

Aquatic Invasive Organisms in Trade - Marketing & Outreach Plan

RIPPLE- Reduce Invasive Pet and Plant Escapes

2015



RIPPLE

REDUCE INVASIVE
PET & PLANT ESCAPES

Executive Summary

Aquatic plants and animals introduced through channels of trade pose a significant threat to Michigan waters, according to Michigan's Aquatic Invasive Species State Management Plan (2013 Update; MDEQ 2013). Invasive organisms available through trade can reach Michigan's waterways via a number of pathways, including intentional release of pets or plants purchased via retail outlets, and escape from private ponds and water gardens during floods or other disturbances.

Communication between the Michigan Department of Agriculture and Rural Development, the public, and the businesses involved with organisms in trade is imperative to the success of the RIPPLE (Reduce Invasive Pet and PLant Escapes) campaign. Its purpose is to establish and foster mutual understanding, promote public involvement, and influence the behaviors, attitudes and actions of consumers and retailers in the pond and pet store industry. Through RIPPLE, the public and retail establishments will see a unified message regarding containment and disposal of aquatic plants and organisms commonly acquired through pet store and pond retail businesses.

The RIPPLE campaign strives to build a unified understanding of the harmful impacts aquatic invasive species have on Michigan's waterways and promote the proper containment and disposal of potentially invasive organisms by creating and distributing visual materials and developing partnerships with leading environmental organizations and businesses to provide consistent information about organisms in trade to the public. Developing stewardship and public understanding of aquatic invasive species will also lead to an increase in public appreciation for State of Michigan efforts to control and eradicate invasive species in the future.

This Marketing and Outreach Plan is intended to guide the implementation and continued success of the RIPPLE campaign. Its purpose is to serve as reference for future outreach and marketing efforts. In order for RIPPLE to be a success, messaging must come from a variety of avenues, on a regular and consistent basis, to the public and retailers.

Reference:

MDEQ. 2013. Michigan's aquatic invasive species state management plan – 2013 update. Michigan Department of Environmental Quality, Lansing, MI. Available: <https://www.michigan.gov/invasives/stateresponse/aquatic-invasive-species-state-management-plan>

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Background

The mission of the Michigan Department of Agriculture and Rural Development (MDARD) is to “assure the food safety, agricultural, environmental, and economic interests of the people of the State of Michigan are met through service, partnership, and collaboration.” Priorities of the department include assuring food safety, protecting animal and plant health, sustaining environmental stewardship, providing consumer protection, enabling rural development, and fostering efficient administrative operations.

RIPPLE: Reduce Invasive Pet and PLant Escapes is aimed at educating both consumers and retailers of proper containment and disposal methods for plants and animals associated with the pond and pet store industries. Invasive organisms available through trade can reach Michigan’s waterway via a number of pathways, including intentional release of pets or plants purchased via retail outlets, and escape from private ponds and water gardens during floods or other disturbances. Unintentional distribution and release may also result due to contaminant species (including pathogens) associated with legitimately sold species, misidentification/mislabeling of species, and organisms that “hitchhike” in the transport or growing media of otherwise non-invasive plants and animals

RIPPLE will focus on the risks associated with the release of aquatic invasive organisms available to aquarium and water garden hobbyists, and practices that can reduce the likelihood of establishment. The long-term result of this program will be more educated retailers and consumers, and reduced introductions of invasive species to Michigan’s waters.

Opportunities and Challenges

MDARD is well-positioned to launch and maintain the RIPPLE campaign. MDARD has strong relationships with the Michigan Nursery and Landscape Association and Michigan State University/MSU Extension; both organizations are opinion leaders and could be long-term supporters and promoters of the RIPPLE campaign. MDARD works closely with the Michigan Department of Environmental Quality (MDEQ) and Department of Natural Resources (MDNR), both of which have established programs aimed at educating the general public about aquatic invasive species. Both agencies could be long-term RIPPLE partners as well. For example, the RIPPLE campaign could be integrated into existing outreach materials and efforts. An additional strength of the RIPPLE campaign is Michigan’s Aquatic Invasive Species State Management Plan (2013 Update; MDEQ 2013) which identified organisms in trade as a source of invasive species establishment, giving justification for the RIPPLE campaign and a potential source for funding opportunities to continue consumer and retailer education. Because MDARD is responsible for inspections of retailers that sell aquatic plants and animals, outreach around invasive species that could be introduced via these pathways is a natural fit for MDARD.

Environmental opportunities that could benefit this outreach campaign include overall increase in news coverage of aquatic invasive species in the Great Lakes (e.g., Asian Carp), the growing popularity of native (and non-invasive) plants among garden hobbyists (and the corresponding response in native offerings by large retailers), and business efforts to market themselves to consumers as being “environmentally friendly”. One potential threat to the campaign is retailers seeing RIPPLE as a threat to their business, if they perceive that the campaign will discourage consumers from purchasing certain plants, animals, or products. To avoid this perception, campaign materials focus on containment and disposal methods, rather than specific species to avoid; however, consumers may choose not to purchase potentially invasive organisms to reduce the likelihood of an environmentally damaging escape.

RIPPLE Campaign

The RIPPLE campaign strives to build a unified understanding of the harmful impacts aquatic invasive species have on Michigan’s waterways and promote the proper containment and disposal of potentially

invasive organisms by creating and distributing visual materials and developing partnerships with leading environmental organizations and businesses to provide consistent information about organisms in trade to the public. In the end, RIPPLE will convince the public and retailers that proper containment of aquatic plants and animals, and careful disposal of unwanted fish and plants is the best, safest, and only option.

