

Building a Framework to Advance Aquatic Nuisance Species Management of Organisms in Trade in the Great Lakes Region

Project #847

Final Progress Report 4: August 23, 2008 – December 31, 2008

Prepared by the Great Lakes Commission for the Great Lakes Protection Fund

Introduction

The Great Lakes Commission submits this final progress report to the Great Lakes Protection Fund (GLPF) covering the period August 23, 2008 through December 31, 2008 under the terms of the grant *Building a Framework to Advance Aquatic Nuisance Species Management of Organisms in Trade in the Great Lakes Region* (Grant #847). This grant provided funds support to the Great Lakes Commission (Commission) to investigate a critical vector of aquatic invasive species (AIS) introduction and spread, the trade of live organisms, in efforts to support the Great Lakes states and other ongoing regional efforts to strengthen AIS prevention and control. Project activities under this grant have provided an opportunity for public and private sectors to work together to address fundamental questions and identify information resources regarding high-risk organisms in trade (OIT) pathways and associated species, business practices, consumer behavior and management approaches (e.g., regulatory, voluntary and outreach). This grant also supported efforts to explore ways of using information and information technology for the ultimate purpose of modifying high-risk commercial and consumer practices and behaviors. The overarching goal of this planning effort has been to develop the components of a project to enhance the capacity of the region to reduce the invasion risks of OIT pathways through a cooperative effort(s) between the public and private sector.

Major Accomplishments

Pathway Summaries

As discussed in the previous progress report, Commission staff convened “Pathway Expert Teams” on five major pathways of the organisms in trade vector: aquaculture, live bait, live food fish, aquarium, and horticulture/water gardens. The Pathway Expert Teams were asked to contribute to the development of a summary document characterizing the pathway, including information on the scope, risks, management efforts and opportunities for further work related to the pathways. These pathway summaries are available in final draft form and will be posted online on the project website at <http://glc.org/ans/initiatives.html#oit> once a final review is complete. A list of participants in the Pathway Expert Teams is provided as part of the OIT project participants list (Attachment A).

OIT Project Ideas

A key accomplishment during this reporting period was development of a set of project ideas based on information that has emerged during the course of this planning grant. In our assessment, these ideas (below) hold significant viability in future efforts to reduce the invasion risks of OIT.

- *Risk Assessment for Potential Aquatic Invaders in the Great Lakes*
- *Internet Monitoring for the Sale of Aquatic Invasive Species*
- *Advancing Efforts to Reduce Risks for Aquatic Invasion in Private and Public Aquaculture*

The recommended project ideas support the overarching goal of the planning grant by providing the basis for development of a full project proposal(s) by the Commission. For each idea, abstracts were developed (Attachment B), including a rational statement, goal, objectives and project components. The project idea abstracts were utilized in development of the agenda for second project workshop: *Proposed Projects to Advance Management of Organisms in Trade* (Workshop II) (see section below). Also included under each of the project abstracts is a set of questions/issues for consideration in further development of the project as a proposal.

It is significant to note that in the process of formulating the OIT project ideas, considerable effort was invested by staff to represent the perspectives of industry as well as the Great Lakes states and provinces. The seeds of the project ideas were derived from outcomes of the first workshop held under this project, *Exploring the Organisms in Trade Vector* (Workshop I), held June 10-11, 2008 in Romulus, Mich. Further substantiation for the project ideas was provided by research related to the OIT pathway summaries that include aquaculture, live bait, live food fish, pet/aquarium, and horticulture and water gardens. Staff continued to work with members of the Pathway Expert Teams in developing the project ideas. As part of this effort, a series of conference call was held with state agency AIS representatives (most serving on the Great Lakes Panel on Aquatic Nuisance Species (Panel, GLP) to determine if the proposed OIT projects would serve in advancing state priorities to address OIT problems. These discussions provided an opportunity to learn more about state-specific issues and ensure state support for the project ideas.

Workshop II: *Proposed Projects to Advance Management of Organisms in Trade*

Workshop II was held Dec. 3-4, 2008 in Ypsilanti, Mich. The meeting was scheduled to follow the fall meeting of the Panel to enable participation of GLP members, especially for state members, given their limited travel funds. The overall purpose of Workshop II meeting was to present, discuss and review the OIT project ideas. The workshop agenda, including goal and objectives, is provided as Attachment C.

