Workshop Summary: Aquatic Invasive Plants in Indiana

January 10, 2007
Indianapolis, IN

Scope

Invasive aquatic plants pose a serious threat to the ecologic and economic health of the state of Indiana and the broader Great Lakes region. In an effort to address this issue and implement certain objectives of the 2003 Indiana Aquatic Nuisance Species Management Plan, the Indiana Department of Natural Resources (IDNR) is considering a combination of prevention strategies including regulation, voluntary best management practices, and education and outreach. In partnership with Illinois-Indiana Sea Grant (IISG) and the Great Lakes Commission (GLC), the IDNR held an introductory workshop to lay the groundwork for engaging Indiana's plant industries in the development and implementation of these strategies to prevent the introduction and spread of harmful invasive aquatic organisms.

Objectives

IDNR and IISG identified three primary objectives for this workshop:

1. Increase awareness of the risks associated with invasive aquatic plants and the approaches used for their management;
2. Explore various prevention strategies, including regulation, voluntary best management practices, and education; and begin to develop a framework for their implementation in Indiana; and
3. Initiate development of a network of stakeholders who are committed to collaborating on the development of prevention strategies.

Workshop Proceedings

Welcome, Agenda Review, Objectives

Pat Charlebois, Illinois-Indiana Sea Grant

The workshop began with Charlebois welcoming guests and introducing them to the workshop sponsors, IISG, IDNR and GLC. She also welcomed the guest speaker for the workshop, Reuben Keller of the University of Notre Dame. Charlebois addressed various house-keeping issues including passing around a sheet for participants to fill out their contact information. She explained the workshop objectives: the desire to increase awareness; explain approaches to attenuate risks and address the issue; explore prevention strategies that can be used in Indiana; and the formation of a workgroup to be involved further down the road in this process. Charlebois reviewed the agenda, explained the process for the break-out sessions and concluded by introducing the first presenter of the morning.

Invasive Species and the Trade in Ornamental Plants

Reuben Keller, University of Notre Dame

Keller introduced himself and his presentation explaining that he had just finished is Ph.D. work in September, working with David Lodge at the University of Notre Dame. He said that his presentation that morning would focus particularly on work he has done to look at the role of trade industries in aquatic invasive species (AIS) prevention and spread. He provided an outline of his presentation which included a definition of invasive species; upper midwest invaders; his Notre Dame research; the role of trades in moving AIS; preventing future invaders; and a brief summary and recommendations. Keller's definition of invasive species outlined the criteria a species must exhibit to be considered "invasive" as the following: movement from native area to non-native area; introduction; establishment; spread; and finally, invasive. Keller indicated that many species pass through some of the steps but may not make it through all of them. In fact, he said only 10-20% of aquatic plants introduced become invasive. He provided examples of a few priority freshwater invasive species causing very large economic and

ecologic impacts, including the sea lamprey which had devastating impacts on the lake trout fishery and costs U.S. and Canadian taxpayers $15 million a year to control. Keller said that freshwater AIS are rarely eradicated due to a lack of effective methods that will not also impact all other living organisms in an infested lake. He also pointed out, however, that aquatic ecosystems can be discontinuous, meaning it is possible to protect systems that are not invaded by isolating them from invaded water bodies. He said the key to reducing the impacts of invasive species is preventing their arrival.

Keller then spoke about the various pathways through which invasive species may be introduced. He explained that many are transportation related, but the focus of today's workshop is the pathway created by commerce in living organisms (live plants). He emphasized that trade was only a part of the problem of invasive species introduction and spread and not the whole problem. He said there were roughly 27 established non-native aquatic plants in the Midwest with 14 considered invasive and having large negative impacts. Species such as Eurasian water milfoil and Brazilian waterweed (*Egeria densa*) are costing a significant amount of money in impacts and control. Keller discussed the work he has been a part of at the University of Notre Dame regarding the live organism trade's role in invasive plant introduction and spread. The researchers first tried to determine which species were being sold in the trade industries and determine if they were species of concern. To do this, the research team went out to stores selling aquatic plants to get a clearer picture of what plants are being sold, and also, what kinds of invertebrate organisms are being transported on these plants. The research team found there is a massive diversity of species available, all live, and they purchased ones they thought would be a risk to the Great Lakes (i.e., not tropical fish). Keller displayed a chart that listed the 27 established non-native aquatic plants and showed that 18 of them are available in trade, 10 of which are known invaders. In addition, six species are available that are not established, but have been identified as potential invaders due to their invasiveness in other regions similar to the Great Lakes. The research team also examined how accurately the species were being identified in the stores. They found that those involved in the plant trade are much better at using the binomial Latin name than those involved in animal trades. Keller said that roughly 50% of the species are correctly identified at the appropriate level and that the other 50% were identified by the common name or incorrectly identified. Next the research team looked at the presence of contaminant organisms (i.e., hitchhikers) on plants in trade. The researchers focused on animal organisms and identified species by taxa; they could not identify organisms down to the species level because they did not know the geographic origin of the species. They found that when plants are purchased, it is possible to get up to 60 live macroinvertebrates per gram of plant.