The campaign mark, color scheme, and font were designed to catch the eye but not be discouraging to consumers. The campaign's look is meant to invoke curiosity and interest. The campaign mark includes a hand with a water droplet shape forming the thumb. The hand design is meant to catch the eye, and could be interpreted as a stop hand signal (possibly also evoking the Michigan "mitten") with the droplet shape possibly interpreted as a water droplet, leaf, or fish. The color scheme is made up of natural hues (blues and greens), to coincide with aquatic and natural environments. The core message "Reduce Invasive Pet and PLant Escapes" and the acronym RIPPLE were chosen for their simplicity and aquatic theme. Invasive species have a (negative) ripple effect on aquatic ecosystems, while education can have a positive ripple effect on ecosystem protection. The core message of RIPPLE was chosen for its simplicity, easy-to-understand vocabulary, and overall message. The campaign logo, mark, and design of all print materials was created by Redhead Design Studio, Lansing, Michigan.

RIPPLE Core Message:

Remember – never release your aquatic plants and animals into local waterways or compost piles. For trips on how to safely contain and dispose of pond and aquarium animals and plants, visit (www.mi.gov/invasivespecies). Together, we can keep Michigan's waterways pure and healthy!

In the past, there has been no widely recognized symbol or campaign for aquatic invasive species awareness specifically for use by pet stores and pond retailers in Michigan. A recent study of aquarium and pond hobbyists in the Great Lakes region found that only 8% were aware of *Habitattitude*, a nation-wide campaign focused on proper disposal of aquatic organisms [Mayer and Seekamp 2014 (Appendix A)]. Considering that large retailers such as PetSmart have *Habitattitude* language and symbols printed on fish bags, yet the symbol is still not recognized by hobbyists, indicates more effective imagery, language, and marketing strategies should be developed. RIPPLE was created to fill that void.

During the creation of RIPPLE, pet and pond retailers provided guidance on messages and material development, and should remain a target audience for education and outreach, as well as collaborative partners in sharing messages to consumers. Research shows hobbyists believe local retailers are responsible for distributing information about aquatic invasive species to aquarium and pond owners. Retailers are viewed as the experts in maintenance and care, and receive the most questions from hobbyists about water garden/pond design and what to do with fish and plants when they are no longer wanted [Mayer and Seekamp 2014 (Appendix A)].

Pet and pond retailers also acknowledged that there is a lack of identification experience and knowledge of prohibited and restricted species among their own staff, therefore materials such as the RIPPLE retailer brochure specifically highlight Michigan regulated species. Aquatic plants are difficult to identify, even for experts and experienced retailers, so consumer-oriented materials developed for the RIPPLE campaign do not emphasize species identification. Instead, these products feature easy-to-remember recommendations about containment and disposal practices. The recommended disposal methods were created based on language from the Great Lakes Sea Grant network, which is currently developing a tip card for water gardeners.

Target Audiences

The RIPPLE campaign and materials are focused on owners of aquariums, ponds and water gardens, and the businesses that sell organisms in these trades.

The demographics of aquarium and pond hobbyists vary widely. Pond hobbyists are generally older (40+), homeowners, well educated, and of a high income level. Pond hobbyists usually have a pond as part of a larger residential landscape. On the other hand, aquarium hobbyists span a very broad range of age, ethnicity, income level, and educational background; in fact, fish are the most popular household pet in the U.S. - over 12 million homes have an aquarium (American Pet Products Association 2014). The general public is also exposed to aquariums and ponds outside of their homes; for example, in classrooms, nature centers, and zoos.

Aquarium retailers vary greatly in size, number of employees, geographic reach, and revenue across Michigan. Eleven locally owned pet stores have been identified as potential partners in the lower peninsula of Michigan (Appendix B). Nationally, more than half of the revenue in the pet store industry comes from PetSmart and PETCO. Family-owned stores, small franchises, and small chain pet stores make up the other portion of the industry (Carter 2015). There are 35 PetSmart locations and over 25 PETCO locations in Michigan. Other large retailers in Michigan that sell aquaria include Pet Supplies Plus, Meijer, and Walmart.

Pond retailers, installers, and distributors vary widely across the state. Many backyard ponds are part of a larger landscape, installed by a contractor. Not all companies that sell aquatic plants to consumers are aquatic plant nurseries; many get shipments from across the country. Based on preliminary research in Michigan, there are a few large distributors of pond supplies and plants (Appendix B) and countless landscape businesses that install and maintain ponds. Other retailers that sell pond equipment and plants include large hardware stores (e.g., Home Depot, Lowe's, and Ace Hardware). While they do not sell a large volume of aquatic plants, they provide information to customers regarding installation and maintenance.

Barriers to Reaching Target Audience

To reduce the spread of aquatic invasive species via the aquarium and pond industry, education of consumers is imperative. However, with an estimated 11 million households nationwide having a pet fish and smaller fraction having backyard ponds or water gardens, education will need to be widespread and communicated via a range of avenues.

Consumers receive their information about care and maintenance from retailers. Surveys of aquarium and pond hobbyists in the Great Lakes region [Mayer and Seekamp 2014 (Appendix A)] indicate that over half of respondents trusted their local retailers for advice, while fewer than 20% trusted online retailers. The same survey indicated that over 80% of survey respondents felt that retailers are responsible for educating the public on ways to prevent the spread of aquatic invasive species, indicating they are expecting to see education about invasive species while shopping, making retailers an obvious first choice for outreach and education materials.

However, the same survey indicated that hobbyists tend not to trust their local retailers for *invasive species* advice. Only 33% of survey respondents "agreed" or "strongly agreed" that they trusted retailers to give them proper handling advice for unwanted species. Currently there is a lack of information available to retailers regarding handling of unwanted species; a void which RIPPLE could fill.

