant species consists of 18 species, categorized as prohibited (13 species) or restricted (5 species). The USDA has authority under the Plant Protection Act 7 USC 7701 *et seq.* to regulate the movement of noxious weeds interstate within the United States and gives authority for the Federal Noxious Weed (FNW) List published in 7 CFR 360. Nineteen aquatic plant species are listed in 7 CFR 360. A comparison between the two listings in table 1 shows that 12 of the FNW species are not listed in NREPA. Currently the two lists only overlap for seven species - see attached documents for additional information on these 12 species. Absence of the 12 FNW species from NREPA in essence provides a safe haven opportunity to possess and grow these species and increases the risk for endangering Michigan's water resources.

### Benefits of Harmonization

Harmonization of the NREPA listed plant species and the Federal Noxious Weed List Aquatic Section would facilitate cooperative enforcement efforts involving the Michigan Department of Agriculture and Rural Development and the United States Department of Agriculture. Plant health regulatory officials at the state and federal level have a long tradition of harmonizing regulatory activities to prevent the introduction and spread of quarantine significant species and to mitigate the effects in colonizing populations of invasive pests and diseases.

### Recommendation

The 12 aquatic federally listed plant species which are currently absent from NREPA should be listed as prohibited in Michigan due to their federal regulated status. State law should reflect and support federal efforts to prevent the spread of these species throughout the more vulnerable areas of the United States. Michigan should not be a safe haven to potentially possess or propagate these species. It is recommended that the following 12 species be added to NREPA Part 413 as prohibited species.

1. *Azolla pinnata* (mosquito fern, water velvet)
2. *Caulerpa taxifolia* Mediterranean strain (Caulerpa, killer algae)
3. *Hygrophila polysperma* (Indian hygrophila, Indian swampweed, miramar weed)
4. *Ipomea aquatica* (Chinese water spinach, swamp morning glory)
5. *Limnophila sessiliflora* (Asian marshweed, ambulia)
6. *Melaleuca quinquenervia* (Melaleuca, punk tree, paperbark tea tree)
7. *Monochoria hastata* (arrowhead false pickerelweed)
8. *Monochoria vaginalis* (heartshape false pickerelweed)
9. *Ottelia alismoides* (duck lettuce)
10. *Sagittaria sagittifolia* (arrowhead)
11. *Solanum tampicense* (wetland nightshade)
12. *Sparganium erectum* (bur reed)

Future additions to the federal list will need to be evaluated on an individual species basis to determine if the species should be regulated under NREPA Part 413.

Table 1. Status at the federal and state (Michigan) level of regulated aquatic plant species.

Scientific Name	Common Name	Regulatory Status	
		Federal	Michigan
<i>Azolla pinnata</i>	mosquito fern, water velvet	X	
<i>Butomus umbellatus</i>	flowering rush		X
<i>Cabomba caroliniana</i>	Carolina fanwort		X
<i>Caulerpa taxifolia</i> (Mediterranean strain)	Caulerpa, killer algae	X	
<i>Cylindrospermopsis raciborskii</i>	cylindro		X
<i>Eichhornia azurea</i>	anchored water hyacinth, common water hyacinth		X
<i>Egeria densa</i>	Brazilian elodea, also known as Anacharis		X
<i>Fallopia japonica</i>	Japanese knotweed		X
<i>Heracleum mantegazzianum</i>	giant hogweed	X	X
<i>Hydrilla verticillata</i>	Hydrilla	X	X
<i>Hydrocharis morsus-ranae</i>	European frogbit		X
<i>Hygrophila polysperma</i>	Indian hygrophila, Indian swampweed, miramar weed	X	
<i>Ipomea aquatica</i>	Chinese water spinach (swamp morning glory)	X	
<i>Lagarosiphon major</i>	African oxygen weed, African elodea	X	X
<i>Limnophila sessiliflora</i>	Asian marshweed, ambulia	X	
<i>Lythrum salicaria</i>	purple loosestrife		X
<i>Melaleuca quinquenervia</i>	Melaleuca, punk tree, paperbark tea tree	X	
<i>Monochoria hastata</i>	arrowhead false pickerelweed	X	
<i>Monochoria vaginalis</i>	heartshape false pickerelweed	X	
<i>Myriophyllum aquaticum</i>	parrot's feather		X
<i>Nitellopsis obtusa</i>	starry stonewort		X
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil		X
<i>Nymphoides peltata</i>	yellow floating heart		X
<i>Ottelia alismoides</i>	duck lettuce	X	
<i>Phragmites australis</i>	Phragmites or common reed		X
<i>Potamogeton crispus</i>	curly leaf pondweed		X
<i>Sagittaria sagittifolia</i>	arrowhead	X	
<i>Salvinia auriculata</i>	giant salvinia	X	X
<i>Salvinia biloba</i>	giant salvinia	X	X
<i>Salvinia herzogii</i>	giant salvinia	X	X
<i>Salvinia molesta</i>	giant salvinia	X	X
<i>Solanum tampicense</i>	wetland nightshade	X	
<i>Sparganium erectum</i>	bur reed	X	
<i>Trapa natans</i>	water chestnut		X

