

**SETTING THE ROAD MAP:
A WORKSHOP FOR DEVELOPING
PENNSYLVANIA'S INVASIVE SPECIES MANAGEMENT PLAN**

Proceedings Document

April 2006

Prepared by: Sarah Whitney
Coastal Outreach Specialist
Pennsylvania Sea Grant
1450 Edgmont Ave., Suite 150
Chester, PA 19013

*This project was made possible through a grant from the Great Lakes Commission
and the National Oceanic and Atmospheric Administration Sea Grant program.*

**SETTING THE ROAD MAP: A WORKSHOP FOR DEVELOPING
PENNSYLVANIA’S INVASIVE SPECIES MANAGEMENT PLAN**
Proceedings Document

TABLE OF CONTENTS

I. Background.....5

II. Recommendations.....5

III. Presentation Summaries

Invasive Species: Prevention, Strategic Planning, Local and State Level Partnering, and Leadership,
Randy Westbrook, U.S. Geological Survey.....10

Regional Perspectives on Aquatic Invasive Species State Management Planning,
Kathe Glassner-Shwayder, Great Lakes Commission.....10

Lessons Learned: What Maryland’s Snakehead Can Teach Us About Invasive Species Response,
Jonathan McKnight, Maryland Dept. of Natural Resources.....12

Pennsylvania Department of Agriculture Activities,
Charlie Conklin and Karl Valley, Dept. of Agriculture.....13

Pennsylvania Department of Conservation and Natural Resources Activities,
Sally Just, Dept. of Conservation and Natural Resources.....13

A Prototype Invasive Species Tracking System for the State of Delaware,
John Young, U.S. Geological Survey.....14

Pennsylvania Fish and Boat Commission Activities,
John Arway, Fish and Boat Commission.....14

Pennsylvania Department of Environmental Protection Activities,
Jim Grazio, Dept. of Environmental Protection.....15

Synthesis of an Action Plan Against the Emerald Ash Borer: Pennsylvania's Multi-Agency Approach,
Jim Stimmel, Dept. of Agriculture.....16

Pennsylvania Department of Transportation Activities,
Joe Demko, Dept. of Transportation.....16

Finding the Common Denominator in Complex Fractions,
John Peter Thompson, Behnke Nurseries, Mid-Atlantic Exotic Plant Pest Council.....17

IV. Appendices

Agenda.....19

Speaker Biography.....21

Participant List.....24

Acknowledgements

A special thanks to the workshop speakers and facilitators for their help in making the workshop possible. Their contributions, as well as those of the workshop attendees, were critical to the success of this project. Thanks also to Randy Westbrook for identifying key players to participate in the workshop and to Kathe Glassner-Shwayder and Lisa Butch of the Great Lakes Commission for their logistical support with facilitation and the compilation of the proceedings document.

Please direct comments and questions concerning these proceedings to Pennsylvania Sea Grant at:
1450 Edgmont Ave., Suite 150, Chester, PA 19013, phone: 610-304-8753, email: swhitney@psu.edu

I. Background

There are a number of activities occurring throughout Pennsylvania to prevent the introduction and spread of invasive species; however, more work and coordination is needed to deal with this growing issue. To move forward in addressing invasive species problems, the Commonwealth of Pennsylvania established an Invasive Species Council under Governor Rendell's Executive Order 2004-1. A primary responsibility of the Council is to advise the Governor on the development and implementation of a state invasive species management plan. In recognition of the need for a formal invasive species prevention and control plan, Pennsylvania Sea Grant organized *Setting the Road Map: A Workshop for Developing Pennsylvania's Invasive Species Management Plan*, held October 26-27, 2005 in State College, Pa. This workshop was attended by 65 participants, representing state and federal agencies, environmental non-profits and commercial industries.

Support for this initiative was provided by the Great Lakes Commission through a grant from the National Oceanic and Atmospheric Administration (NOAA) Sea Grant Program. The grant, *A Collaborative Approach to Advance State Management Plans for Prevention and Control of Aquatic Nuisance Species* is being administered by the Great Lakes Commission in cooperation with Sea Grant programs and state natural resource agencies around the Great Lakes region. This regional initiative supported a series of state specific workshops in the Great Lakes states as in Pennsylvania. The project is guided by the premise that regional coordination is a critical element for invasive species prevention and control. Near the completion of the project, the Great Lakes Commission will convene stakeholders for a culminating regional summit to facilitate sharing lessons learned among the Great Lakes states on state management planning.

Setting the Road Map is the first step towards creating a comprehensive plan for invasive species management. The ideas generated by speakers and discussions will provide essential guidance to the Pennsylvania Invasive Species Council (PISC), the umbrella organization charged with developing Pennsylvania's invasive species management plan. This plan will establish interagency responsibilities; describe coordination among different agencies and organizations; recommend approaches to funding invasive species work; address prevention, early detection and rapid response needs; identify opportunities for control and restoration including research needs; and describe effective outreach and education.

II. Recommendations

The agenda for *Setting the Road Map: A Workshop for Developing Pennsylvania's Invasive Species Management Plan* included a combination of speakers, agency updates, and break out sessions (see *Appendix I* for Workshop Agenda). Participants were divided into break out groups focusing on prevention, early detection and monitoring, rapid response, and control and management. During the breakout sessions, participants were asked to consider the following:

- What should be the overarching goal(s) of the Pennsylvania Invasive Species Management Plan? What is the purpose of the Pennsylvania Invasive Species Management Plan? What should be the more specific goal(s) for prevention, early detection and monitoring, rapid response, control and management?
- What needs to be addressed long-term and short term for this topic?
- What key steps and strategies are needed in order to realize the short term and long-term objectives?
- What are the priority strategies and tasks?