More than a quarter of respondents reported releasing species into the environment in the past, while most (over 70%) indicated they were at least somewhat aware of aquatic invasive species. This indicates there is a barrier between knowing about harmful impacts of invasive species and using that knowledge to modify behavior. The RIPPLE campaign will address that barrier by positively reinforcing proper containment and disposal behaviors.

Role of MDARD

MDARD it serves an important role in protecting animal and plant health. Due to MDARD's current relationships and partnerships with nurseries, pet stores, and the organizations that serve them, and given its organizational capacity, MDARD should lead the implementation of the RIPPLE campaign. RIPPLE represents a unique opportunity for MDARD to lead an education and outreach campaign that will be impactful across the state of Michigan, and include audiences beyond the traditional agriculture sectors.

MDARD works closely with nurseries and pet stores and is the responsible agency for inspections of these businesses. Because MDARD already serves in an advisory role for retailers regarding prohibited and restricted species, the industry will be looking to MDARD for advice on invasive species. MDARD should encourage their inspectors to become familiar with RIPPLE campaign materials and promote them during aquatic nursery and pet store inspections. MDARD also has a relationship with the Michigan Nursery and Landscape Association and Michigan State University/MSU Extension, organizations that could be key partners in the implementation of the RIPPLE campaign.

MDARD should serve as the clearinghouse for information related to RIPPLE. The campaign webpage should be located on a State of Michigan website supported by MDARD, and all materials developed for the campaign should be approved by MDARD prior to production. MDARD should be responsible for coordinating its efforts related to the pet and pond trades with other State agency invasive species awareness campaigns, and lead an organisms in trade workgroup.

MDARD should encourage other organizations, beyond those specifically mentioned above, to become involved with RIPPLE and promote the program. Due to the wide variety of pet stores and pond nurseries in the state, and the broad consumer demographics of each, the campaign will need to reach audiences via a number of pathways. MDARD is not a familiar organization to the majority of aquarium and pond hobbyists, therefore messaging will need to be distributed via partners and local retailers.

RIPPLE Partners

In order for the RIPPLE campaign to be a successful state-wide program, given limited resources and project staffing within MDARD itself, it is imperative that the program take a collaborative approach. Partners should provide assistance with message development, program implementation, and program evaluation.

RIPPLE is a unique campaign in that while it serves to specifically educate pond and aquarium hobbyists and the businesses that serve them, it can also educate the general public. There are many water resource conservation organizations throughout Michigan that could share the RIPPLE message through social media, outreach materials, and connections to local business—which would be nearly impossible for MDARD to do alone. Local connections are of value to the RIPPLE campaign and would be made possible with collaborating with water organizations.

Potential RIPPLE collaborators include (as mentioned above) MDNR and MDEQ aquatic invasive species programs, Michigan State University and MSU Extension; as well as nursery associations, aquariums and zoos, K-12 schools, aquarium and pond hobby groups, and conservation organizations.

Implementation

The following section lays out a detailed implementation strategy for RIPPLE, including recommended collaborators and the target audiences. MDARD should play a central role, ideally working closely with collaborators.

The majority of aquarium and pond hobbyists receive their information from local retailers, which currently lack educational material on invasive species. Research indicates that hobbyists think that informative campaign pamphlets at the time of purchase and informational booths at aquarium shows and water garden expos are very effective educational tools. Therefore, these avenues should be pursued. Magazine advertisements, information pamphlets and television commercials were rated as “somewhat effective” (Mayer and Seekamp 2014).

Due to the popularity of aquariums and water gardens in many settings, outreach materials should not be limited to retail outlets or expos. Nature centers, zoos, and aquariums all potentially have aquarium displays or ponds and therefore are sources of information for the general public that should be included in the distribution of materials. Combining the RIPPLE message with other educational programs such as Michigan State University’s Master Gardener program is also recommended. The Master Gardener program currently highlights native plants in many of its curricula but does not focus on backyard ponds, so it would be an excellent opportunity for integrating the RIPPLE message and materials. There are also a number of koi and backyard pond clubs throughout the state of Michigan. Usually the clubs are small and local, but they often offer advice about pond placement and species selection to members at meetings, events, and through their own materials, websites, and social media. Trainings offered to pond installers and landscapers via the Michigan Nursery and Landscape Association’s “Certified Green Industry Professional” certification course do not currently include information about water garden features but could in the future, where information regarding RIPPLE could be included. A list of potential partners can be found in Appendix B.

Youth outreach is important as well. Many children learn about aquatic environments in school and also have an aquarium in the classroom. Educating children is especially helpful as many have fish as first pets at home and can relay proper disposal messages onto their parents. One outlet for information to school children with aquariums is the MDNR Salmon in the Classroom program, which gives school children the opportunity to learn about salmon life cycles raising them from eggs to fingerlings. The program also releases the fish into Michigan waters once they reach maturity, which would be an ideal time to talk to kids about never releasing pets or plants into waterways. Additional youth outreach opportunities include outreach to science teachers (for example, through the Michigan Science Teachers Association and their annual conference), the State of Michigan Earth Day event, and Michigan Envirothon.

A large number of water resource organizations are active across Michigan, such as watershed councils. They share a mission to educate the public about water resources, and may have strong local relationships with nurseries or pet stores. As such, these organizations could be key partners in the RIPPLE campaign.

Another recommended avenue for the RIPPLE campaign to reach retailers is to work with the distributors of pond supplies. For example, Blue Thumb, based in Saginaw, has shown interest in the RIPPLE campaign and sharing the message with retail outlets they currently supply.