Prepared by Mike Bryan, MDARD-PPMD Plant Industry Specialist

**324.41302 Adding or deleting from list of prohibited species or restricted species; consultation; procedure; determination.**

Sec. 41302.

(1) The commission of natural resources may by order add to or delete from the list of prohibited species or restricted species under section 41301 any species other than an insect or plant species. Before issuing an order under this subsection, the commission of natural resources shall consult with the department of agriculture and rural development. After the consultation, and at least 30 days before the commission of natural resources issues the order, the department of natural resources shall post a copy of the proposed order on the department of natural resources' website and shall submit a copy of the proposed order to all of the following:

(a) The legislature.

(b) The standing committees of the senate and house of representatives with primary responsibility for any of the following:

(i) Agricultural issues.

(ii) Environmental issues.

(iii) Natural resources issues.

(2) The commission of agriculture and rural development may by order add to or delete from the list of prohibited species or restricted species under section 41301 any insect or plant species. Before issuing an order under this subsection, the commission of agriculture and rural development shall consult with the department of natural resources. After the consultation, and at least 30 days before the commission of agriculture issues the order, the department of agriculture and rural development shall post a copy of the proposed order on the department of agriculture and rural development's website and shall submit a copy of the proposed order to all of the following:

(a) The legislature.

(b) The standing committees of the senate and house of representatives with primary responsibility for any of the following:

(i) Agricultural issues.

(ii) Environmental issues.

(iii) Natural resources issues.

(3) The commission of natural resources or the commission of agriculture and rural development, as applicable, shall list a species as a prohibited species or restricted species if the commission of natural resources or commission of agriculture and rural development, respectively, determines the following:

(a) For a prohibited species, all of the following requirements are met:

(i) The organism is not native to this state.

(ii) The organism is not naturalized in this state or, if naturalized, is not widely distributed in this state.

(iii) One or more of the following apply:

(A) The organism has the potential to harm human health or to severely harm natural, agricultural, or silvicultural resources.

(B) Effective management or control techniques for the organism are not available.

(C) The Federal Government has determined an organism presents a threat to national interests and has listed that organism as Injurious Wildlife under the Lacey Act or the USDA Animal Plant Health Inspection Service has classified it as an Aquatic Federal Noxious Weed.

(i) It is understood that some organisms listed by the federal government will not pose a significant risk to Michigan's ecology since there is little chance of them persisting long term in the state's climate. However, given the federal government's interest in prohibiting the future introduction and spread of these species into more vulnerable ecosystems in the U.S., Michigan should be acting as a partner in that effort. Allowing the commercial sale and private possession of federally listed species within the state borders only provides a loophole to federal regulation and a potential source for illegal interstate transport. In the fight against invasive species, it is imperative that states think beyond their self-interests and take a national perspective when considering invasive species laws. Given Michigan's central place in the Great Lakes region, it should not only be a regional but also a national leader in the fight against Aquatic Invasive Species. As such it is important for Michigan to establish its state regulations with state as well as national interests in mind. Future organisms listed by the federal government should automatically result in review for listing in Michigan following the protocol established in this Part.