This forum provided the opportunity for a robust discussion on the OIT project ideas among state agency representatives, industry stakeholders and leadership from non-governmental organizations. Commission staff made a concerted effort to facilitate dialogue to find common ground among the states and industry for each of the project ideas. As the Commission moves forward in developing a full proposal(s) for one or all of these ideas, common ground will be particularly important in facilitating buy-in from the public and private sector. The agenda and abstracts describing projects are available at <http://glc.org/ans/initiatives.html#oit>. This report includes a summary of the workshop discussions. An additional, more detailed description of the discussion of the workshop is available on request.

Other

Advisory Committee: Commission staff has continued work with the members of the project Advisory Committee on an individual basis and/or in a small group forum. The list of the members serving on the Advisory Committee is available as Attachment A. The relationships established with members of this committee have played an instrumental role in building viable project ideas that address concerns/needs of both public and private stakeholders involved in the trade of live organisms.

Project Wiki: The project wiki has been extremely useful in facilitating information sharing between staff, the Advisory Committee and Pathway Expert Teams, as well as in the development of the pathway summaries. At the request of a number of our partners, given the sensitivity of some of the material posted there, the wiki has been protected by controls that allow only users approved by Commission staff to view or edit information. The project wiki is located at <http://wiki.glin.net/display/oit/Home>. If Protection Fund staff is interested in reviewing the materials on the wiki, please let us know.

Project Website: Commission staff continued to post project information on the Great Lakes Commission AIS project web page at <http://www.glc.org/ans/initiatives.html#oit>. Information on this web page is fully accessible to the public and provides valuable information and reference materials regarding the OIT project for interested parties.

Challenges and Lessons Learned

Through the course of this planning grant, considerable progress has been achieved in developing a technical understanding on how the OIT pathways function and the wide range of implications of the trade of live

organisms. This includes the risks posed by various activities and how these risks are being managed. During this process, it has been evident that industry involvement is critically important in taking steps to further reduce risks from each pathway. Industry's technical expertise and networking capacity underlying the OIT business operations are fundamental to solving these problems. While we acknowledge their role, we also have found it challenging to find common ground with industry in identifying risks and how to reduce these risks. It was also apparent that further efforts are needed to strengthen communication and working relationships between industry and the states to further support reduction of OIT risks.

As experienced earlier during this project in developing the pathway summaries, a valid concern of industry is the possibility of increased restrictions and/or regulations that potentially could result from project activities. State agencies would also like to avoid additional economic hardship for the private sector and in some cases have limited regulation to the benefit of industry. There is general agreement, however, that more needs to be done to aggressively address the trade of live organisms as part of an overall effort to stop the spread of species causing harm and to prevent the introduction of species with the potential to cause harm.

A recurring challenge that surfaced from efforts under this planning grant is reaching those segments of the industry that are unaware or ambivalent to AIS risks associated with their activities or intentionally willing to avoid complying with rules. Public and private sector stakeholders alike cited a small segment of industry operators that are consistently in violation of regulations and/or are not engaged in efforts to reduce risk. Often it is the same group of concerned industry representatives and business owners that attend meetings, participate in workshops and comply with regulations, etc. The challenge lies in reaching those industry members who do not participate or regularly violate regulations. One suggestion that emerged for dealing with this issue is to increase market demand for "certified" products and encouraging those purchasing live organisms to make sure they know the source of their product. This, in effect, would reduce the market for illegal or "unsafe" products.

Another significant challenge that emerged during the final phase of the planning grant has been building OIT project ideas that hold the capacity to effectively address the complexity of the OIT related problems, while meeting the expectations of stakeholders. The proposed project ideas on risk assessment, internet monitoring and aquaculture will require not only a technical understanding for the problems and associated solutions but also insight into the political sensitivities associated with the problem-solving process. Each of these ideas presents unique challenges and opportunities which were discussed as part of Workshop II and are summarized in the following section.

Risk Assessment for Potential Aquatic Invaders in the Great Lakes:

Project Overview: The primary components proposed for this project would include (1) assembling an advisory team of stakeholder representatives including industry to help with project design and execution; (2) identifying species in trade or proposed for trade that should be run through a risk assessment; (3) developing and applying a risk assessment model; (4) identifying alternative species for those identified as high-risk; and (5) implementing an outreach strategy to communicate results of the risk assessment.