Phase 1 of RIPPLE included the development of materials and videos, based on research of past invasive species campaigns, input from industry representatives, and MDARD’s desired initial outcomes. All materials produced include the RIPPLE mark and core message. Materials were finalized in August 2015. The initial materials produced for RIPPLE are intended to give MDARD a starting point and launching pad for future projects. Selected materials are depicted in Appendix C. Phase 1 materials include:

- Brochure (4”x9”, full color, quad-fold) describing regulated (prohibited and restricted) aquatic invasive plant species, with photographs. The target audience is retailers. Text focuses on identification and advice to give their consumers, and will be primarily distributed to retailers via MDARD inspectors.
- RIPPLE rack card (4”x7”, full color, two-sided) with RIPPLE core message, and containment and disposal tips for retailers to display near cash registers or attach to receipt at the time of purchase.
- Fish and pond plant tank clings made of waterproof, repositionable vinyl material with RIPPLE logo and program URL. Tank clings are designed for placement on aquariums and pond containers at retail locations across the state.

- RIPPLE sticker for fish bags, plant containers, youth outreach, and engaged hobbyists with RIPPLE logo and messaging.
- Coloring page for use in schools and during youth outreach events.
- Poster (18"x22", full color, for production on paper or weather-resistant vinyl) for pet store and pond retailers with containment and disposal methods and graphic artwork related to aquatic invasive species.
- Short video for aquarium hobbyists, focused on negative impacts of aquatic invasive species on Michigan waterways and proper disposal methods
- Short video for water garden hobbyists, focused on negative impacts of aquatic invasive species and proper siting, winterizing practices, and disposal of aquatic plants and animals in water gardens.
- RIPPLE digital graphic content, including versions of logo mark and core messages compatible with the State of Michigan web content management system, social media, and email.
- Expo display materials, including 33"x80" full color retractable banners and table-top banners with RIPPLE logo, graphics and messaging, for use at trade shows, conventions, and other events.

Phase 2: Next Steps. Gaining partner buy-in to the RIPPLE program will take an investment of time and energy from MDARD. A RIPPLE kick-start meeting between MDARD and lead organizations (e.g., MDEQ, MDNR, Preuss Pets, Blue Thumb, MSU, and MDARD inspectors) is necessary so all partners are in agreement of the expectations of the program and communication is clear. The RIPPLE campaign relies heavily on partner-MDARD communication, and having a clear plan of action will be imperative to the success of the program. Six-month meetings regarding the RIPPLE campaign are also recommended, to facilitate conversation and receive updates from partners on potential new programs, consumer feedback, sources of funding, and outlets for communication.

Distribution of materials should primarily focus on retail outlets first. Interviews with pet stores and pond retailers during the creation of RIPPLE indicated that retailers did not know who to contact at MDARD regarding invasive species and what invasive species were regulated (prohibited and restricted), therefore outreach to retailers is especially important.

The rack cards, tank clings, stickers, and posters are all meant to be displayed at retail stores; however other appropriate locations include nature centers, zoos, and aquariums. The coloring pages and stickers can be distributed at outreach events MDARD attends and could also be used by various water organizations throughout the state that do youth education. The videos should be featured on the MDARD website and YouTube channel and can also be distributed widely to other state agency websites and external partners including retailers, conservation groups, public television, and MSU Extension.

In order for RIPPLE materials to be used most effectively by retailers and program partners, RIPPLE outreach kits should be provided that include a guidance document with specific, easy-to-follow instructions along with a starter set of materials (tank clings, posters, rack cards, color pages, and other giveaway items, as appropriate) and information on how to order additional materials. Due to the popularity of large retail stores for both aquarium purchases and water garden set-up, MDARD should contact retail corporate offices with information on RIPPLE and encourage them to participate. A complete listing of potential retailers is available in Appendix B.

Finally, MDARD should also consider water garden and aquarium magazines, as well as mainstream media, as potential sources to share information about the launch of the RIPPLE campaign.

Future Products and Actions

MDARD should consider creating other products that complement the RIPPLE program, such as:

- Plant stakes/labels with core message and RIPPLE logo, to label nursery stock and aquarium organisms
- Retailer training video(s) focused on disposal methods, customer recommendations, and proper notification methods if prohibited and restricted species are found within shipment.
- Giveaway items with RIPPLE logo and core messaging for MDARD, retailers, state agencies, and conservation organizations to distribute at events. Possible giveaways appropriate for the RIPPLE campaign include fish nets, sample-size fish food and fertilizer tabs, lighted key chains, flashlights, pens, sticky notes, tote bags, kneeling mat (for gardening), thermometers, or expandable sponges. Co-branding with business partners could offset the costs of production and create positive outcomes for all partners.

MDARD should consider the following actions to maintain and enhance the RIPPLE campaign:

- Incorporate RIPPLE branding into current State of Michigan aquatic invasive species outreach materials such as displays, MDEQ aquatic invasive species newsletters, MDNR/MDEQ invasive species factsheets, brochures, and aquatic invasive species web pages.
- Promote RIPPLE via social media (e.g., Facebook and Twitter)
- Create an email list, electronic newsletter, or similar means of communicating updates to retailers, including updates to the regulated species listings and RIPPLE campaign activities, materials and training (potentially via the GovDelivery mechanism).
- Conduct yearly training to pond retail staff at annual meetings and/or landscapers expo. Training would include invasive species identification, an introduction to RIPPLE, and talking points and recommendations for customer interactions.
- Develop a "register your pet fish" interactive website with information about proper disposal methods, designed for children in partnership with pet stores.
- Incorporate RIPPLE messaging into school-grade educational programs such as Salmon in the Classroom and Michigan Envirothon.