(b) For a restricted species, all of the following requirements are met:

(i) The organism is not native to this state.

(ii) The organism is naturalized and widely distributed in this state.

(iii) One or more of the following apply:

(A) The organism has the potential to harm human health or to harm natural, agricultural, or silvicultural resources.

(B) Effective management or control techniques for the organism are available.

(C) The Federal Government has determined an organism presents a threat to national interests and has listed that organism as Injurious Wildlife under the Lacey

Act or the USDA Animal Plant Health Inspection Service has classified it as an Aquatic Federal Noxious Weed.

(i) It is understood that some organisms listed by the federal government will not pose a significant risk to Michigan's ecology since there is little chance of them persisting long term in the state's climate. However, given the federal government's interest in prohibiting the future introduction and spread of these species into more vulnerable ecosystems in the U.S., Michigan should be acting as a partner in that effort. Allowing the commercial sale and private possession of federally listed species within the state borders only provides a loophole to federal regulation and a potential source for illegal interstate transport. In the fight against invasive species, it is imperative that states think beyond their self-interests and take a national perspective when considering invasive species laws. Given Michigan's central place in the Great Lakes region, it should not only be a regional but also a national leader in the fight against Aquatic Invasive Species. As such it is important for Michigan to establish its state regulations with state as well as national interests in mind. Future organisms listed by the federal government should automatically result in review for listing in Michigan following the protocol established in this Part.

**History:** Add. 2009, Act 52, Eff. Sept. 21, 2009

**Popular Name:** Act 451

**Popular Name:** NREPA

### Definitions for Organisms in Trade: Healthy Organisms

“Ornamental Aquatic Species Retailer” means any person or business commercially selling or bartering at retail any species of live fish, reptile, amphibian, mollusk, crayfish, aquatic plants, or aquatic macroinvertebrate in the aquarium or pet trade.

“Ornamental Aquatic Species Wholesaler” means any person or business commercially selling or bartering at wholesale any species of live fish, reptile, amphibian, mollusk, crayfish, aquatic plants, or aquatic macroinvertebrate the aquarium or pet trade.

The following are not Ornamental Aquatic Species Retailers or Wholesalers:

- 1) A person or business operating as a licensed aquaculture facility as defined under Michigan Aquaculture Development Act (Act 199 of 1996) that is engaged in selling or bartering an approved aquaculture species as defined by that Act.
- 2) A person or business operating as a licensed retail or wholesale bait dealer as defined in Part 487 of P.A. 451 of 1994 that is engaged in selling or bartering an approved bait species as defined by that Part.
- 3) A person or business operating as a licensed commercial fishing business as defined in Part 473 of P.A. 451 of 1994 that is engaged in selling or bartering an approved commercial fish species as defined by that Part.
- 4) A person or business operating as licensed wholesale fish dealer as defined in Part 473 of P.A. 451 of 1994 that is engaged in selling or bartering an approved commercial fish species as defined by that Part.
- 5) A person licensed under the Nursery Law, P.A. 189 of 1931, as amended, unless also trading in Ornamental Aquatic Species.

“HACCP (Hazards Analysis and Critical Control Point)” is a production control system. It is a process that identifies where potential contamination can occur (the critical control points or CCPs) and strictly manages and monitors these points as a way of ensuring the process is in control and that the safest product possible is being produced. HACCP is designed to prevent rather than catch potential hazards.

The Seven Principles of HACCP are:

- 1) Identify the potential hazards
- 2) Identify the control points where the identified hazards may occur
- 3) Establish critical limits for the potential hazards and safety measures
- 4) Establish monitoring routines to ensure safety measures are working

- 5) Establish appropriate responses if monitoring indicates a problem
- 6) Establish accurate and detailed record keeping system that documents problems and the remedial steps to be taken
- 7) Establish a verification system that ensures the above steps are being followed.

**Phragmites Treatment/Management Prioritization Tool**

Draft 3/15/2013

**Criteria**

Value Score

**Ecological Criteria**

In what region of Michigan is your site located?