Challenges and Lessons Learned: Perspectives provided at the workshop from state agency representative Doug Keller (Indiana DNR), reflected the value of a systematic approach for AIS risk assessment. Although risk assessment work in Indiana is currently focused on aquatic plants and the horticulture industry, Keller noted the need to also conduct risk assessment for other taxonomic groups (e.g., fish) and pathways (e.g., aquaculture, live bait). A hybrid approach was recommended for listing species to include a black list, (high risk species not permitted for importation, sale or possession), white list (plants that pose minimal risk and are approved for importation, sale or possession) and grey list (risk unknown for species with further study needed). In the case of species proposed for trade on the grey list, the species would require a full risk assessment or the importer would have to demonstrate that the species do not pose a threat. Reuben Keller (research scientist from Notre Dame University) provided a case study presentation on risk assessment based on the listing process of aquatic plants underway in Indiana through the Indiana Plant Aquatic Work Group

(IPAWG). In working with the IPAWG, it has been found that incorporating industry and stakeholder involvement early-on is integral to the process to ensure buy-in. Keller (Reuben) asserted that for the risk assessment process to be considered valid, it must be based on scientific evidence, providing objective and consistent results. Implementing results of the risk assessment is the responsibility of industry through voluntary actions or state agency actions, based on their determination of acceptable levels of risk.

During discussion, industry representatives supported a scientifically sound approach for risk assessment, indicating their expectation of being informed of the science behind the process. Industry also voiced support for a regionally consistent risk assessment approach to listing species of concern so as to ensure a level playing field from state to state. It was noted that businesses in compliance with regulations would like to see enforcement so they are not put at disadvantage. We heard that a risk assessment for OIT would be helpful to a majority of the Great Lakes states, all of which are in different stages of the process. Reiterated from Reuben Keller's presentation was the importance of securing early "buy-in" from stakeholders (e.g. states and industry). General agreement was expressed regarding the role of scientists in developing a tool to determine the level of risk for different species based on scientific evidence, while the role of industry and the states would be to apply results as appropriate. An issue holding potential challenges in implementing risk assessment is determining how to address the socio-economic aspects associated with each species under assessment. For instance, how should a high risk species be handled if it also holds high socio-economic benefits? Finally, there was strong support for a coordinated, regional risk assessment approach using the Great Lakes Panel to facilitate "buy-in" from member agencies and stakeholders. A future project should be closely coordinated with the Panel to utilize the expertise of members.

Next Steps: Strong interest was expressed during this workshop as well during other phases of the planning grant in moving a risk assessment process forward that would provide opportunity for balanced participation from the public and private sector. The first step in this process is convening potential partners to establish an overall road map for a risk assessment project, including goals and objectives. As part of this planning phase, funding sources need to be explored as well as viable partnerships that will be essential in productively executing the defined project goals and objectives. The scientific research community will play a key role in creating a risk assessment tool and running species through the tool. State representatives need to be prepared for using results from the assessment to inform state action. Key to the success of this project is to engage industry in using the risk assessment results in the development of voluntary management programs and outreach to address those species in trade presenting high risks.

To support this process, the Commission would lead a consultation process region-wide to gather input from stakeholders, including the states, provinces, industry, and NGOs, among others. The primary task of the consultation process will be to work with stakeholders in reaching consensus on a risk assessment model that would be developed by a science team, possibly from Notre Dame. This will include testing the model on known invasive and non-invasive species alike. It will also be necessary to lay the groundwork to identify risks for potential new invaders through trade for use in the screening of new imports. Another aspect of this initiative that will need consideration early-on is how to incorporate (or not) decision support tools to weigh the potential benefits of a species against the established harm or potential risks. A recommended follow-up to this project is identification of a list of alternatives to replace on the market those species that are assessed as high risk.

Internet Monitoring for the Sale of Aquatic Invasive Species

Project Overview: The primary components proposed for this project would include (1) determining a target list of AIS of concern to the Great Lakes region (e.g., regulated species); (2) implementing an internet monitoring system to identify online retailers selling those species; and (3) implementing a strategy to work with those retailers and/or consumers and hobbyists to reduce the sale and purchase of these species via the internet.

Challenges and Lessons Learned: During the workshop, we learned from Karl Suiter (National Science Foundation (NSF)-Center of Integrated Pest Management (CIPM)) that the trade and sale of invasive species over the internet was identified as a significant problem by the U.S. Department of Agriculture (2001). Suiter also explained how the trade of regulated species over the internet can be tracked through application of the Invasive Species Internet Monitoring System (ISIMS) developed by the NSF-CIPM. We learned from the case study presented by Scott Hardin (Florida Fish and Wildlife Conservation Commission) that there is a documented need for internet monitoring for illegal species, especially for the pet trade. The primary outstanding issue, however, is determining how to best utilize an internet monitoring system to reduce the sale/purchase of problem species. The complexities associated with identifying purchasers of problematic species, as well as ensuring regulatory authority and enforcement capacity when species are shipped across jurisdiction lines pose significant challenges. Given such challenges, educational outreach is an approach considered to hold potential in addressing this OIT problem. An important target group would be the operators of the sites where illegal trade was identified. In addition, the many internet groups and forums that exist for hobbyists to exchange information could provide opportunity to increase consumer awareness.