Works Cited

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- MDEQ. 2013. Michigan's aquatic invasive species state management plan – 2013 update. Michigan Department of Environmental Quality, Lansing, MI. Available: <https://www.michigan.gov/invasives/stateresponse/aquatic-invasive-species-state-management-plan>
- Mayer, J. and E. Seekamp. 2014. Addressing aquatic invasive species in the Great Lakes: Survey results from organisms-in-trade event participants. Illinois-Indiana Sea Grant, Glencoe, IL. [See also Appendix A]

Appendices

APPENDIX A:

Executive Summary of Mayer, J. and E. Seekamp. 2014. Addressing aquatic invasive species in the Great Lakes: Survey results from organisms-in-trade event participants. Illinois-Indiana Sea Grant, Glencoe, IL.

APPENDIX B:

Potential RIPPLE program collaborators.

APPENDIX C:

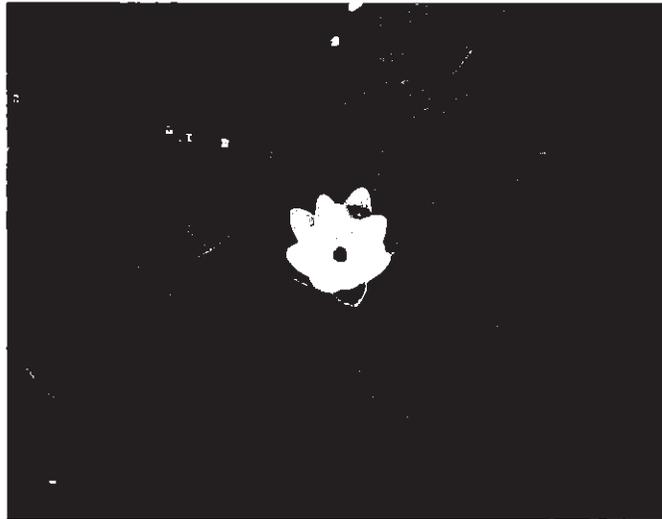
Selected original RIPPLE print products developed in Phase 1, 2014-2015.

Appendix A

Executive Summary of Mayer, J. and E. Seekamp. 2014. Addressing aquatic invasive species in the Great Lakes: Survey results from organisms-in-trade event participants. Illinois-Indiana Sea Grant, Glencoe, IL.

Project Report:

**Addressing Aquatic Invasive Species in the Great Lakes:
Survey Results from Organisms-in-Trade Event Participants**



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Executive Summary

This report describes the findings of a survey distributed to hobbyists involved in the organisms-in-trade (OIT) industry by North Carolina State University (NCSU) in partnership with Illinois-Indiana Sea Grant (IISG) in 2013. This study was designed to assist IISG in its efforts to help stop the spread of aquatic invasive species (AIS) in the Great Lakes. Survey findings will inform an educational outreach campaign aimed at OIT hobbyists to stop the establishment and spread of AIS in the Great Lakes region. Data were collected during one aquarium club event and one garden show in each of the eight Great Lake states (Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin)¹ to capture the perceptions and reported behaviors of aquarium hobbyists, water gardeners and outdoor pond owners. Survey questionnaire items were informed by a preferred behaviors list provided by IISG, as well as results from focus groups and key-informant interviews conducted in September through December 2012. The study's findings are arranged to answer 8 research questions that can inform campaign development and facilitate successful campaign implementation.

1. Who are the respondents?

- Almost one-half of respondents identified as aquarium hobbyist (44%).
- Participants most frequently reported owning a large freshwater aquarium (68%).
- The majority of respondents (60%) were male. The most frequently reported age group was 50-59 years old (22%), and the most frequently reported level of education category was "4-year college degree" (29%).
- The most frequently reported state in which respondents resided was Wisconsin (19%).

2. What level of knowledge, awareness and concern do respondents have toward AIS?

- Respondents, in general, were familiar with and used the term "aquatic invasive species" (70%) and, on average, respondents reported being "very aware" of AIS.
- On average, respondents were "very concerned" about the spread of AIS on the environment. Findings illustrated that respondents' concern about the spread of AIS is more closely related to a general environmental concern and an awareness of the effects of AIS than to personally experiencing the effects of AIS on the environment.

¹ The Illinois portion of this project was funded through the US Fish & Wildlife Service by the Illinois Department of Natural Resources as a subcontract to NC State University from an award granted to the University of Illinois, Illinois-Indiana Sea Grant. Illinois data are included here to enhance the comprehensiveness of findings to the Great Lakes region.

3. What purchase and disposal behaviors known to prevent the spread of AIS have respondents participated in and how likely are they to perform those behaviors in the future?

- Nearly one-quarter of participants have made disposal decisions with preventing the spread of AIS in mind (70%) and almost one-half have made past purchase decisions with preventing the spread of AIS in mind (45%).
- On average, respondents reported being “very likely” to make future purchase and disposal decisions with preventing the spread of AIS in mind.
- On average, respondents are “very likely” to purchase aquatic species from a reputable local dealer and are “somewhat likely” to purchase aquatic species from a reputable online dealer. The most likely future actions to be taken by respondents are buying aquatic species from a reputable local dealer and telling other hobbyists not to release their aquatic species into the environment.
- More than one-quarter of respondents reporting that they released species into the environment in the past (27%) and fewer respondents reported that avoiding release is unlikely in the future (13%).
- The most frequently reported category of distance traveled to make in-store purchases or trades with other hobbyists was less than 25 miles (53%) and the most frequently reported region from which online purchases were shipped was the Northeastern US (62%).