Upper Peninsula	(5 pts.)	
Northern Lower Peninsula (north of vegetation tension zone)	(3 pts.)	
Southern Lower Peninsula	(1 pts.)	

Is invasive phragmites locally abundant in similar habitat in the general area\*?

*\*General area is approximately 2 miles from the site in similar habitat*

Very Abundant (>50% of similar habitat is infested)	(-5 pts.)	
Moderate to low abundance (10-50% infested)	(0 pts.)	
Virtually absent locally (<10% infested)	(5 pts.)	

How large is the Phragmites infestation (approximate patch size)?

Less than 1000 square feet	(9 pts.)	
1000 square feet - 1 acre	(7 pts.)	
1 acre - 20 acres	(5 pts.)	
Greater than 20 acres	(3 pts.)	

Is the infestation in a linear feature, such as a roadside ditch, drain, utility corridor, etc?

Yes, the infestation is in a linear feature	(5 pts.)	
No, the infestation is in a linear feature	(0 pts.)	

Is the area acting as a potential seed source to non-infested areas

The patch size is less than 1 acre AND the entire area will be treated	(5 pts.)	
The patch size is less than 1 acre AND the entire area will NOT be treated	(1 pts.)	
The patch size is more of than 1 acre AND the treatment is on the edge of the infestation	(3 pts.)	
The patch size is more than 1 acre AND the treatment is NOT on the edge of the infestation	(-5 pts.)	

What is the habitat quality and structure development (relative to similar natural community types)?

Excellent - This area is an excellent example of a natural community (e.g. dominated by native plant species; diversity of plant species and growth forms, features such as hummocks, woody debris, open space and cover; and abundant wildlife habitat features such as breeding, rearing, and nursery areas)	(5 pts.)	
Good - not excellent, but still a good example of a natural community (e.g. some diversity of plant species and growth forms, moderate to sparse hummocks, woody debris, open space and cover; and moderate wildlife habitat features such as breeding, rearing, and nursery areas)	(3 pts.)	
Poor - degraded habitat, poor example of a natural community (e.g. very low diversity of native plant species and growth forms, almost no hummocks, woody debris, open space and cover; and very sparse wildlife habitat features such as breeding, rearing, and nursery areas)	(1 pts.)	

**Human Values Criteria**Property Ownership/Location (select **all** that apply)

Great Lakes Bottomlands (Below OHWM of the Great Lakes)	(3 pts.)	
Public (Above the OHWM of the Great Lakes)	(2 pts.)	
Private (Above the OHWM of the Great Lakes)	(1 pts.)	

What is the severity of the aesthetic impacts of the phragmites infestation?

Severe - entirely blocking shoreline views of waterbodies, inhibiting public scenic road or waterway views, etc.	(3 pts.)	
Moderate - some (but not entire) blockage of shoreline or other public scenic views	(2 pts.)	
Mild - Little to no blockage of shoreline or other public scenic views	(1 pts.)	

Is the phragmites negatively impacting recreational opportunities at this site?

Severely impacting recreation - inhibiting boat or walking access to the water, reduction in waterfowl and fish use of the area, reduced visibility inhibiting birdwatching, hunting, etc.	(5 pts.)	
Moderately impacting recreation - some moderate impacts to boat or walking access to the water, reduction in waterfowl and fish use of the area, or reduced visibility for birdwatching, hunting, etc.	(3 pts.)	
Not impacting recreation - little to no impacts on recreational activities.	(1 pts.)	

Is the phragmites infestation causing a human safety hazard?

Significant hazard - blocking views along major roads and intersections, fire-prone dry thatch accumulation adjacent to homes and buildings, etc.	(5 pts.)	
Moderate hazard - Currently not, but has the potential to block views along roads and intersections, some dry thatch adjacent to buildings, etc.	(3 pts.)	
No apparent safety hazard.	(1 pts.)	

**Feasibility/Coordination of Treatment**

Are there sites nearby where Phragmites treatment is planned?