By the end of the workshop a clearer vision for the Pennsylvania Invasive Species Management Plan (ISMP) emerged, supporting the overarching goal of *minimizing the economic, ecological and social impacts of invasive species in Pennsylvania*.

Participants articulated that the organization of efforts to support the invasive species management plan (ISMP) should be transparent, and the ISMP should serve as a blueprint for agencies and non-governmental organizations involved with invasive species prevention and control activities. The ISMP should provide a road map for coordination throughout Pennsylvania. It should outline mechanisms for making decisions and clear lines of communication. The ISMP should develop processes to identify newly discovered infestations, and devise early intervention strategies to eradicate or control these infestations. It should provide a risk assessment process so that limited resources can be used most effectively. The ISMP should also prioritize Pennsylvania's needs for prevention and control which will provide opportunities for new partners to become involved in prevention and control activities.

In other words, participants felt the ISMP must:

- Define the issues, be strategic in nature, and be detailed and specific
- Identify and organize the players
- Provide a framework and coordination for plan implementation, including establishing a legal framework to address invasive species issues
- Establish criteria to prioritize actions
- Avoid duplication of efforts and encourage resource sharing (data, best practices, protocols, etc.)
- Evaluate efforts and provide mechanisms for addressing gaps and inefficiencies in activities

Break out sessions articulated goals for prevention, early detection and monitoring, rapid response, and control and management. Consensus on these more specific goals appears below.

A. Prevention

In order to be effective, the ISMP must focus on prevention as the first line of defense against invasive species. Participants identified the following priorities for prevention:

- Identify and prioritize key audiences for education and outreach efforts
- Target outreach efforts to promote understanding of invasive species dispersal pathways and current risk assessments
- Develop technical partnerships
- Conduct a risk assessment for species that might invade Pennsylvania
- Develop technical measures and barriers to prevent the introduction and spread of invasive species in Pennsylvania
- Encourage state agencies to serve as role models by adopting sound prevention and control practices
- Create a seamless approach for collaboration among multiple agencies within Pennsylvania

Tasks: These are activities that can be undertaken immediately, and may have to be addressed in order for the management plan process to move forward.

- Identify existing federal and state laws and policies that address invasive species and species of priority in Pennsylvania and deal with gaps in regulation
- Create a resource list of contact names and information – “doers and providers”
- Develop an inventory of invasive species in Pennsylvania
- Develop a “watch” list of species deemed to have a high potential to cause significant harm in Pennsylvania

B. Early Detection and Monitoring

Early detection and monitoring activities serve as a second line of defense in the battle against invasive species. If an invasive species does make it through the prevention barriers, early detection of an infestation is a critical first step to prevent it from becoming fully established.

Early detection and monitoring depend on having informed eyes and ears on the ground, and in having scientific resources to verify and report new sightings. Participants identified the following priorities for early detection and monitoring:

- Develop and implement education and training for agency personnel and volunteers. Work with existing natural resource groups such as hiking organizations, master gardeners and angler groups to build a volunteer program
- Create a baseline database for biodiversity in Pennsylvania
- Prioritize a regional species “watch” list (likely invaders currently not documented in Pennsylvania)
- Develop a risk-assessment tool to help prioritize monitoring efforts, including identifying high hazard areas for targeted surveying
- Augment funding for natural heritage program surveys for native species to include invasive species
- Develop an Invasive Species Tracking Program for Pennsylvania, which would include an online interactive GIS interface
- Create a one-stop Pennsylvania invasive species website for public use
- Coordinate and collaborate with neighboring states on early detection activities
- Create a voluntary invasives-free certification program for realtors or landowners

Task: These are activities that can be undertaken immediately, and may have to be addressed in order for the management plan process to move forward.

- Bring key stakeholders from the public and industry into the development of the invasive species management plan
- Address the need for baseline data for Pennsylvania biodiversity
- Create an early detection species “watch list”

C. Rapid Response

Rapid response efforts kick in when prevention fails, at the time soon after a new infestation is discovered but before it becomes established. This is the time period when resource managers must move quickly from prevention to an eradication or control mode. Participants identified the following priorities for rapid response:

- Set criteria and establish a prioritization process to focus rapid response resources. Create an inventory and risk assessment of “what’s here and what’s coming”
- Develop a rapid response decision making process in advance of an infestation to quickly determine if eradication is possible or if the situation should be treated as a management/control process. This assessment should include considering the potential ecological and economic impacts (unique and high quality habitat, pristine waters), opportunity to eradicate species, geographic and temporal framework, and available control measures
- Identify and involve stakeholders in rapid response planning efforts
- Prioritize education of invasive species impacts – for policy makers, the public, scientists, to “grease the skids” so that rapid response action can take place within the window of opportunity
- Create an emergency fund for rapid response implementation

- Establish an interagency task force with leadership and chain of command process to make prompt decisions when rapid response is needed
- Apply the rapid response plan to specific species to ensure that the plan communicates risk and defines the course of action clearly (examples are the existing emerald ash borer and Asian long horned beetle rapid response plans)
- Simulate scenarios to practice implementation of rapid response plan
- Establish a science panel to identify research needs and the geographic scope of an effective response
- Clarify rapid response actions – outreach, education, research, coordination, policy (authorities to make decisions), implementation (funding)
- Determine what to do with species that may fall into multiple regulatory jurisdictions (for example, tree of heaven, Japanese knotweed, and water chestnut)

Task: These are activities that can be undertaken immediately, and may have to be addressed in order for the management plan process to move forward.