Another educationally oriented project suggested was the conduct of a public awareness campaign on the internet trade of illegal species. The CIPM tool could be used before and after the campaign to see if problematic species are removed from online retailers “for sale” lists. In this case, however, it would be difficult to prove that any reduction in sales was a direct result of the education campaign.

Next Steps: A first step in moving forward on this issue is to determine the extent to which the internet sale of AIS poses a threat to the Great Lakes region. This could be accomplished through a short-term contract with CIPM to implement the internet monitoring tool to identify species that are being sold and the location/source of those species. An analysis of the findings could help determine whether a significant effort is needed to address the internet sale of AIS in the Great Lakes region. At a minimum, this information would provide the region with a greater understanding of how the internet sale of live organisms affects the Great Lakes region. If the results of the search show that such sales pose a significant threat to the region, either because of the species being sold or the geographic locations of internet operators, additional work would be needed to develop a strategy to reduce those risks.

Advancing Efforts to Reduce Risks for Aquatic Invasion in Private and Public Aquaculture

Project Overview: The primary project components would include (1) an analysis of private and public aquaculture programs in the eight Great Lakes states and two provinces; (2) an assessment of the implementation of best management practices (BMPs) to reduce AIS and invasive pathogens and the AIS-HACCP programs; and (3) as appropriate, a strategy to promote implementation of BMPs and AIS-HACCP through outreach, training and capacity building programs.

Challenges and Lessons Learned: During Workshop II, the case study on biosecurity for cultured bait and ornamental fish, presented by Nathan Stone (University of Arkansas at Pine Bluff) illustrated how risks could be reduced for live bait through a certification process in private facilities. Of significant note is the integral role industry played in calling for and developing the certification process. Industry sees the value in having this program to show that their product is disease and AIS free. The certification approach could be further strengthened by creating a greater demand in the market for certified fish.

The operation of public aquaculture facilities and related risks was the topic of discussion by Gary Whelan (Michigan DNR). The case was made by Whelan that since the 1970s, considerable progress has been made by the public hatcheries in developing methodologies in disease prevention based on past experience with disease. He used two fish diseases (VHS and whirling disease) to illustrate how risk varies based on characteristics involving disease susceptibility, the pathogen and the environment. Whelan noted that although there are wide ranging differences in public facilities across the U.S., there is generally a high level of biosecurity to prevent the introduction and spread of such diseases. A very important factor in reducing the risk of disease spread is confirmation that the source of fish (e.g., eggs, fry, broodstock) obtained for

cultivation has been certified as disease free. Biosecurity measures, although expensive, are generally taken by public hatcheries to protect their investment. Given financial challenges, it is sometimes more difficult for private operations to take such steps. In large part, however, Whelan said private operations ensure that sources of fish to be cultivated are certified as AIS and disease free. The crux of the problem lies in the 10 percent of operators on the economic margin that are non-compliant with regulations and do not use appropriate management practices. To address these risks, Whelan suggests peer pressure as an effective tool to reach the 10 percent that need education. Another option involves forcing the market of the risky operations to dry up by creating a greater demand for certified fish. It was found with the VHS experience that educated consumers are willing to pay more for certified live bait to help prevent the spread of VHS.

Throughout the project, a significant challenge that has emerged on the aquaculture pathway is that the level of risk posed by the industry is uncertain. Given the wide diversity in aquaculture operations, the risk is highly dependent on the type, size and location of facilities as well as the species being cultivated, their source and population density. Discussion following the workshop presentations supported this view. Given the unknowns related to aquaculture and related risks, there was interest expressed in a project that would help evaluate what the public and private facilities are doing in terms of prevention (e.g., the extent of implementation of HACCP programs, best management practices and status of regulatory compliance). This information could be useful for the Great Lakes states in determining where to focus their efforts. Discussion returned to the promotion of certified “clean” fish as a form of prevention to reduce risks from aquaculture. There was general agreement that influencing the market through education could be effective in dealing with the 10 percent of non-compliant operators by reducing the demand for uncertified fish. In response to discussion on certification, concern was expressed by industry that aquaculture businesses are currently being regulated to extreme levels and that biosecurity and certification programs could severely impact the industry economically.