4. What barriers exist to performing behaviors known to prevent the spread of AIS?

- One-half of respondents “agreed” or “strongly agreed” that they trust local retailers (51%), while less than 20% of respondents “agreed” or “strongly agreed” that they trust online retailers.
- On average, respondents “disagreed” that they own a species-specific aquarium, outdoor pond or water garden that prevents them from purchasing exclusively native species. One-third of respondents tended to purchase aquatic plants that are native (33%).
- Approximately one-half of respondents “agreed” or “strongly agreed” that they know another hobbyist who would be willing to buy or trade their unwanted species (54%). Yet, respondents generally “disagreed” that they tend to accept unwanted species from other hobbyists.
- The majority of respondents “agreed” or “strongly agreed” that retailers are responsible for educating the public on ways to prevent the spread of AIS (84%).

5. How knowledgeable are respondents of the current outreach campaign and what previous AIS informational materials have respondents received?

- A small portion of respondents (8%) reported being aware of the current Habitattitude outreach campaign, with slightly more respondents recognizing the Habitattitude logo (14%).

- Nearly two-fifths of respondents reported receiving information about AIS in the past (39%). Magazines, newspapers, and online water hobbyist forums were the most frequently cited sources of past information.

6. What potential outreach campaign materials and outlets do respondents find most effective?

- On average, respondents rated magazine advertisements, informational pamphlets and television commercials as “somewhat effective” educational campaign materials.
- Informative campaign pamphlets included with a purchase was the highest rated type of retailer-related campaign materials in terms of effectiveness.
- Approximately one-half of respondents rated informational booths at an aquarium show or water garden expo with an educational campaign video playing as “very effective” (48%).

7. What differences exist between hobbyists based on their likelihood to perform the desired behaviors, barriers to performing those behaviors, and their perceived effectiveness of campaign materials?

- Respondents who engage in multiple hobbies are significantly more likely to buy aquatic species from a licensed online dealer and reputable online dealer than pond or water garden owners.
- Pond or water garden owners are significantly more likely to avoid purchasing known invasive species than aquarium hobbyists.
- Pond or water garden owners are significantly less likely than any other hobbyist type to contact another hobbyist to give or trade aquatic species.
- Aquarium hobbyists are significantly less likely to purchase native species than pond or water garden owners or respondents who engage in multiple hobbies.
- Aquarium hobbyists are significantly more likely to know hobbyists willing to buy or trade unwanted species than pond or water garden owners.
- Pond hobbyists perceive informative campaign posters displayed throughout retail stores as significantly more effective outreach materials than aquarium hobbyists.

8. What theoretical implications are associated with respondents’ intention to engage in activities known to prevent the spread of AIS?

- Five theoretical constructs emerged from the principal component analysis that were later used in the regression analyses to predict future behavioral intentions. These constructs included:
 - *Awareness and concern, ascription of responsibility, perceived behavioral control, subjective norm, and personal norm.*
- Aquarium hobbyists reported significantly higher awareness of AIS and concern for the environment than pond or water garden owners.
- Respondents who engage in multiple hobbies and aquarium hobbyists reported significantly higher perceived behavioral control to perform behaviors that prevent the spread of AIS than outdoor pond or water garden owners.

- Respondents who engage in multiple hobbies were significantly more likely to perform future disposal behaviors with preventing the spread of AIS in mind than respondents who only own an outdoor pond or water garden.
- Several theoretical constructs were found to predict behavioral intentions:
 - Personal norm, ascription of responsibility, and awareness and concern accounted for 23% of the variance of intentions to make future purchase decisions with preventing the spread of AIS in mind.
 - Personal norm, awareness, perceived behavioral control, and awareness and concern accounted for 31% of the variance of intentions to make future disposal decisions with preventing the spread of AIS in mind.

Key Findings and Implications

Study findings suggest that hobbyists regularly perform behaviors known to prevent the spread of AIS. However, with more than one-quarter of respondents reporting that they released species into the environment in the past and more than ten percent reporting that they are likely to release species in the future, OIT hobbyists will likely continue to be a vector of AIS release. Nevertheless, appealing to constructs shown to evoke behavioral intention in future outreach efforts, as well as developing a campaign that addresses overcoming known barriers to performing recommended behaviors, may lead to the adoption of behaviors known to reduce the spread of AIS. Future campaigns should focus on visual representations of the effects of AIS and define clear links between performing specific behaviors and accompanying impacts. Additionally, appealing to personal norms and concern for the environment may positively impact campaign effectiveness. Of interest, a large educational burden falls upon retailers, as respondents reported a lack of AIS information and felt that retailers were responsible for educating hobbyists on ways to prevent the spread of AIS. Successful campaign implementation will likely necessitate retailer participation in information dissemination. A low effort but effective method may be to develop an informative campaign pamphlet and request that retailers distribute it when hobbyists make purchases.

Appendix B

Potential RIPPLE program collaborators. This list is not exhaustive, but meant to serve as a starting point.