Keller provided a summary of the risks associated with the trade industries, including the spreading of known invaders and the introduction of new invaders as 13% of the species sampled were already invasive and 8% were potential invaders. As a result of unreliable identifications, he indicated that regulation would be difficult and said that contaminants were ubiquitous on purchased plants, posing an unknown but possibly large risk of impacts. Keller then identified some potential ways to respond to each from an ecological standpoint. He suggested known invaders could be removed from trade and awareness of them increased through public education; potential invaders could undergo a risk assessment and restrictions could be placed on the high risk species; improvement of identifications; and mechanical or chemical treatment of plants before sale to reduce contaminant organisms.

Keller next spoke about reducing the risk of new invasive species. He indicated that many ecologists have been trying to predict which species might become invasive by looking at patterns in species that have become invasive and those that have not. Keller said that if patterns are found and applied to other species, ecologists can estimate risk with about 80-90% accuracy. He provided the example of Australia, which has mandated risk assessments for all new plant introductions since 1997 and said that following Australia's example and apparent good results, New Zealand now requires the same process and the U.S. Department of Agriculture is considering the adoption of a similar program. Keller attempted to demonstrate how a risk assessment process is not only environmental beneficial, but can be economically

beneficial as well. He explained if 100 species are proposed for introduction and we make the assumptions that 10% will become invasive and ecologists can predict invasions with 80% accuracy, then in this example, 8 invasions are prevented and 2 occur. He pointed out a problem, however, that is that 20% of the predictions will be wrong which results in 26 species being prohibited of which a large percentage would have been beneficial. This results in a worse economic outcome than the invasions that would have happened. Keller then tried to prove the economic benefit of risk assessment by gathering data for the Australian trade in ornamental plants found that it becomes economically beneficial after only 10 years. He predicted that over 50 years, the program would lead to economic benefits of $1.8 billion. Keller also indicated that the results for the U.S. might be similar because, while the country has a much bigger industry, it also has much higher costs associated with the impacts of invasive plants. That is, the U.S. has more agriculture resulting in higher costs of control which would increase the benefits of a risk assessment program. In addition, he said that more aquatic plants become invasive than terrestrial, which also increases the benefits of risk assessment. In summary, Keller reminded participants that trades in live aquatic organisms sell many species known to cause large negative impacts and other species that may become invasive in the future; there is a high occurrence of incorrect identification; contaminant organisms pose an unknown, but possibly large, risk; and removing high-risk species from trade leads to environmental and economic benefits.

Regional Perspectives: State Management Planning for Great Lakes Aquatic Invasions
Kathe Glassner-Shwayder, Great Lakes Commission

Shwayder's presentation was intended to provide a broad overview of aquatic invasive species (AIS) issues in the region. She first explained the role of the Great Lakes Commission (GLC), a multi-state compact agency for the region that works on ecologic as well as transportation and sustainability related issues. She indicated to participants that other states in the Great Lakes region were conducting similar workshops as part of a GLC project intended to advance a regional approach to state management planning for AIS prevention and control. She explained that state management plans (SMPs) have their roots in federal legislation – the National Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA). Shwayder said that while the legislation has not provided a silver bullet for the AIS issue, it has provided an institutional framework for AIS prevention and control. NANPCA established the Aquatic Nuisance Species Task Force (ANSTF) to coordinate AIS management on a national scale, and established regional panels, of which the Great Lakes Panel was the first. Further, the legislation provides federal funding for implementation of ANSTF approved AIS prevention and control plans, with a state match. Many of the Great Lakes states have approved plans and the Indiana SMP was approved in 2003, with several goals:

- Coordinate efforts among agencies and organizations
- Prevent new ANS introductions
- Conduct monitoring to enhance early detection of new invasions
- Institute rapid response planning
- Limit the spread of established ANS populations
- Mitigate harmful ANS impacts
- Evaluate plan effectiveness using adaptive management strategies to update the plan

Shwayder described the various values of an SMP as an effective tool that helps regional collaboration; facilitates information sharing and consistent messages; and raises public and private awareness. She explained how the GLC has been involved in state management planning through developing a model plan and advancing state management planning through state specific workshops, such as this one. Theses workshops, she said, are part of a larger project, *A Collaborative Approach to Advance State Management Plans for Prevention and Control of Aquatic Nuisance Species*, funded through the National Oceanic and Atmospheric Administration (NOAA) Sea Grant Programs. Shwayder explained that each workshop is state specific with this workshop being the fifth to be completed. The next workshop will be

in Ohio early that spring. She described the culminating event for this project, a regional summit in Pennsylvania in May. She highlighted the project website (http://www.glc.org/ans/initiatives) on which materials from other workshops will be posted.

After describing various state management planning efforts, Shwayder provided examples of other programs for AIS prevention and control, including plant listing and outreach programs. She introduced outreach programs such as

- Clean boats, Clean waters – a program of watercraft inspections for recreational boaters;
- Do Not Release – a program identifying plants to consumers and retailers in trade industries;
- Hydrilla Hunt – a proactive Michigan program to prevent hydrilla in the state;
- HACCP – a national campaign that provides a way of looking at a whole process to identify areas where risk can be reduced; and
- HabitattitudeTM – a program focused on providing a consistent massage for different private industries such as the pet and nursery industry

Shwayder discussed plant listing programs and highlighted an important resource for those interested in these programs: a publication issued by the Environmental Law Institute entitled *Making a List*, which is available online (http://www.elistore.org/reports_detail.asp?ID=10990). She indicated that establishing a definition of what it means to be invasive is and important first step in terms of developing a listing process, which, she pointed out, R. Keller also alluded to during his presentation. Shwayder said that this type of program has the capacity to help limit the spread of invasive species but is very dependent on funding and staff support. In addition, she noted that regional inconsistencies in management can undermine one state's efforts and said that it is important to keep an even playing field. Shwayder indicated that Indiana is not the only state considering a listing process as several other states already have them in place. Examples she gave were Wisconsin, Illinois and Minnesota. Minnesota was the most complex of the listing programs she presented and involved "clean" and "dirty" lists of plants. Based on these programs, Shwayder provided some important points for discussion including, definitions; the burden of proof; the ability to identify species; systematic science; transparency of the process; flexibility and responsiveness; de-listing; and enforcement. In addition she advised that stringent requirements might be reserved for the most problematic species and that there needs to be considerable outreach and education, as well as a voluntary approach to management. In conclusion, Shwayder emphasized that aquatic invasions are a challenging environmental problem demanding multifaceted solutions and that stakeholders should look for AIS problems held in common and opportunities to work together in solving those problems. She said that, ultimately, the economic and environmental health of the Great Lakes region is strongly dependent on how effectively our society can prevent, control and mitigate aquatic invasive species.

An ounce of prevention is better than $2 million in control: Indiana's Aquatic Invasive Species Strategy
Doug Keller, Indiana Department of Natural Resources

Keller began his presentation by thanking IISG and GLC for helping to organize this effort to address a problem he has wanted to tackle since he started in his current position at IDNR. He gave an overview of his presentation which would include what actions are currently be taken in Indiana, Indiana's current problems and a proposal for future actions. He provided a framework for his presentation with a recommendation from Indiana's state management plan:

> *Establish a systematic risk identification, assessment and management process to identify and modify pathways by which nonindigenous aquatic nuisance species spread.*

Keller emphasized that this effort would not be limited to specific species, but would be taking into consideration pathways through which major invaders are coming in to the state. He described two primary pathway groups, as follows:

1. *Foreign introductions*: ballast water; aquaculture; organisms in trade
2. *Movement once here*: fish transfer and bait release; recreational activities; canals and waterways

With regards to preventing introductions via these pathways, Keller acknowledged that state influence lacks in two of these areas: ballast water and canals and waterways. He indicated that the state would not be effective in attempting to regulate ballast water and would prefer federal legislation. As a regulatory agency, Keller explained that IDNR has started to address or made plans to address all the pathways the state can have influence over. He gave the following examples of these efforts:

- *Fishery rules* – a mostly reactive, but in some cases proactive (snakehead, walking catfish, black carp), list of species that are illegal to possess live in the state
- *Fish stocking permits* – regulations which make it illegal to stock fish without a permit in the hopes of controlling what species go into Indiana waters
- *Aquaculture species list* – a "clean" list of 33 species which can be brought into the state, any species not on the list requires a permit; and a "black" list of species which are prohibited and for which a permit will not be approved
- *Bait regulations* – limited regulations which need to be improved and that IDNR is working to develop so that it will address the fish transfer and bait industry pathway

Keller also indicated that IDNR is considering regulations that some other states have adopted to slow invasive plant spread via aquatic equipment. He said that the organisms in trade pathway has not received a lot of attention from the agency and that it would be the focus of the rest of his presentation.

Keller explained the few regulations in place for plants. He indicated that the regulations have primarily been reactive and very cautious in favor of the plant trade because the agency realizes it is a money-making business. He also said that this caution has caused much of the regulation to be ineffective. The regulations cover only a couple of the current problem species present in the state, including curly leaf pondweed; purple loosestrife; Eurasian water milfoil; Brazilian elodea; and hydrilla. He qualified this list explaining that Brazilian elodea has been found only in one lake, but is very aggressive and displacing even the Eurasian water milfoil, and that hydrilla was only recently found in August of 2006, also only in one lake. He provided a description of the regulations, as follows:

- *Purple loosestrife Rule* – any species of *Lythrum* (purple loosestrife) is prohibited and the native *Lythrum* species requires a permit in Indiana.
- *Brazilian elodea Rule* – elodea is illegal to possess, sell, offer for sale, etc., as an outdoor water plant. Elodea can only be used in indoor aquariums and anyone in possession of the plant not in an indoor aquarium must make lawful efforts to eliminate the species. The rule was implemented about a year ago as a temporary rule that IDNR is working to make permanent over the next few months. Keller described this rule as a good example of caution in favor of the industry as this plant has proven very problematic in many areas of the U.S.
- *Hydrilla Rule* – a rule similar to the Brazilian elodea rule, with one addition: the state has the ability to quarantine (i.e., shut down) a body of water if hydrilla is found to be present. Hydrilla is listed as a federal noxious aquatic plant along with 1-2 dozen others and is the only federally noxious weed regulated in state. The federal regulation prohibits transfer across state lines, but allows for species movement within a state if they do no have their own regulation. Keller indicated that this is another temporary rule IDNR would like to make permanent.

Keller next moved into describing the costs associated with aquatic plant invasions in the state of Indiana. He noted the important difference between eradication and control: eradication implies completely eliminated throughout the state whereas control is implemented under conditions when the plant already exists throughout the state and eradication is unlikely, thus leading to strategic removal of the species in

areas where feasible. The first example Keller provided was the lake in which Brazilian elodea was found. The lake is approximately 109 acres, and it costs approximately $1,240/acre to eradicate. Lake Manitou, the lake in which hydrilla was found will cost an estimated $2 million over 5-6 years ($2,290/ per acre per year) to eradicate. Keller explained that the Lake and River Enhancement Program in Indiana has been funding $0.5million/year for Eurasian water milfoil control in 70 lakes across the state, but he said, the state could easily spend four times that amount per year ($2 million/year) and still only be controlling the species. He described that the costs of aquatic invasive plants include not just the price of herbicides but other economic figures such as:

- Reduced recreation spending, which amounts to about $1.5 billion/year in the state and is money that goes not only to the state but to local economies as well;
- Reduced property values as a result of weedy lakes;
- Equipment damage such as tangled boat motors and clogged irrigation systems;
- Ecological damage; invasive species can create a monoculture in an ecosystem, reducing the number of plants which in turn will reduce the number of animal species and create unattractive ecosystems.

Keller concluded his presentation with a proposal for action to control and prevent the spread of aquatic invasive organisms. His proposal included a "white list" of plants that pose little threat and a "black list" of plants that are known to have extremely negative effects. He emphasized that the "black" list would not be longer than the "white" list and that it should focus on plants that are known to be able to live in Indiana. He also indicated that there would be a grey area consisting of everything that is not on either list and for which careful consideration should be made before bringing that plant into the state. In conclusion, he explained that regulation will be combined with other actions such as implementing BMPs, education directed at consumers and retailers, and establishing alternatives for prohibited plants will also contribute greatly to this effort.