Yes - This site is near (e.g., within 1 mile radius) another site where phragmites treatment is planned and will be conducted in synchronization with pooled resources, etc.	(2 pts.)	
Maybe - Unsure, at this point, if nearby treatment is being planned.	(1 pts.)	
No - The site is not near any other planned treatment sites.	(0 pts.)	

How difficult would treatment be at this location?

Very Easy - easy access to the entire phragmites infestation, already have access to the proper equipment. Minimal natural resource impacts (i.e., native vegetation/habitat) from treatment with the proper use of BMPs.	(5 pts.)	
Moderate - easy to moderate accessibility to the infestation, may have the proper equipment. Using BMPs will minimize negative impacts to native vegetation/habitat.	(1 pts.)	
Difficult - difficult or impossible to access the entire phragmites infestation, may not have the proper equipment. Treatment may cause excess damage to natural resources.	(-5 pts.)	

**TOTAL SCORE**

## Summary of Michigan's Aquatic Invasive Species Program Funding

Prepared by the Aquatic Invasive Species (AIS) Program Core Team  
Submitted to the AIS Advisory Council  
March 15, 2013

### **1. Introduction**

Michigan's AIS Advisory Council was established in December, 2011 per Part 414. Aquatic Invasive Species Advisory Council, of the Natural Resources and Environmental Protection Act, Act 451 of 1994, as amended. Section 324.41407(3) requires that:

“Within 60 days after the issuance of a final update to the aquatic invasive species management plan, the council shall submit a report with recommendations on the funding necessary to implement the plan and the method of providing that funding. The council shall submit the report to the governor, the senate majority leader, the speaker of the house of representatives, and the standing committees of the senate and house with primary responsibility for natural resources, conservation, agriculture, and commerce.”

The AIS Advisory Council requested that the AIS Core Team summarize background information on the status of AIS Program funding in Michigan. Michigan's interdepartmental AIS Core Team was established in 2010 and is composed of representatives from each of the state agencies with environmental or natural resource responsibilities: MDEQ's Water Resources Division (WRD) and Office of the Great Lakes (OGL); MDNR's Fisheries Division (FD), Wildlife Division (WLD), Parks and Recreation Division (PRD), and Law Enforcement Division (LED); MDARD's Pesticide and Plant Pest Management Division and Animal Industry Division; and MDOT's Project Planning Division.

Historically, AIS prevention and control activities in Michigan have been limited or sporadic largely due to inadequate funding. Beginning in late 2010, the State of Michigan received a significant increase in funding from a federal Great Lakes Restoration Initiative (GLRI) grant to address priority AIS actions. This new funding initiated a surge in AIS related activities by the state agencies; however, this grant funding is short-term and a reliable long-term funding source is needed. In addition, AIS Program funding needs to be responsive to yearly fluctuations as emerging issues arise and costs increase. The following sections summarize the past (pre-GLRI) and present (largely GLRI) funding levels and outputs for the AIS Program as well as currently unfunded activities.

### **2. Pre-GLRI AIS Program Funding Levels and Outputs**

Michigan's baseline AIS-related activities historically have been accomplished using a variety of state and federal funds (Tables 1 and 2). The funding levels, sources, and projects are highly variable from year to year and are project driven rather than providing baseline funding for staff to strategically accomplish tasks. Spending for these baseline program activities is on an as needed basis or is opportunistic as grant funding is available. Generally, there is a downward trend of many of these state and federal funds, leading to program instability and uncertainty. As a consequence of this funding method, historically Michigan's AIS program has been somewhat reactive in its approach rather than strategic and proactive.

Table 1. Summary of AIS Program spending prior to receiving federal GLRI grants.

Year	Funding Source	Activity	Funding estimate	Yearly Total
2009	State	AIS- General	\$1,367,500	\$1,756,000
		Asian Carp	\$5,750	
	Federal (non-GLRI)	AIS- General	\$382,750	
		Asian Carp	\$0	
2010	State	AIS- General	\$912,500	\$1,579,000
		Asian Carp	\$123,000	
	Federal (non-GLRI)	AIS- General	\$463,500	
		Asian Carp	\$80,000	

Table 2. Examples of AIS related activities funded by state sources (from Table 1) in 2009 and 2010. This list is not exhaustive and funding ranges are estimated for illustrative purposes.