Next Steps: Pivotal to a project on the aquaculture pathway is addressing the uncertainty regarding the level of risks posed by AIS and pathogens in the aquaculture industry. To address this uncertainty, there is clearly a need to determine what has been accomplished in reducing these risks in private and public aquaculture operations, where gaps exist, and strategies to address these gaps. To guide in the project design and implementation, the Great Lakes Commission would convene a project advisory committee, including stakeholders from the industry, (e.g., North Central Regional Aquaculture Center) and private and public operators), state agencies and Sea Grant programs across the region.

To lay the ground work for reducing risk levels in the aquaculture industry, steps must be taken to ensure that the aquaculture community is actively engaged in the project. To accomplish this, a series of workshops would be held in each of the 8 Great Lakes states with participation targeting aquaculture representatives from both the private and public sector. These workshops would provide an opportunity for education/outreach as well as to build consensus on a methodology for certification, additional training/outreach or other efforts to reduce risk. The educational component of each state workshop would be designed to provide up-to-date information from regional aquaculture experts on 1) what is known about AIS and pathogenic risks associated with aquaculture operations; 2) how these risks are currently being addressed through regulations, best management practices and HACCP (Hazard Analysis Critical Control Points) programs 3) information on building capacity for AIS-free and biosecure facilities. Following these presentations, a forum would be conducted to gather input on a process and programs (e.g., survey, on-site visits, training, education or certification programs) to strengthen risk reduction efforts practiced in both private and public aquaculture operations. It is important that the workshops provide an opportunity for aquaculture operators across the region to understand the purpose for the program and why their participation is needed. Results will provide the basis of information regarding the need for additional research and development of new and improved management tools to address outstanding risks, such as invasive pathogens (e.g., VHS). The outcome of the workshop series would provide the basis for the design and regional implementation of action oriented strategies, including mechanisms to measure effectiveness of efforts.

Subsequent phases of the project would focus on development and implementation of additional outreach, training, certification programs or assessment. These steps could provide the basis for documentation and acknowledgement for those aquaculture operators who are “doing the right thing” by operating AIS-free and biosecure operations. Through marketing strategies (e.g., certification and advertisement), this information would be useful in the process of creating incentives (e.g. financial) for the good actors instead of spending money confronting the small percentage of bad actors.

Project Conclusions in Moving Forward to Address OIT:

The project has provided essential support for the Great Lakes Commission to engage experts from industry, stakeholders and state agencies in evaluating risks from trade of live organisms, and to evaluate options for reducing risk of introduction and spread. Development of pathway summary reports provide the Commission with valuable background on the characteristics and extent of trade in live organisms from each pathway, management steps being undertaken and gaps in information and management.

For many of the pathways, some industry experts were resistant to engage in discussions about taking additional steps to reduce risks. Many challenged assumptions that their industry was engaged in activities that could result in any significant risk of new introductions or spread of invaders. Others believe that their industry was already heavily regulated or that existing outreach and education programs were adequate.

Most project partners agreed that internet sales of potentially invasive species could pose a significant risk, largely due to the unknown, poorly understood and unregulated nature of internet sales. Creating a new web crawler to identify species of concern being sold in the Great Lakes would probably be prohibitively expensive. The existing tool created by the National Science Foundation (NSF)-Center of Integrated Pest Management (CIPM) could be utilized to better assess and quantify risks from sales in the region; at a cost (the software is proprietary).

The project with the greatest interest and support is the development of a risk assessment model. A risk assessment model would be used to screen and evaluate species in trade to identify those that could be the target of voluntary and education efforts to remove problem species from trade. States are very interested in support for development of a regional model that could be tailored for use in each state. Industry sees value in a risk assessment approach because of a desire to know that education and management efforts are based on a scientific determination of target species of concern, and a desire to see a level playing field from state to state. There was strong interest and support for development of a risk assessment model from members of the Great Lakes Panel. The project could build on efforts already underway in Indiana in conjunction with Notre Dame University and the Nature Conservancy and would explore partnerships with Canadian experts Nick Mandrak and Becky Cudmore (Center of Expertise for Aquatic Risk Assessment, Fisheries and Oceans Canada).

Next steps in developing follow up work will include discussions with the staff of the Great Lakes Protection Fund to evaluate project outcomes. Discussions with Notre Dame and the Nature Conservancy to develop the risk assessment model will pick up in the coming weeks, to scope the next steps and costs of a proposal that could be submitted to the Protection Fund or other potential funders. Additional discussions with industry to identify participants will occur after initial targeting of the risk assessment project. As we identify opportunities for funding, staff will continue to pursue next steps in the design of a project to quantify risks to the region from internet sales. Similarly, staff will continue to identify opportunities to fund additional work with the aquaculture industry on additional education, outreach, assessment and certification approaches.