- Conduct legislative analysis to determine who has the authority to act in a rapid response situation; identify associated policy gaps

D. Control and Management

Control and management is the final piece to the suite of tools applied when previous efforts fail, or when the extent of the infestation is so broad that eradication is not possible. Control of invasive species strives for a long-term reduction in the population size to below an acceptable level. Participants identified the following priorities for control and management:

- Create a mechanism to determine what management scale is appropriate
- Decide what lands should receive management and control priority; determine priority areas and management units
- Identify what has already been done for control and management to avoid duplication and identify management needs; clearly delegate management responsibility especially among agencies
- Establish a network of taxonomic experts and technical work groups
- Establish dedicated funding
- Research treatment options and analyze invasion risks
- Build capacity by forging regional partnerships and creating a transparent organizational structure
 - Develop a common volunteer training and help volunteers optimize control and management activities
 - Create landowner technical assistance and incentive programs
 - Create accountability tracking method
 - Standardize methods, record keeping and reporting

E. Wrap Up Session; Recommendations to PISC

For the final session, workshop participants were asked to identify the most critical tasks that must occur for the management plan to be successful; i.e., what task(s) should have the highest priority?

Priorities for the ISMP development process include:

- Identify and involve stakeholder groups
- Establish technical working groups that include public stakeholders (to ensure buy-in for implementation)
- Identify agency authority and clearly identify each organization's responsibilities. Maintain a transparent organizational structure

- Have a dedicated coordinator to lead the plan-writing process
- Learn from other plans that have been done – review and benchmark
- Use specific species as examples within the plan
- Ensure that the final document is user friendly; consider having the final document edited by a professional technical writer
- Include a vector focus, especially in the prevention section
- Develop a methodology for risk assessment to identify priorities
- Identify a target audience for the plan
- Define invasive species and explain the definition
- Identify necessary funding sources to get the plan written
- Include evaluation criteria and benchmarks in the plan

Considerations important for ISMP implementation:

- Do a good job of selling the plan to ensure stakeholder buy-in
- Obtain statewide legislative support, especially with regard to funding
- Secure adequate funding and staff support for implementation
- Identify a coordinated mechanism for implementation
- Determine how the funding that is obtained is allocated
- Spell out implementation actions and delegate responsibility
- Establish clear lines of communication
- Incorporate an evaluation process into implementation actions
- Develop compliance assistance strategies

III. Presentations

Invasive Species: Prevention, Strategic Planning, Local and State Level Partnering, and Leadership Randy Westbrooks, U.S. Geological Survey

Why should we be concerned about the impact of invasive species? Because they cost agriculture \$138 billion each year and are the second greatest threat to biodiversity. Invasive species make their way into and across the United States in a variety of ways – plants and animals can be imported for domestic cultivation, or they can be hitchhikers tagging along with other species. The rule of 10s argues that of 100 species introduced, approximately 10 species will become free-living exotics and only one species will become invasive. There are four major categories of invasive species – aquatic invasive species, injurious wildlife, insects and diseases, and invasive plants.

Traditional strategies for prevention and control of invasive species include production of pest free commodities, preclearance, exclusion at ports of entry, early detection, containment, eradication and control. The U.S. Department of Agriculture and the Department of Homeland Security run the Animal and Plant Health Inspection Service, which is the first line of defense at U.S. borders. However, this regulatory exclusion effort is only about five percent effective. As invasive species continue to impact both the ecology and economy of the United States, it is time to consider some new strategies such as state interagency partnerships, national early detection and rapid response system for invasive plants, and a new biological protection ethic. Many examples exist demonstrating that control of invasive species is most successful when there is the capacity for interagency partnerships. Weeds won't wait, so it is imperative to organize now and begin taking action.

In the 20th century, an environmental protection ethic was developed. It included preventing pollution from chemicals and hazardous waste. Woodsy the Owl got his message of "Give a Hoot, Don't Pollute" out to students across the country. And now, in the 21st century, Westbrooks calls for a biological protection ethic to be developed. This will mean that everyday citizens are actively involved in preventing the introduction and spread of invasive species, and they will be driving regulations and the marketplace. He attested that we need to help change the way people think because the way people think and feel can determine their actions.

Westbrooks made several suggestions for the newly formed Pennsylvania Invasive Species Council, recommending that there should be four subgroups focusing on aquatic invasive species, plants, pathogens, and wildlife. He also suggested developing a rapid response plan and finding an individual with the time to serve as a strong leader and keep the process moving forward productively.

Regional Perspectives on Aquatic Invasive Species State Management Planning Kathe Glassner-Shwayder, Great Lakes Commission

Upon introduction, invasive species, whether aquatic or terrestrial, can become established as reproducing populations. Once established, the population will spread, regardless of jurisdictional boundaries. It is, therefore, critical that we look beyond state borders to a regional level in the search for solutions to invasive species problems.

To promote a regional approach to state invasive species management planning, the Great Lakes Commission is working with the Commonwealth of Pennsylvania as well as other Great Lakes states on a grant titled *A Collaborative Approach to Advance State Management Plans for Prevention and Control of Aquatic Nuisance Species* from the National Oceanic and Atmospheric Administration Sea Grant Program. The project, based on a collaborative relationship between the state natural resource agencies,

Sea Grant and the Great Lakes Commission, is supporting a series of state specific workshops which vary depending on where each state stands in its invasive species management planning process. As part of the project, the Great Lakes Commission will organize a regional summit enabling the states to share priorities, implementation strategies, and funding opportunities on invasive species prevention and control. The regional summit will be designed to facilitate communication between the Great Lakes states and the sharing of ideas and lessons learned from the state specific workshops. States will also have the opportunity to develop collaborative strategies for controlling invasive species at the regional level.