State Funding Source	Activity	Funding Estimates and Notes on Restrictions
Fees	Chemical and mechanical permitting for AIS. Aquatic Nuisance Control Program (ANC) administration of permitting program.	>\$500,000/year for ANC. These are restricted funds that can only be used for permitting program administration.
General Fund	Used as match for federal grants (e.g. OGL- Coastal Management Program), WRD ballast water program staff, and DARD staff	OGL- \$4,000-\$14,000/year. Ballast water \$3,000/year. DARD staff \$175,000/year. Federal grants are variable and project driven. General funds allocated to Departments continue to decline.
Great Lakes Protection Fund	Used as match for federal grants (e.g. OGL- AIS SMP implementation used for staff and small projects)	\$9,000-\$15,000/year. Federal grants continue to decline and are restricted to certain projects.
Fish and Game Fund	Fisheries Division and Law Enforcement Division staff- general duties related to AIS	\$150,000-\$270,000/year.
State Transportation Fund	Phragmites control and wetland mitigation	\$250,000/year.
Clean Michigan Initiative Grants	Projects related to monitoring or research of AIS.	\$0-\$100,000/year. Grants awarded to AIS related projects are highly variable from year to year based on a small number of AIS grant proposals.

### **3. Current AIS Program Funding Levels (GLRI) and Outputs**

Michigan received federal Great Lakes Restoration Initiative grant funding at approximately \$1,000,000 in 2010, 2011, and 2012 to establish a more formal, cohesive AIS Program; update the AIS State Management Plan (SMP); and implement priority strategic actions in the AIS SMP. The grant application process for 2013 has been modified from previous years and the level of funding that MI will receive this year is unknown.

Currently, this GLRI grant funding is being used to support interdepartmental AIS Core Team staff (5 full time employees [FTEs]) as described in the introduction. The AIS Core Team has nearly completed the update to Michigan's AIS SMP and has many ongoing projects. In addition, GLRI funding is being used for special projects to implement the Michigan Asian Carps Management Plan and to implement an organisms in trade outreach and education campaign.

The updated AIS SMP details strategic actions, many of which are being addressed by the AIS core team. These are ongoing activities initiated prior to GLRI funding that have been enhanced

and new activities that are being initiated. The AIS core team is gaining momentum establishing a program focused on being proactive and strategic. As a result, state agencies are far more prepared and better coordinated. Examples of activities currently funded using GLRI grants are provided below (Table 3).

Table 3. Summary of newly initiated and enhanced activities currently funded by GLRI grants (2010-2012). At the conclusion of the GLRI grants, these activities will be unfunded.

General Activity	Example	Funding estimate
Capacity building	AIS core team staff available to update the AIS SMP and implement many strategic actions.	AIS core team current short-term funding at ~\$750,000 annually (2010-2012) for 5 full time employees (FTEs) WRD- 2 FTEs WLD- 1 FTE FD- 1 FTE LED- 0.3 FTE PRD or OGL- 0.3 FTE DARD- 0.3 FTE Additional funding for outreach materials ~\$24,000 annually.
Coordination across Department and Division sectors.	Regular AIS core team staff meetings to communicate and work across Departments/Divisions. Definition of roles and responsibilities. Heightened AIS priority/awareness.	
Responsiveness to public and legislature.	Knowledgeable full time staff available to provide better information, more efficient, continuity in staff, consistency in messaging and staff. Public meeting to solicit feedback on AIS SMP.	
Coordination and collaboration with partners.	Interaction with universities on research projects. Enhanced partnership with other states. Participation on Asian Carp Regional Coordinating Committee, Great Lakes Panel on Aquatic Nuisance Species, etc. Collaboration with local groups (e.g. Cooperative Weed Management Areas).	
Education outreach	Updated websites, WLD workshops, Best Control Practices sheets, Asian Carp identification video, bait shop outreach, Stop Aquatic Hitchhikers! billboards, new materials that are Michigan specific, presentations/booths at key events statewide.	
Monitoring	WRD training and sampling as part of national inland lake sampling, mapping and distribution data.	
Identify/focus on high threat species and pathways	Planning for implementation of risk assessment processes.	
Inspection and enforcement	Inspection of food markets, bait wholesalers and retailers, and plant nurseries. Enhanced partnerships with other law enforcement agencies and coordination on cases.	
Asian carp project	Project focused on response planning including equipment purchase, mock exercise, and Asian carp environmental DNA sampling.	
Organisms in trade project	Project focused on developing contact lists, outreach materials and workshops for multiple industries with a focus on the aquarium industry.	