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Rick Weidenhamer, Michigan Wholesale Bait, Inc
Gary Whelan, Michigan Dept. of Natural Resources

** Denotes a state representative that provided specific input into the development of project ideas through a series of conference calls prior to Workshop II.*

ATTACHMENT B: Project Idea Abstracts

Risk Assessment for Potential Aquatic Invaders in the Great Lakes

Since control of invasive species is extremely costly and eradication nearly impossible once established, researchers emphasize that prevention is the most cost-effective management tool available. In taking steps to advance prevention efforts, a scientifically valid process is needed to guide sound management and policy decisions targeting organisms and vectors that pose the greatest threats. Risk assessment (RA)² can serve as a useful scientific tool in identifying aquatic invasive species (AIS) of priority concern based on the ecological factors that contribute to their invasive potential.

Goal: Support management efforts to reduce the potential for AIS to be introduced or spread in the Great Lakes region through live organism trade pathways by implementing a risk assessment to identify high-risk species.

Objectives:

- Facilitate the development and implementation of a risk assessment for potentially invasive aquatic species for the Great Lakes region.
- Disseminate results to stakeholders including states and federal policy makers, agencies and resource managers, industry, and NGOs to inform management strategies.
- Based on the results of the risk assessment, work with OIT businesses and consumers to reduce likelihood of release of high risk species, through targeted outreach and other programs.
- Provide a list of alternative species that can replace those AIS identified as high risk.

The primary components of such a project would include:

- Identify species in trade that are appropriate for a risk assessment (potentially using a screening protocol);
- Develop & apply a risk assessment model with appropriate input and validation to ensure useful results;
- Identify alternative species for those identified as high-risk; and
- Implement an outreach strategy to communicate results of the risk assessment.

An important consideration for this project will be to ensure that the risk assessment model is both scientifically sound and will yield results that are accepted by and useful for stakeholders to identify and implement risk management activities, as appropriate. This project will **not** identify or make recommendations related to options for risk management.

Questions / Issues for Discussion

- How do we determine the list of species that will be put through a risk assessment?
- How will this effort support or build on existing state/provincial efforts to identify high-risk species?
- How do we engage stakeholders to make the process useful while maintaining scientific credibility?

² Risk assessment, for purposes of this project, is defined as the process of determining how often an undesired event might occur and the potential consequences of that event. Comparatively, risk analysis is a comprehensive evaluation that combines the results of the risk assessment with potential risk management solutions.

ATTACHMENT B: Project Idea Abstracts

Internet Monitoring for the Sale of Aquatic Invasive Species

Unregulated direct sales (e.g., internet, consumer to consumer) of live organisms is an issue that has received limited attention in the management of the organisms in trade vector. This issue has been most commonly associated with aquatic plants in the horticulture and water garden trades, although it could have implications for other organisms in trade pathways as well (e.g. aquarium pets). Several studies have documented the availability of invasive aquatic plants via the internet, including federally listed noxious weeds. Although identified as a problem, limited work is being done in the Great Lakes region to assess and manage this mechanism for aquatic invasive species (AIS) introduction and spread.

Goal: Reduce the potential for AIS to be introduced or spread in the Great Lakes region via unregulated direct sales of live organisms over the internet.

Objectives:

- Assess the availability of AIS of concern to the Great Lakes region over the internet.
- Work with online retailers as well as consumers and hobbyists to increase awareness of AIS and best management practices for reducing risks of introduction and spread.
- Reduce the sale/purchase of these species over the internet.

The proposed project will support management efforts by assessing the availability of AIS via internet sales and implementing management actions, as appropriate, to reduce the risk that these species will be released in the Great Lakes region as a result of this pathway. The primary components of such a project would include:

- Determine a target list of AIS of concern to the Great Lakes region (e.g., regulated species)
- Develop and implement an internet monitoring system to identify online retailers selling those species; and
- Implement a strategy to work with those retailers and/or consumers and hobbyists to reduce the sale and purchase of these species via the internet.

The internet monitoring system maybe developed anew or could be an adaptation of the Invasive Species Internet Monitoring System (ISIMS) developed by the National Science Foundation (NSF) Center for Integrated Pest Management (CIPM). In addition, a committee of “subject matter experts” will need to be convened to assess the relevancy of the data the system collects and provide associated recommendations for revising the system parameters to yield increasingly relevant results. While technology and tools exist to implement the monitoring system, ensuring relevant results and developing an effective management strategy to work with retailers and/or consumers are challenges for this project.