Under Section 1204 of the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA), the states are called upon to develop and implement state management plans for the prevention and control of aquatic nuisance species. The state management plans have been promoted as an effective tool to help identify and address aquatic nuisance species problems involving many jurisdictions, federal and state agencies, private entities and a wide array of vested stakeholders. Reinforced in the planning process is collaboration on a multijurisdictional level to prioritize and resolve aquatic invasive species problems.

Funding for plan implementation, administered through the U.S. Fish and Wildlife Service, depends on approval from the national Aquatic Nuisance Species Task Force, established under NANPCA. In order to be approved by the Task Force, a plan must:

- Identify and describe state and local programs for environmentally sound prevention and control of the target aquatic nuisance species;
- Identify federal activities that may be needed for environmentally sound prevention and control of ANS and a description of the manner in which those activities should be coordinated with state and local government activities;
- Identify any authority that the state does not have at the time of development of the plan deemed necessary for the state to protect public health, property, and the environment from harm by ANS; and
- Set a schedule of implementing the plan, including a schedule of annual objectives and enabling legislation.

Funding requirements include a state match of the federal funding at 25 percent. Federal funding is only available for plan implementation, not for initial plan development. Each Great Lake state with an approved plan has stated that federal funding is not nearly enough for full implementation, therefore states need to also find alternative funding sources for implementation. States like Pennsylvania that are developing management plans that are focusing on both aquatic and terrestrial invasive species can only use Task Force funding to implement aquatic portions of their plan.

The take home message offered to the workshop participants was the importance of cooperation, coordination and collaboration on a local, state, regional and national level to leverage funding for invasive species management plan development with limited federal and state dollars. As development of Pennsylvania's invasive species plan proceeds, the group was encouraged to keep an eye towards the horizon where challenges and solutions to those challenges are shared on a regional scale. Working together with Great Lakes neighboring states will be critical in identifying regional priorities on invasive species prevention and control to enhance funding opportunities for implementation efforts.

Lessons Learned: What Maryland's Snakehead Can Teach Us About Invasive Species Response
Jonathan McKnight, Maryland Dept. of Natural Resources

In 2002, northern snakeheads were found in a pond in Crofton, Md. The northern snakehead (*Channa argus*) is a top level predator fish native to China. Maryland Department of Natural Resources convened a scientific advisory panel to recommend appropriate action. The panel recommended treatment of herbicides to facilitate rotenone application for eradication of all fish life in the pond and in two adjacent ponds with potential water connection. Control is estimated to have cost \$110,000. Maryland Department of Natural Resources faced a number of challenges when dealing with this issue, the main issues being lack of experience with this type of problem, lack of resources, misinformation in the media, and gaining access to the property.

Maryland's efforts in 2002 to eradicate the northern snakehead from this pond were successful. However, additional sightings have since confirmed the existence of northern snakehead in several locations including tributaries to the Potomac River, and so the story continues. As a result of these snakehead incidents, Maryland has changed some of its laws regarding invasive species. It is now illegal to possess certain snakehead species and illegal to transport them into Maryland. Also, a private property owner can now be held liable for knowingly harboring an invasive species threat, but they are not held accountable if they cooperate.

Maryland Department of Natural Resources learned several lessons from their experience in dealing with northern snakehead and other invasive species of concern in the state, including:

- Fast response is critical to success
- Fast response is not enough
- Access to private property may be critical
- We must deal with the pathways to species introduction
- We may not be as effective as we might think in reaching out to the public
- Our greatest successes – species prevented – will be hard to celebrate
- Some species are a lost cause with the existing technology
- There are battles that are worth fighting and that can be won
- We need to have a team assembled before the next event
- Not even PETA loves the snakehead

McKnight also mentioned another issues impacting the effectiveness of invasive species control. One is that the message may not be getting out to the public as well as it is thought to be. Mute swans are an invasive species that consume large amounts of submerged aquatic vegetation, thus damaging the ecosystem. Control methods include preventing eggs from hatching, live capture and removal of adult swans and humane euthanasia of adult swans. However, while the general public has been able to understand the sad but necessary actions to control mute swans, a very vocal minority has refused to accept that this beautiful fairytale creature could be an ecological menace. At the same time, the public has supported eradication of the uncharismatic snakehead. The question to ponder is how to educate and inform the public that whether invasive species are beautiful or ugly, invasive species can cause serious ecological and economic impacts and that in order to reduce those impacts control and eradication measures must be implemented.