In addition, the state agencies received several other separate GLRI grants to prevent and manage AIS. This includes an Early Detection and Rapid Response project focused on mapping and control of priority aquatic invasive plants, response planning, and mock exercises. WLD is

leading this 3 year project, which received a one-time grant of \$1,051,336. Other examples include a \$2.85M habitat restoration project conducted by the DNR at Sterling State Park that includes Phragmites treatment over a 5 year period and a \$489,838 habitat restoration project at Pointe Mouillee that includes improved control of Phragmites and Purple loosestrife.

#### 4. Currently Underfunded or unfunded AIS Activities

There are additional AIS activities that are currently unfunded or could be enhanced with funding above the levels currently provided with GLRI grants. These activities are summarized below with funding estimates based on known expenditures in Michigan or other states (Table 4).

Table 4. Summary of currently underfunded or unfunded AIS activities. Implementation of these activities would require long term funding above the levels currently funded with short-term GLRI grants.

Category	Example	Funding estimate
Monitoring	Comprehensive eDNA testing, marker development and sampling.	?
	Surveys of waterbodies using traditional gear, follow-up on reports (largely current surveys are for other purposes and may capture incidental observances)	?
Field involvement/ regional coordinators	Conduct monitoring and provide assistance to local groups and landowners.	e.g. WI? Number of FTEs?
Education and Outreach	Boat washes and seasonal employees to operate boat washes and inspections	MN single largest expenditure-\$2.2M) estimate cost of boat wash and seasonal employees
	OIT more workshops training, HACCP training	
	Training on BMPs mgmt and control restoration, weed free materials	
	Education/outreach materials and workshops	e.g. \$55,000 for 300,000 Asian carp brochures in 2010. \$20,000 for 2,500 boat launch signs in 2010.
Grant program	State match/reimbursement to provide seed funding to support planning or management and control of priority AIS in strategic locations.	?
Research	Support development of new control and prevention techniques. Research new technologies and pilot tests.	?
Restoration	State lands, assistance for private lands.	?
Inspection/ enforcement	Dedicated inspectors for priority pathways organisms in trade (LED and DARD) and ballast water. Funding for patrol, detective, case preparation and follow-through.	?
EDRR emergency funding	Dedicated funding source available to respond to high threat invaders.	e.g. Marris Lake rapid assessment (no treatment) \$50,000; WI red swamp crayfish eradication 2 ponds \$250,000 to date and \$800,000 project over next 5-6 years, IN Hydrilla in Lake Manitou-?

## 5. Funding Sources

There are many funding sources for the AIS program that should be considered. A short list of possibilities generated by the AIS core team listed in no particular order is provided below.

Funding sources:

- Waterways Fund (state marine fuel tax and water craft registrations)
- Enforcement-fines
- Gas taxes
- Licenses- fishing/hunting (consider resident/non-resident)
- Boat registration
- Voluntary dropbox or raise fee at launch
- Park use fees (recreation passport)
- General fund
- Voluntary sticker/license plate
- Donate to fund as a tax right-off (income tax)
- Ship dock fee (e.g. CA)
- Certification program fee
- Lottery
- NRTF-gas mineral lease on state lands
- Taxes associated with tourism
- Property tax- some lake associations use for control
- Sales tax
- Tax internet OIT
- Raise permit fees

New funding sources for the AIS Program are preferable rather than reallocating existing funding away from other programs.