Questions / Issues for Discussion

- How do we effectively work with retailers and/or consumers?
 - warning (e.g. pop-up notification) to consumers intending to buy a species of concern
 - email/letter notification to the retailer that they are selling potentially invasive or prohibited species
 - warning “labels” for species of concern
 - educational information (e.g., proper disposal practices, Habitattitude (TM) information posted on retailer websites and/or hobbyist forums
- Is there opportunity for an enforcement mechanism if species are regulated?
- How do we determine if our efforts are successful?

ATTACHMENT B: Project Idea Abstracts

Advancing Efforts to Reduce Risks for Aquatic Invasions in Private and Public Aquaculture

There is evidence indicating that considerable progress has been made over the past decade by private and public aquaculture towards the reduction of risks associated with aquatic invasive species (AIS)³ and aquatic invasive pathogens and viruses. This has occurred through regulatory programs, policies and best management practices (BMPs), as well as educational outreach targeting industry. Another sign of progress, particularly in the Great Lakes region, is voluntary adoption of the AIS-HACCP (Hazard Analysis and Critical Control Point) program. HACCP is a structured process of analysis to identify hazards posed by AIS, the active or passive means to control those hazards and the means to document that those controls are being implemented.

Management challenges, however, still exist. The aquaculture industry in the region is highly varied, with differences among private and public aquaculture facilities in operations and practices, as well as available resources and technical capacity to engage in efforts to prevent the introduction and spread of AIS, pathogens and viruses. States and provinces responsible for managing aquaculture programs are also frequently constrained by limited resources to address AIS risks within their jurisdictions, let alone across jurisdictional lines. Questions have also been raised regarding the degree and scope of implementation of BMPs and programs such as HACCP to effectively reduce AIS risks. There is a critical need for these management efforts to be implemented to the maximum extent possible. Additional work is needed to facilitate continuous improvement for AIS prevention in aquaculture, including the detection of new threats such as from disease related pathogens and viruses. A comprehensive assessment of regulatory and voluntary programs and policies will provide information that can be used to improve regional consistency, target resources and promote progress towards reducing AIS risks from aquaculture in the Great Lakes region.

Goal: Advance existing efforts to ensure that the aquaculture industry in the Great Lakes region is AIS-free⁴ and biosecure⁵ through an analysis of regulatory programs and an assessment of AIS-related BMPs and AIS-HACCP programs for both private and public operations.

Objectives:

- Conduct a regulatory analysis of private and public aquaculture programs in the eight Great Lakes states and two provinces, including facilities and species regulations, as well as stocking policies and practices.
- Use results from the regulatory analysis to guide an assessment of AIS-related BMPs to determine what, why and where (if at all) practices are utilized to support AIS risk reduction. Given the difference in management scenarios of private and public aquaculture, the assessment is to be handled separately for each of these sectors.
- Assess implementation of AIS-HACCP programs for private and public aquaculture in the Great Lakes region, to identify gaps and unmet needs that need to be addressed to further strengthen AIS risk reduction efforts.
- Develop recommendations based on findings to strengthen regional coordination and consistency for the aquaculture industry in managing AIS risks within the region.

³ AIS: Aquatic species (e.g., fish, crustaceans, reptiles, plants) not native to the Great Lakes that may cause significant harm to the environment, economy, or human health. For purposes of this document, AIS will be used in reference to aquatic invasive species as well as aquatic invasive pathogens and viruses.

⁴ AIS-Free: AIS risks managed or mitigated to an “acceptable” level

⁵ Biosecurity: A health plan or measures designed to protect a population from transmissible infectious disease (WWF and Blue You, 2008)

ATTACHMENT B: Project Idea Abstracts

- Promote implementation of AIS-related BMPs and AIS-HACCP through capacity building programs for purposes of raising awareness, technology transfer and enhancing regional consistency to strengthen reduction of AIS risks.