Pennsylvania Department of Agriculture Activities

Charlie Conklin and Karl Valley, Pennsylvania Department of Agriculture

The Pennsylvania Department of Agriculture (PDA) has regulatory authority for 13 noxious weeds under the Commonwealth's Noxious Weed Control Law (Marijuana, Canadian thistle, Multiflora rose, Johnson grass, Mile-a-minute, Kudzu-vine, Bull or Spear Thistle, Musk or Nodding Thistle, Shattercane, Jimsonweed, Purple Loosestrife, including all cultivars, Giant Hogweed, and Goatsrue). The Department's current weed initiatives are directed against purple loosestrife and three (3) other noxious weeds of limited distribution in the Commonwealth (Giant hogweed, Kudzu, and Goatsrue). Giant hogweed is a public health concern because it can burn and scar skin. Kudzu is a rapidly-growing vine that, under ideal conditions, will eventually grow over nearby objects, including other vegetation, and is capable of smothering trees by blocking sunlight. Goatsrue is poisonous to wildlife. Purple loosestrife forms dense populations that limit the growth of native wetland plants and reduce habitat and food for waterfowl. A recently detected invasive in Pennsylvania is the plum pox virus which impacts stone fruit trees (*Prunus* species) and is considered the most serious disease of stone fruit trees in the World. Although currently known to occur in three (3) counties in south central Pennsylvania, the virus has had a major impact on stone fruit growers in this region. The only means of halting its spread is to destroy the infected trees along with other *Prunus* species within a 500-meter buffer zone around the infected blocks of trees, causing great economic harm to the fruit growers impacted, which has been somewhat mitigated through grant programs available through PDA and the U. S. Department of Agriculture (USDA). The PDA also conducts surveillance for a number of exotic pests through the Cooperative Agricultural Pest Survey (CAPS), which is administered by USDA. Two such species of concern, which are not yet in Pennsylvania but would greatly impact its ecosystems, are emerald ash borer and Asian longhorned beetle. Surveys for exotic bark beetles, Sudden Oak Death, Soybean Rust, Golden Nematode, etc. are other examples of exotic pest surveys that PDA conducts through CAPS.

The Department of Agriculture currently has no policies for invasive species in the aquaculture industry, which is something they hope to begin addressing. Pathogen introduction via feral swine to livestock populations is a concern for the Department of Agriculture. This swine brucellosis can cause harm to humans as well as livestock populations. The Department of Agriculture is also concerned about making farmers less afraid of discovering invasive species on their property and regulation, therefore allowing farmers to be partners in early detection instead of trying to cover up any invasive species on their land.

Pennsylvania Department of Conservation and Natural Resources Activities

Sally Just, Pennsylvania Department of Conservation and Natural Resources

In 2003, the Department of Conservation and Natural Resources (DCNR) began to develop an invasive species management plan for lands managed by DCNR. The first step was to form an Invasive Species Team comprised of representatives from all bureaus and then conduct an agency-wide survey. The survey results highlighted several gaps, including 1) the need for a geospatial map to track both the spread of invasive species as well as DCNR's success in managing or eradicating those species; 2) the need for common protocols for management and control; and 3) the need for increased awareness at all levels and buy-in of the critical nature of this issue.

The goals for the management plan are to define the issues, guide prevention and control efforts on DCNR lands and through their programs, and raise awareness about invasive species. The plan is divided into sections dealing with prevention; survey and detection; control and restoration; education, training, and outreach; recommendations; and implementation. Within each section, DCNR has developed recommendations to help prioritize actions. Recommendations for the plan as a whole include:

- Characterize and control existing problems
- Prevent new species from establishing
- Pursue opportunities and partnerships
- Incorporate invasive species information & efforts into existing DCNR programs
- Track progress

DCNR will work to accomplish these tasks by setting priorities, creating an annual implementation plan, establishing partnerships, utilizing existing funding sources and developing new ones, and providing training. For the first year, DCNR will work to raise awareness among management and staff by creating an education committee and developing hands-on training opportunities. They will also develop site-specific invasive species plans and work on integrated weed management issues.

A Prototype Invasive Species Tracking System for the State of Delaware

John Young, U.S. Geological Survey

The U.S. Geological Survey, Leetown Science Center and the Delaware Natural Heritage Program partnered to develop an online tool for mapping locations of invasive species within the state of Delaware. The purpose of the system is twofold, first it is meant to be used as a database for members of the Delaware Invasive Species Council to keep track of new invasive species locations found during surveys, and secondly it is meant as an information source for the general public, decision makers, and scientists interested in the status of invasive species in Delaware. The project goals were:

- Develop a prototype tool to track invasive species locations and attributes for state Invasive Species Councils
- Standardize recording in an online database
- Exploit online mapping to assist location and tracking of species locations
- Provide immediate feedback to resource managers on new invasive species sightings
- Provide an information resource and educational tool for managers and the public

The database can be searched in various ways to help make it more useful. All the data in the database is linked to an online mapping system to help track species distribution and spread. The database was designed to be primarily populated by volunteers, but all data is validated by experts after it is entered into the system. This system is only a prototype, and the partners envision being able to do more with the system if funds become available, including translating the system to other states. Possible future extensions to the system include capabilities for predictive habitat modeling and mapping by time period to show spread or contraction of species ranges.

Pennsylvania Fish and Boat Commission Activities

John Arway, Fish and Boat Commission

The Pennsylvania General Assembly has assigned the Pennsylvania Fish and Boat Commission the responsibility for “the encouragement, promotion and development of the fishery interests and the protection, propagation and distribution of fish.”

This law broadly defines fish to include “all game fish, fish bait, bait fish, amphibians, reptiles and aquatic organisms.” In addition, further responsibilities are outlined through regulations and codified policy dealing with species listed as threatened and endangered and aquatic invasive species. Fish and Boat Commission’s Technical and Law Enforcement staff carry out these policies by:

- Tracking distribution of the species
- Conducting on-site inspections
- Coordinating with other regulatory agencies
- Conducting public education and outreach

Arway explained that there has been only one known location of a northern snakehead in Pennsylvania, but their introduction may have resulted from an Asian custom where people will buy one fish to eat and one to release. He also mentioned that many reports of snakeheads are made but turn out to be false because two species of native fish look similar to the snakehead.