Potential tools for invasive aquatic plant management
Kristin TePas, Illinois-Indiana Sea Grant

TePas recapped the following potential tools that were explained during the morning's presentations and would be the topics of discussion during the break-out sessions:

- Regulations (black and/or white lists geared toward suppliers)
- Education (geared toward consumers and suppliers)
- Best management practices (HACCP; cleaning off contaminants/hitchhikers; improving identification)
- Risk Assessments

She asked that those organizations with more than one representative at the workshop please split up to help ensure varied representation in each of the break-out groups.

Break-out Sessions (see Appendix)

Next Steps
Pat Charlebois, Illinois-Indiana Sea Grant

In concluding the workshop, Charlebois addressed the question: where do we go from here? She reminded participants of the opportunity to participate in a workgroup, likely meeting on a monthly basis starting in March, to come up with a plan using the potential tools discussed at the workshop, for Indiana to address the invasive plant/organism issue. Charlebois indicated they would be using the evaluation sheets to gauge interest in this process and that people will be contacted via email to join the workgroup. She then thanked the participants and adjourned the workshop.

Appendix: Break-out Session Notes

Break-out Session Discussion – Group 1

Facilitator: Tom Crane, Great Lakes Commission
Recorder: Reuben Keller, University of Notre Dame

(1) *What are the important components of a regulatory approach to prevent and control the spread of invasive aquatic organisms in Indiana?*

- Ensure that federally controlled species are also regulated within the state
- Enforce regulations with fines and follow through consistently
- Ensure that penalties for violating regulations are sufficient to provide a real disincentive to release
- Test and evaluate the risks of species before they are allowed into trade
- Terrestrial plants often need to be documented as pest and pathogen free – this requirement should be extended to aquatic plants
- DNR needs to be given adequate funding to enforce regulations
- Current invasive species lists need to grow
- Regulations should be targeted at the "grow" level – there are fewer growers and if pests can be eliminated at this level, it will go a long way towards preventing invasions
- Consider penalties that are scaled to the size of the store – don't want to penalize "Lowes" in the same way as a "mom & pop" store

(2) *What kind of voluntary best management practices (BMPs) could various plant industries use to help prevent and control the spread of invasive plants?*

- Landscapers should observe plants over long periods of time and report their observations
- Education directed at customers about how they should treat the plants they purchase
- Currently many aquatic plants are sold by their common name or function (e.g., oxygenator) and instead, species should be sold by their proper scientific name
- The trend towards big box stores selling a log plants is a problem because they are less able to identify the plants, and less likely to make restricting invaders a priority
- Industries can voluntarily self police to ensure that high risk species are not sold
- Industries can treat plants to remove hitchhikers

3) *What kind of invasive aquatic plant education and outreach strategies would be most helpful to the various plant industries and their consumers?*

- Educate retailers about invasive species issues and their role in handling them
- "Do Not Release" messages are unrealistic for outdoor plants – water garden plants that pose a large risk should be black-listed because any species planted outside will have the potential to spread
- Convene classes to educate retailers and customers
- Improve publicity for existing outreach efforts – no one in this group had heard of HabitattitudeTM or Protect Your Waters
- Landscapers deal with a lot of potential vectors and a booklet outlining these would be useful (e.g., participant is subcontracting to an animal control company to remove beaver – as a landscaper he needs to know that the beaver-trappers boat and equipment are clean)
- Plants could be sold with the equivalent of a chemical MSDS to be sure that buyers know what they're getting and what they can/should do with it
- If a good "Do Not Sell" list was put together, the bulk of sellers would likely abide by it
- Retailers should offer to take in unwanted plants or offer advice for how the plants should be treated
- Establish lists of alternative species to any that are black-listed

Break-out Session Discussion – Group 2

Facilitator: Kathe Glassner-Shwayder, Great Lakes Commission
Recorder: Erika Jensen, Great Lakes Commission

(1) *What are the important components of a regulatory approach to prevent and control the spread of invasive aquatic organisms in Indiana?*