Locally owned pet stores

- [Oceans and Seas, Roseville](#)
- [Moby Dick Pet Store, Waterford Charter Township](#)
- [Kee's Aquarium and Pets, Shelby Charter Township](#)
- [Fantastic Fins, Livonia](#)
- [Stingray Bay Pet Supplies, Eastpointe](#)
- [MVPets, Portage](#)
- [Fish Doctors, Ypsilanti, Canton, Adrian](#)
- [V.I. Pets, Holland, Cutlerville, Plainfield, Jenison](#)
- [Blue Fish Aquarium, Grandville](#)
- [Preuss Pets, Lansing](#)
- [Soldan's Pets, greater Lansing area](#)

Nation-wide pet store retailers located in Michigan

- [PetSmart, Phoenix, AZ](#)
- [Petco, San Diego, CA](#)
- [Pet Supplies Plus, Livonia, MI](#)
- [Meijer, Grand Rapids, MI](#)
- [Walmart, Bentonville, AR](#)

Local water garden manufacturers

- [EasyPro Pond Products, Grant](#)
- [Blue Thumb Distributing, Saginaw](#)
- [Cygnet Enterprises, Flint](#)
- [Airmax, Romeo](#)

Nation-wide pond supply retailers located in Michigan

- [Lowe's, Mooresville, NC](#)
- [Home Depot, Atlanta, GA](#)
- [Ace Hardware, Oak Brook, IL](#)
- [True Value, Chicago, IL](#)

Michigan Zoos and Aquariums

- [Potters Park Zoo, Lansing](#)
- [John Ball Zoo, Grand Rapids](#)
- [Binder Park Zoo, Battle Creek](#)
- [Detroit Zoo, Detroit](#)
- [Belle Isle Aquarium, Detroit](#)
- [Sea Life Aquarium, Auburn Hills](#)

Michigan Watershed Organizations

- [Tip of the Mitt Watershed Council, Petoskey](#)
- [Huron River Watershed Council, Ann Arbor](#)
- [Clinton River Watershed Council, Rochester](#)
- [Yellow Dog Watershed Preserve, Marquette](#)

Michigan Invasive Species Organizations

- [Northwest Michigan Invasive Species Network](#)
- [Midwest Invasive Species Information Network](#)

Aquarium Societies

- [Grand Valley Aquarium Club](#)
- [Greater Detroit Aquarium Society](#)
- [Michigan Guppy Breeders](#)
- [Motor City Aquarium Society](#)
- [Southwestern Michigan Aquarium Society](#)
- [Michigan Killifish Association](#)
- [Great Lake Aquaria](#)
- [Michigan Cichlid Association](#)

Water Garden Clubs

- [Michigan Koi and Pond Clubs, Southeast Chapter](#)
- [Great Ponds & Koi Society of West Michigan](#)
- [Capital Area Koi and Water Gardening Club](#)
- [Metro-Detroit Pond & Garden Club](#)
- [Aquatic Gardeners Association, Inc.](#)

Appendix C

Selected original RIPPLE print products developed in Phase 1, 2014-2015. Content developed by Michigan State University/MSU Extension (J. Latimore, P. Filice) and the Michigan Department of Agriculture and Rural Development. Design by Redhead Design Studio, Lansing, Michigan.

1. Sticker design
2. Brochure describing regulated aquatic invasive plant species – for retailers
3. Rack card – for consumers
4. Coloring page/word search – for youth
5. Poster – for retail and educational display

1. Sticker Design



WHAT'S THE PROBLEM?

LEARN MORE

WORKING TOGETHER
IN MICHIGAN
FOR HEALTHY
WATERS

Invasive plants have moved into Michigan waters from around the globe. These invaders lack natural predators and are clogging waterways, disrupting aquatic ecosystems, and limiting native habitat. It is extremely costly to eradicate invasive species from Michigan waterways once introduced.

Some of these species may be appealing for aquariums and ponds because of their vigorous growth and reproduction. However, they can be unintentionally released into the wild via careless disposal by hobbyists, or escape from ponds and water gardens during floods or other disturbances. To reduce these invasions, Michigan regulates the possession and sale of certain plant species.

REPORT INVADERS!

If you suspect you may have received a regulated invasive species in a plant shipment, contact MDARD immediately:

1-800-292-3939
MDA-info@michigan.gov

Report invasive species found in the wild to the Midwest Invasive Species Information Network:

mis.in.msu.edu

The list of state-regulated species is regularly updated. For the latest information:

michigan.gov/mdard

Together, we can keep Michigan waters pure.

TIPS FOR CONSUMERS

If you decide to clean or dispose of aquariums or water gardens, don't dispose of the plants and animals into natural waterways where they may introduce disease or become established. Alternative ways to safely and humanely dispose of unwanted plants and animals:

Inspect and rinse new aquatic plants to rid them of seeds, plant fragments, snails and fish.

Build water gardens well away from other waters.

Seal aquatic plants for disposal in a plastic bag in the trash. Do not compost.

Give or trade unwanted fish or plants with another hobbyist, environmental learning center, aquarium or zoo.

Contact a veterinarian or pet retailer for guidance on humane disposal of animals.

For more information on how to reduce invasive pet and plant escapes, visit **mi.gov/invasivespecies**



RIPPLE
REDUCE INVASIVE
PET & PLANT ESCAPES



RIPPLE
REDUCE INVASIVE
PET & PLANT ESCAPES



LIST OF REGULATED SPECIES AS OF 3/31/2015

GET TO KNOW

THE INVADERS

REGULATED PLANT SPECIES

Michigan laws regulate the possession and sale of certain plant species which are considered undesirable. These unwanted species are listed in Part 413 of the Natural Resources and Environmental Protection Act (NREPA), or Act 451 of 1994, as amended.

Prohibited or restricted plant species identified in NREPA Part 413 cannot be sold or imported into Michigan. These species, however, could be sold unintentionally if they are misidentified or mislabeled, or when plant fragments hitchhike in the transport or growing media of otherwise allowable species.

All of the following plants, fragments, seeds or a hybrid or genetically engineered variant thereof are specifically prohibited or restricted and cannot be sold or imported.