Another potential aquatic invasive species problem for Pennsylvania is Asian carp, which is the collective name for silver carp, bighead carp, and black carp. Bighead carp are now in the Ohio River and making their way towards Pennsylvania. Asian carp can grow over 4.5 feet long and are a public safety hazard because they jump when disturbed by boat engines. They are also a problem because they eat from the base of the food chain which can have serious impacts to the ecosystem.

Fish and Boat Commission priorities with regard to invasive species include research, the creation of new regulations, education and training initiatives for employees, pet store inspections, and public education. More specific research needs include information on distribution and population sizes of invasive species and their interaction with native species. Arway would also like to see more sharing of research results among all the state agencies. There are currently several sources of funding available for invasive species research, including the state wildlife grants (typically \$50-\$100K per project), the wild resource conservation fund (typically \$30-\$40K per project), and the Pennsylvania Sea Grant research funds (typically \$5-\$10K per project).

Pennsylvania Department of Environmental Protection Activities

Jim Grazio, Dept. of Environmental Protection

The Department of Environmental Protection oversees Pennsylvania's zebra mussel monitoring program. Zebra mussels, native to Eastern Europe, were introduced to the Great Lakes in the mid 1980s when ocean-going ships released infested ballast water into Lake St. Clair, near Detroit, Mich. Zebra mussels are a problem because they reproduce rapidly, establish large populations, and filter feed so they have the ability to remove much of the base of the food web. They also have strong bisset threads that will attach to any solid surface, therefore giving them the capability to clog water intake pipes and colonize native mussels and kill them. Because of this, many of the native mussel species in the Great Lakes have been removed completely. Another problem is that the zebra mussel selectively excludes blue-green algae when it filters food from the water column, artificially increasing concentrations of this biotoxin.

During the first three years of the zebra mussel monitoring program, about 200 locations were surveyed, in each of the six river basins, major tributaries, state park and inland lakes. Initially, about 60 monitors participated. Most were trained state field biologists or consultants. Of those, about 20 are still actively monitoring today. Attrition of volunteers was probably due to the low frequency of sightings. In the mid 1990s, few zebra mussels or veligers were detected in inland lakes and waterways. Between 2000-2002, however, sightings rapidly increased. Quagga mussels were found at quarries in several counties and zebra mussels were found in several inland lakes and New York's headwaters to the Susquehanna River.

The Department of Environmental Protection also has conducted research on zebra mussel control options. When the first inland lake in Pennsylvania, Edinboro Lake, was infested with zebra mussels in

2000 they tried a rapid response method to eradicate them. The Department of Environmental Protection responded by drawing down the lake water level to kill the zebra mussels, which worked for all the ones that were exposed. However, they could not drain the lake completely so the zebra mussels that were still submerged survived. In addition, this method of eradication is ecologically harmful to the native species and it may not be an option if there is no method of controlling the water level in a lake.

The Department of Environmental Protection is also involved with the West Nile Virus surveillance program. West Nile virus appeared for the first time in Pennsylvania in 2000 in birds, mosquitoes and a horse. To combat the spread of West Nile virus, which is transmitted by mosquitoes, Pennsylvania traps mosquitoes, collects dead birds and monitors horses, people and sentinel chickens.

Synthesis of an Action Plan Against the Emerald Ash Borer: Pennsylvania's Multi-Agency Approach
Jim Stimmel, Dept. of Agriculture

Emerald ash borer (*Grilus Planipennis*) was first identified in North America in Michigan in 2002. Larvae of the beetle feed in the tissues under the bark of ash trees causing the girdling and death of entire trees. Emerald ash borer is largely transported by wood pallets, nursery stock, and firewood. Since its discovery in Michigan, the beetle has been detected in Ohio, Maryland, Virginia, Indiana and Canada. In Michigan alone, over 7 million ash trees have been lost to this pest. Signs of emerald ash borer include upper crown dieback, woodpecker damage, and "D"-shaped emergence holes.

Two percent of Pennsylvania's deciduous trees are ash. In order to minimize the potential impact of emerald ash borer in Pennsylvania, a multi-agency task force was assembled to develop an action plan. Participants included the Department of Conservation and Natural Resources Bureau of Forestry, Department of Agriculture, U.S. Department of Agriculture Animal and Plant Health Inspection Service, U.S. Forest Service, and Penn State Cooperative Extension. The action plan is a document outlining procedures and assigning the responsibilities of the participating agencies. It is "planning ahead" to allow for an immediate response. In order to create an effective action plan, it must contain an organizational chart and comprehensive background and historical information. The action plan must be independent, complete and self-explanatory, and it must be dynamic and fluid in order to accommodate changing situations. Finally, the action plan must be approved by the head of each agency to ensure financial and personnel commitment and obtain legal clearance. The emerald ash borer action plan final draft is now being reviewed by the action team and will then go to the head of each agency for approval.

Pennsylvania Department of Transportation Activities
Joe Demko, Dept. of Transportation

The Department of Transportation is concerned about invasive species not only due to their ecological impacts, but also because they can obstruct views and become a transportation hazard. Invasive plants in roadside ditches like purple loosestrife and along the edge of roadways like Japanese knotweed impede water movement from the road surface and subbase. The increase in standing water accelerates pavement damage and requires more frequent repavement.