- Address internet/catalog sales of plants
- Should know regulations for plant growers (i.e., drug manufacturers have to get new drugs approved by the Food and Drug Administration – do new plants have to go through a similar process?)
    - Growers conduct their own plant testing to see if a plant will be viable to sell and will grow a plant for 4-5 years before putting it on the market to ensure there is product
    - There are regulatory requirements, but unsure what these are, although there might be something as part of the patenting process because a plant needs to be patented before it can be sold
- Regulation should encourage eco-friendly labeling on non-invasive plants
    - This would require industries to know what is considered invasive in specific areas
- State regulations are not common knowledge among the industries (e.g., Don't know when/what cannot be transport from Ohio to Indiana)
- Regulations could require training sessions regarding regulations/prohibitions – could be a mandatory course for getting a license?
    - Could be expensive, but would be provide uniformity – could be subsidized by the state
- Encourage the adoption of a risk assessment program by the USDA
- Develop a definition and criteria for determining what is "invasive"
    - Criteria such as: capacity for reproduction/spread; impact on natural vegetation
- Growers should be required to list in which areas the plant is potentially invasive when they are listing/advertising the other characteristics of species they are trying to sell
- The DNR and USDA could develop a testing or some other mechanism to qualify for nursery license the would require applicants to show some proficiency in the industry they are dealing with
    - There needs to be job qualifications for those working in the industry – there are too many people in the industry who don't understand the potential risk of non-native plants, and don't know how to get the information they need related to invasive plants

(2) *What kind of voluntary best management practices (BMPs) could various plant industries use to help prevent and control the spread of invasive plants?*

- Retailers need more tools to implement voluntary BMPs
    - They would like labels/stickers saying "Do Not Release", so they are still able to sell the plant but can educate consumers about the risks; need tools to educate customers on a general basis (don't have time to educate consumers individually)
    - At the end of a season, retailers will have a lot of plant material left over and they need to know how and should be required to properly dispose of them (e.g., "Do Not Share") – many plant enthusiasts don't like to "kill" plants
    - Need signage at retailer stores (small and large) that is something recognizable, easy for the general public to understand and remember – a recognition campaign for the public to begin to learn how to identify potential invaders (e.g., e "Give a hoot, don't pollute"; Smoky the Bear)
    - Customers are often not willing to go search out information on their own, instead they use retailers as a library for information, so retailers need to be equipped with that information that presents the risks of invasive plants
    - Retailers could increase encouragement of the use of native species with customers – often times, customers will be more successful with the native species

- Plant industries and the state need to actively search what other plants are available that are an equivalent native substitute (as is done with purple loosestrife) for invasive species
- Would like to have HabitattitudeTM campaign awareness materials to hand out at register, especially ones that detail how to properly dispose of aquatic organisms
- Most retailers would be happy to display awareness information but the materials are not reaching them – need an effective dissemination strategy
- People in this room can contact the people they know and develop/use a network of concerned industry people through which information can be disseminated

(3) *What kind of invasive aquatic plant education and outreach strategies would be most helpful to the various plant industries and their consumers?*

- Companies (retailers, suppliers) should familiarize themselves with plants that are known to be invasive and limit the availability of these plants
    - Plants come into the state from all different places and different species are invasive in different areas so there needs to be a list maintained on an accessible location for Indiana that tells growers/suppliers about what is prohibited/potentially/known invasive for the state
    - Companies should be provided lists of prohibited species (particularly submerged aquatic invasive plants) for each state
    - Possibly distributed through Extension agents or at events like trades shows

- Education and awareness directed towards retailers and consumers is a key missing piece
    - Government has spent money on research to learn to identify species that are invasive but are not communicating these findings
    - Only a limited percentage of people are knowledgeable about invasive species; the average person hasn't heard about most of the problem species so information that is isolated to the few interested people needs to be expanded to the greater population
    - Start education (i.e., building a conservation ethic) at a younger level (e.g., the Boy Scouts have incorporated invasive species education into their curriculum)
    - Education needs to be directed at consumers as well as retailers (i.e., consumers often buy something because it is "pretty" without knowing anything about the plant)
    - Local garden centers are cognizant of some of the issues, but big box stores are also a problem (e.g., Wal-Mart); want to know how this issue of the larger retailers will be addressed
    - Development of "watch cards" for invasive species that include a picture and identification information that can be disseminated with mechanisms like fishing licenses
    - Example of outreach: a PBS show in which a well-known person is narrating that would provide the perspective from national scale and provide mass education
    - If consumers are aware of invasive species and associated risks are, it would follow that they would be inclined to stop purchasing those species that are invasive, which through market forces will lead to the invasive species being taken off the "shelf."