Questions/Issues for Discussion

- In the conduct of a comparative analysis of private/public aquaculture regulations and policies in the eight Great Lakes states and two Canadian provinces, how can we ensure that the results of the analysis are useful in promoting efforts to reduce AIS risks?
- What is currently known and how can we best assess the status of aquaculture operations regarding AIS-related BMPs and AIS-HACCP to support efforts in identifying outstanding risks (e.g., a survey, on-site visits)?
- In the assessment of private and public aquaculture operations, the following areas are proposed to guide in the collection of information on AIS-related BMPs and AIS-HACCP, including regional consistency issues. Should other topical areas be considered in this assessment?
 - Basic Facility Information
 - Best Management Practices to Address AIS: Level of awareness and/or use of BMPs in the different types of facilities.
 - AIS-HACCP: The level of awareness and/or participation in the AIS-HACCP program to address AIS, including consideration for how pathogens and viruses are addressed
 - Environmental Technologies: Innovative approaches under development and/or adopted to minimize AIS introduction and spread?
- What questions should be considered in analyzing the assessment results on AIS-related BMPs and AIS-HACCP to support development of recommendations for improvements on AIS risk reduction?
 - Do barriers exist that impede facilities from implementing BMPs to the maximum extent? Is it cost, training, staff?
 - What can we do to reduce the barriers and work with aquaculture operators to improve risk reduction efforts through BMPs and HACCP?
 - How can this assessment be applied in future initiatives to improve efforts for AIS risk reduction for aquaculture?
- What types of outreach strategies, such as a culminating project workshop, can be most effective in targeting project findings in order to achieve the project goal of ensuring that private and public aquaculture operations are AIS-free and biosecure?

Who are the potential partners to be engaged in this aquaculture project?

Aquatic Invasive Species Workshop II:
Proposed Projects to Advance Management of Organisms in Trade

December 3-4, 2008

Ann Arbor-Ypsilanti Marriott at Eagle Crest

Ypsilanti, MI

734-487-2000

Goal: Define viable project ideas that can be implemented collaboratively to advance management of the organisms in trade vector to reduce the risk of aquatic invasive species (AIS) introduction and spread.

Objectives:

1. Gather input based on the questions below from stakeholders and potential project partners on a proposed suite of project ideas that have been developed based on outcomes from project activities and Workshop I: *Exploring the Organisms in Trade Vector*.
 - Does the project hold potential in effectively addressing AIS priorities in the Great Lakes region?
 - How will the project add value in regional efforts to advance AIS prevention and control?
 - Is the proposed project feasible in terms of available resources to effectively address goals and objectives?
 - Does the project provide opportunity for balanced participation from the states/provinces (e.g., resource managers and policy makers), industry, academic, environmental stakeholders?
2. Identify additional resources that may be needed, not already been identified, in order to implement the project ideas (e.g. information, funding, partners, time, etc.) and identify challenges that could impede implementation.
3. Prioritize project ideas (could be based on perceived need, political will, availability of information needed to implement the activities, potential for having the greatest impact, etc.).

Agenda

Wednesday, December 3

1:15 PM **Welcome & Introductory Presentation: Planning Grant & Workshop I Outcomes**
Tim Eder, Great Lakes Commission

1:40 PM **Project Idea A: Risk Assessment for Potential Invasion of Aquatic Species in the Great Lakes**
Moderator: Tim Eder, Great Lakes Commission

Case Study: Implementing Risk Assessment for Plants in Indiana
Doug Keller, *Indiana Department of Natural Resources*
Reuben Keller, *University of Notre Dame*

Great Lakes State/Province Perspective

Discussion

ATTACHMENT C: Workshop II Agenda

- 3:30 PM** **BREAK**
- 3:45 PM** **Project Idea B: Internet Monitoring for the Sale of Aquatic Invasive Species**
Moderator: Erika Jensen, Great Lakes Commission
- Case Study: Invasive Species Internet Monitoring System
Karl Suiter, *National Science Foundation-Center for Integrated Pest Management*
Scott Hardin, *Florida Fish and Wildlife Conservation Commission*
- Great Lakes State/Province Perspective
- Discussion
- 5:30 PM** **Adjourn for the day**
- 6:30 PM** **Group Dinner at Grizzly Peak**
(pay on your own – details and directions provided at meeting)

Thursday, December 4

- 8:30 AM** **Agenda review; Report out from previous day**
- 8:45 AM** **Project Idea C: Advancing Efforts to Reduce Risks for Aquatic Invasions in Private and Public Aquaculture**
Moderator: Kathe Glassner-Shwayder, Great Lakes Commission
- Case Study: Biosecurity for Public and Private Aquaculture
Dr. Nathan Stone, *Aquaculture and Fisheries Center – Univ. of Arkansas at Pine Bluff*
Gary Whelan, *Michigan Department of Natural Resources; Chair, Great Lakes Fish Health Committee*
- Great Lakes State/Province Perspective
- Discussion
- 10:30 AM** **BREAK**
- 10:45 AM** **Discussion: Prioritizing Project Ideas**
- 11:45 AM** **Wrap Up & Next Steps**
- 12:00 PM** **ADJOURN**