The Department of Transportation is represented on both the Invasive and Noxious Plant Committee and the Interagency Invasive Species Work Group to address invasive species issues in Pennsylvania. In addition, Penn State's Roadside Research Project is investigating various combinations of treatments to control invasive species. The aim is to preserve as much desirable vegetation as possible while minimizing undesirable vegetation and maintaining a desirable aesthetic, within the confines of finite resources. Examples of some of the ongoing research and demonstrations include management of specific

weed species, such as tree-of-heaven, Japanese knotweed, and Canada thistle; evaluation of alternative plant materials for roadside conservation plantings, such as native warm-season grasses and forbs; and evaluations of corridor management approaches, equipment, and herbicides.

The Department of Transportation recently partnered with the U.S. Forest Service, U.S. Fish and Wildlife Service, and U.S. Department of Transportation to develop the video *Dangerous Travelers: Controlling Invasive Plants Along American's Roadways*. This video will help road maintenance crews recognize and control noxious weeds along roadsides, a critical piece to preventing the spread of invasive plants.

Finding the Common Denominator in Complex Factions

John Peter Thompson, Behnke Nurseries, Mid-Atlantic Exotic Plant Pest Council

Gardening is, for the most part, built on the premise of creating space that is beautiful, manageable, and safe from the chaos of the world. Gardeners are also driven to find the newest discovery. Landscape plants are introduced for privacy, erosion control, and to add value to property. However, some of the same characteristics that make plants popular for these uses – fast growing, hardy, lacking local pests, easily reproducible – can be a problem if the plant becomes an invasive species.

Thompson has realized over time that environmental organizations are not trying to put the nursery industry out of business. Environmental organizations would much rather partner with the industry to cooperatively manage a problem. He also mentioned, however, that most people in the nursery industry view the government as a threat because they do not understand the long term impacts of invasive plants, only their short term loss in profits.

But much of the issue comes back to the consumer. People in general do not understand what is natural and do not care about what they plant, as long as it meets their criteria of pretty, easy to grow, and low maintenance. Many members of the public also see monocultures as pretty and not ecologically destructive. Because invasive plants, such as multiflora rose and purple loosestrife, are considered to be attractive, people want to plant them even though they can cause great harm. The industry is under constant pressure to develop new plants to match the popular colors of the season. Consumer requirements of predictability and less work often lead to people picking invasive plants such as English ivy that they know will grow well and require little or no maintenance.

Thompson sees the education of the nursery industry and the public as the way to step towards a more sustainable plant nursery industry. People have to learn about ecology, the impacts of various plants, and what is truly natural so they understand the issue; the public does not like to be told what to plant or not to plant. The nursery industry, he explained, is in a tough situation stuck between being good environmental stewards and giving the public what they want. Thompson maintained that buy-in from the public is infinitely important and that they should have some say in the planning process from the beginning, possibly in the form of a citizen's advisory committee. Other interests that should be included are the various recreational industries, garden clubs, golf clubs, developers, and landscape architects.

Thompson asserted that a proactive approach has to be taken for the Pennsylvania invasive species management plan. He said that by looking for the next major invaders that are coming to Pennsylvania, in the case of invasive plants, banning their sale before they have begun to be sold or have established uncontrollable populations is an intelligent way to approach the problem, because if a plant is already established and its sale is banned, that plant will still be a problem. He also stated that early detection and rapid response are as or more important than management and control because once a species has become established it is very difficult to contain it, let alone eradicate it.

Appendices

Appendix I

SETTING THE ROAD MAP: A WORKSHOP FOR DEVELOPING PENNSYLVANIA'S INVASIVE SPECIES MANAGEMENT PLAN Workshop Agenda

Meeting Objectives:

- To develop overarching goal(s) to strive for to prevent the introduction and spread of invasive species in Pennsylvania.
- To brainstorm more specific short term and long term objectives that will help achieve the overarching goal.
- To identify and prioritize the strategies and tasks that will be necessary to meet the various objectives.

One Sentence Summary: *What should be happening in Pennsylvania with regard to invasive species, and how do we create a road map to get there?*

Wednesday, October 26, 2005

10:00 a.m. Welcome, Introductions, Goals and Objectives, *Sarah Whitney, Pennsylvania Sea Grant*

10:15 a.m. Invasive Species: Prevention, Strategic Planning, Local and State Level Partnering, and Leadership, *Randy Westbrook, U.S. Geological Survey*

11 a.m. Regional Perspectives on Aquatic Invasive Species State Management Planning, *Kathe Glassner-Shwayder, Great Lakes Commission*

11:45 a.m. Lessons Learned: What Maryland's Snakehead Can Teach Us About Invasive Species Response, *Jonathan McKnight, Maryland Dept. of Natural Resources*

12:30 p.m. Lunch

1:30 p.m. Pennsylvania Agency Activities:

- Current Invasive Species Activity Within The Pennsylvania Department of Agriculture, *Charlie Conklin and Karl Valley, Dept. of Agriculture*
- DCNR's Invasive Species Management Plan, *Sally Just, Dept. of Conservation and Natural Resources*

2:15 p.m. Break out session I

3 p.m. Break

3:15 p.m. A Prototype Invasive Species Tracking System for the State of Delaware, *John Young, U.S. Geological Survey*

3:45 p.m. Break out session II

4:30 p.m. Pennsylvania Agencies Activities

- PA Aquatic Invasive Species, *John Arway, Fish and Boat Commission*
- Department of Environmental Protection, *Jim Grazio, Dept. of Environmental Protection*