Break-out Session Discussion – Group 3

Facilitator: Kristin TePas, Illinois-Indiana Sea Grant
Recorder: Doug Keller, Indiana Department of Natural Resources

(1) *What are the important components of a regulatory approach to prevent and control the spread of invasive aquatic organisms in Indiana?*

- Knowledge of what you are going to regulate, know the species
- Would require enforcement
- Some regulations look good in paper, but how are you practically going to enforce it, some people go underground with their sales
- Partnerships to be educational to help get word out about existing regulations and what they entail – this may help generate "peer pressure" to "encourage" others into following laws
- Be sure that those involved in developing regulations need to have diversity of players
- Need to have agreed upon risk assessment to evaluate species
- University input to help get scientific input on whether species would thrive in specified area
- Look at hardiness zones
- Need regulatory and industry people equally represented in the process of risk assessment
- Industry unclear who has the authority to regulate, need to educate them
- Need to have ability to reevaluate species
- Weigh the threat potential using risk assessment
- Concerns about a "non-list" grey area
- Designers need to know what is invasive so they do not recommend them in plantings
- Need regulatory credibility, credibility is dependent on the accuracy of science

(2) *What kind of voluntary best management practices (BMPs) could various plant industries use to help prevent and control the spread of invasive plants?*

- Require tagging on plant material
- Tagging could describe which species are invasive (education) – genus, species, care information, common name, disposal
- Promote native plants

(3) *What kind of invasive aquatic plant education and outreach strategies would be most helpful to the various plant industries and their consumers?*

- Voluntary compliance can only work through education
- Need to show "externality costs" as this will open up people's eyes and be more accepting of the education
- Use extension to get word out about educational opportunities
- Education business and their employees
- Certification for nurseries requiring knowledge of invasive plants
- Careful about using media, it has potential to create panic among certain audiences
- Who will pay for education?
- Educate industry so they can educate the customers
- Customers must be educated at the elementary/basic level, don't get complicated

Break-out Session Discussion – Group 4

Facilitator & Recorder: Pat Charlebois, Illinois-Indiana Sea Grant

(1) *What are the important components of a regulatory approach to prevent and control the spread of invasive aquatic organisms in Indiana?*

- Clarity and preciseness
- Delineated process of enforcement and consistency in implementing the enforcement
- Outreach on regulations that is understandable ("digestible")
- Multi-lingual outreach (e.g., English, Spanish, Chinese dialects)
- Decision based on: potential invasiveness; what is currently causing problems; consult other states as well as industry; how it reproduces; temperature tolerance; performance in test areas – controlled environments (e.g., experimental ponds); aggressiveness; research on hybridization
- Identify current "big problems"
- Research needed in process of listing species as invasive
- Burden of proof on agency
- Include plant & hitchhiker training with certification
- Outreach using Purdue Extension, Chemist Office, Green Expo, ASLA, CENTS Show (Columbus, OH), Mid-American Show (Chicago), trade publications (e.g., Water Garden News), radio/TV (e.g., Dick Crum), recreational movement (e.g., bass fishing, sports shows, retailers), etc.
- Create Aquatic Association which would provide a good vehicle for information distribution
- Send information out to via mailings to registered nurseries/dealers
- Emphasize economic impact

(2) *What kind of voluntary best management practices (BMPs) could various plant industries use to help prevent and control the spread of invasive plants?*

- Avoid pond overflow (siting of ponds) when building – know hydrology/flood history of pond site
- Education of employees and clients
- Hitchhiker removal - reject shipments if they are contaminated
- Aquatic certification – this could also have the potential to increase sales
- Voluntary quarantine (hitchhikers – emerging eggs, larva, etc.)
- Promote the advantages of native species/alternatives – increase market for native species
- Provide "warnings" (monetary disincentives?) of non-natives
- Take advantage of the "green" (organic, native, no herbicides) trend
- Provide proper disposal information to consumers (and retailers)
- Encourage/emphasize that it is ok to "kill" (dispose) of a plant

(3) *What kind of invasive aquatic plant education and outreach strategies would be most helpful to the various plant industries and their consumers?*

- Seminars
- Plant tags at retail sites – expand them to include disposal and pond fish (e.g., Koi)
- Need to get education/information down to employee level
- Provide information to retailers and consumers on native alternatives
- Educate home-owners (pond siting), landscapers, maintenance
- "Advertise" economic impact – use pictures
- Provide material in boater registration information – boat landing signage (with pictures)
- Growers and dealers have their licenses renewed yearly – provide education with license
- Mandatory(?) display signs
- Require permits for ponds (based on hydrology/flooding)