European frog-bit | *Flydrocharis morsus-ranae*



- Leafy, heart-shaped leaves are 1 to 2 inches wide, resembles a miniature water lily
- Free-floating, not typically anchored into a substrate
- Flowers have 3 white petals, bloom in summer

Hydrilla | *Hydrilla verticillata*



- Leaf margins are distinctly saw-toothed and often have one or more sharp teeth along the length of the leaf mid-rib
- Leaves grow in whorls of 4 to 8 around the stem
- Stenar roots with potato-like tubers

Yellow floating heart | *Nymphoides peltata*



- Bottom-rooted with long branched stems up to one meter in length just below the water's surface
- Heart-shaped leaves are 1-4 inches long on long stalks
- Bright yellow 5 petalled flowers are about 1 inch in diameter; flower edges are distinctively fringed
- Leaves are often purplish underneath, with slightly waxy margins

Fanwort | *Cabomba caroliniana*



- Multi-branched submerged plant with leaves opposite arranged
- Leaflets are less than 1/8 inch long and very narrow
- Leaves finely divided into a fan-shaped arrangement of leaflets
- Small oval-shaped leaves are sometimes present

Parrot feather | *Myriophyllum aquaticum*



- Bright green, fir-tree-like emergent leaves and stems grow out of the water
- Generally 5 leaves whorl around the stem

Brazilian elodea | *Egeria densa*



- Leaves are oblong or broadly linear in whorls of 4-6 around the tip of slender stems above the water in late summer
- Very small white flowers form at the tip of slender stems above the water in late summer

Curly-leaf pondweed | *Potamogeton crispus*



- Leaves are stiff and oblong, rounded at the tip, and alternate around the stem
- Leaf margins are wavy like lasagna noodles and are finely toothed
- Flowers rise above the water during late spring
- Appears reddish-brown when in the water but is actually green

Eurasian water-milfoil | *Myriophyllum spicatum*



- Leaves have 12 or more pairs of leaflets
- Collapses around the stem when removed from the water
- Leaves are arranged in whorls of four around the stem

Water chestnut | *Tropae natans*



- Floating leaves are triangular with toothed margins
- Produces thorny four-pointed nutlets in early summer
- Four-petal white flowers appear in early summer
- Leaves are waxy on the top and hairy on the underside

Purple loosestrife | *Lythrum salicaria*



- Erect, perennial plant grows up to 8 feet tall
- Two leaves are at each joint and are attached directly to square on long spikes
- In July produces lush magenta-colored flowers with 5 to 7 petals and slightly fuzzy stem

These plant species are also regulated under NREPA Part 413 but are not as likely to be found in the aquarium or water garden trade: *Phragmites* or Common reed (*Phragmites australis*), Flowering rush (*Butomus umbellatus*), Giant salvinia (*Salvinia molesta*, *auriculata*, *bioba*, or *hezzogii*), Japanese knotweed (*Fallopia japonica*), Giant hoopedeed (*Aricadum manegazzianum*), Cyndro (*Cyrtocarpus raciborskii*), African oxygen weed (*Lagarosiphon major*), Water soldier (*Stratiotes aloides*), Starry stonewort (*Melolopsis obtusa*), Autumn olive (*Elaeagnus umbellata*)

PHOTO CREDITS: Paul Skawinski, from Aquatic Plants of the Upper Midwest; Leslie J. Mannheim, University of Connecticut, Bugwood.org; Jo Latimore, Michigan State University; Rob Anders, Department of Conservation & Natural Resources, Bugwood.org; Paige Filco, Michigan State University; Eric Coombs, Oregon Department of Agriculture, Bugwood.org



RIPPLE
REDUCE INVASIVE
PET & PLANT ESCAPES

3. Rack Card - Front



RIPPLE
REDUCE INVASIVE
PET & PLANT ESCAPES



MICHIGAN STATE UNIVERSITY | Extension



3. Rack Card - Back



HOW TO PREVENT ESCAPES

Remember—never release your aquatic plants and animals into local waterways or compost piles. For more information on aquatic invasive species, visit mi.gov/invasivespecies

Inspect and rinse new aquatic plants to rid them of seeds, plant fragments, snails and fish.

Build water gardens well away from other waters.

Seal aquatic plants for disposal in a plastic bag in the trash. Do not compost.

Give or trade unwanted fish or plants with another hobbyist, environmental learning center, aquarium or zoo.

Contact a veterinarian or pet retailer for guidance on humane disposal of animals.

Report invasive species found in the wild to the Midwest Invasive Species Information Network:

misin.msu.edu

The list of state-regulated species is regularly updated. For the latest information:

michigan.gov/mdard



TOGETHER WE CAN KEEP MICHIGAN'S WATERWAYS HEALTHY & PURE



RIPPLE
REDUCE INVASIVE
PET & PLANT ESCAPES

I Z Y S Q M V D T J U K O V P
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|----------------|---------------|
| BOAT | SHARP TEETH |
| ECOSYSTEM | STARRY |
| PARROT FEATHER | STONEWORT |
| PONDWEED | WATER SOLDIER |
| PREDATOR | WETLAND |
| PREVENT | WHORL |

DID YOU KNOW?

Invasive plants and pets can harm Michigan's ecosystem! Never release your aquarium pets or plants into local waterways.



5. Poster



AQUATIC PETS

Can be returned to a local pet store.



TOGETHER WE CAN KEEP



PARROT FEATHER

Keep a look out!
This invasive plant forms dense populations and can spread quickly.

MICHIGAN'S WATERWAYS

HEALTHY AND PURE



YELLOW FLOATING HEART

Yellow floating heart is a perennial, waterlily-like plant that carpets the water surface with long-stalked heart-shaped leaves. Watch out, it is an invasive plant!



RIPPLE
REDUCE INVASIVE
PET & PLANT ESCAPES

REMEMBER

Never release your aquatic plants and animals into local waterways or compost piles. For tips on how to safely dispose of pond and aquarium plants and animals, visit mi.gov/invasivespecies