Thursday, October 27, 2005

- 9 a.m. Welcome, goals for the day
- 9:15 a.m. Synthesis of an Action Plan Against the Emerald Ash Borer: Pennsylvania's Multi-Agency Approach, *Jim Stimmel, Dept. of Agriculture*
- 9:45 a.m. Pennsylvania Agency Activities
 - Species Invasive to Transportation, *Joe Demko, Dept. of Transportation*
- 10 a.m. Finding the Common Denominator in Complex Factions,
John Peter Thompson, Behnke Nurseries, Mid-Atlantic Exotic Plant Pest Council
- 10:30 a.m. Break
- 10:45 a.m. Break out session III
- 11:30 a.m. Where Do We Go From Here? *Don Eggen, Dept. of Conservation and Natural Resources*
- 12:30 Workshop finish

Appendix II

SETTING THE ROAD MAP: A WORKSHOP FOR DEVELOPING PENNSYLVANIA'S INVASIVE SPECIES MANAGEMENT PLAN

Speaker Biographies

John Arway is Chief of the PA Fish & Boat Commission's Environmental Services Division which is responsible for the environmental risk and damage assessment and natural diversity programs. John is the Commission's alternate on the Governor's Invasive Species Council and Pesticide Advisory Board. John and his staff deal with a wide range of environmental issues ranging from water pollution, instream flows and watershed disturbances to fish tissue contamination to the protection of rare animals under the Commission's jurisdiction.

Charles A. Conklin II is the Pennsylvania Aquaculture Coordinator, for the PA Department of Agriculture. He is also president of Big Brown Fish Hatchery Inc. in Effort, PA, a company he started at the age of 11. A 1984 graduate of East Stroudsburg University with a degree in Biology from the Environmental Studies Program, Mr. Conklin has served as president of the United States Trout Farmers Association, and the Pennsylvania Aquaculture Association. He has also served as Chairman of the Board of the Northeast Regional Aquaculture Center in Dartmouth, MA and Chairman of the Board of PennAg Industries Aquaculture Council.

Joe Demko has nineteen years in roadside vegetation management - eleven years as a district roadside specialist and eight years as a roadside manager. Mr. Demko represents the Department of Transportation on the Governor's Invasive Species Council, Department of Agriculture's Pesticide Advisory Board, Pennsylvania Urban and Community Forestry Council and the Mid-Atlantic Exotic Pest Plant Council; he is currently the chairperson of the Transportation Research Board's Roadside Maintenance and Operation Committee. Mr. Demko has a Bachelor of Science in Forest Science, Penn State; one year of graduate work at Penn State, and a Master of Business Administration from Duquesne University.

Kathe Glassner-Shwayder has worked as an environmental policy analyst for the Great Lakes Commission since 1992. Her primary responsibility involves management of the AIS issue area for the Commission; she has also provided staff support for more than a decade to the Great Lakes Panel on Aquatic Nuisance Species, a multijurisdictional entity established under federal legislation to advance ANS prevention and control in the Great Lakes-St. Lawrence region. Ms. Glassner-Shwayder holds a master's degree in water resources management from the University of Wisconsin, Gaylord Nelson Institute for Environmental Studies specializing in limnology and related water quality issues. She holds a bachelor's degree in biology from Oberlin College.

Jim Grazio is the Great Lakes Biologist for the Department of Environmental Protection. In addition to providing general scientific support to the Department's Office of the Great Lakes on a variety of topics, he works actively as an aquatic biologist on the Great Lakes-St. Lawrence Seaway System--one of the most important and active invasion corridors for non-indigenous aquatic invasive species. Jim has discovered the occurrence of a new aquatic invasive fish species in Pennsylvania and has conducted research involving the control of zebra mussels in inland lakes. He presented a paper entitled "Winter Lake Drawdown as a Strategy for Zebra Mussel (*Dreissena polymorpha*) Control: Results of Pilot Studies in Minnesota and Pennsylvania" at the 11th International Conference on Aquatic Invasive Species. Mr. Grazio represents the Commonwealth on the Great Lakes Panel on Aquatic Nuisance Species and co-represents the Commonwealth on the newly-formed Mid Atlantic Regional Panel on Aquatic Nuisance Species.

Sally Just has been working in the conservation field for nearly 20 years. She has a degree in geography from Wittenberg University and spent a year in Switzerland where she conducted research on water quality and policy concerns related to practices along the Rhine River. She has worked in various capacities within state government always with the focus of promoting conservation of our natural resources. Under the Ridge Administration she served as the senior advisor to Secretary of DCNR, John Oliver. In the Rendell administration, Mike DiBerardinis created an Office of Conservation Science to integrate science into agency policy decisions, to manage the Wild Resource Conservation Program and the PA Natural Heritage Program and appointed Ms. Just to direct that office within his secretary's office. Within this role, she has among other accomplishments, convened a cross agency team to develop an invasive species management plan to address this major threat to biodiversity on DCNR managed lands.

Jonathan McKnight serves as Associate Director for Habitat Conservation with the Maryland Department of Natural Resources. Originally an Endangered Species Biologist, Mr. McKnight was designated Maryland DNR's lead for invasive species in 2001. He has served in various roles in Maryland DNR and as Director of the Maryland Field Office of The Conservation Fund, a national land trust. Mr. McKnight holds a BS in Biology from Washington College and a Certificate in Ecosystem Science from the University of Maryland.

Jim Stimmel was born and raised on a farm in Juniata Co., PA, where he developed a love and respect for the outdoors. A graduate of the University of Pittsburgh, his entire career of over 33 years has been spent as a survey entomologist with the Pennsylvania Department of Agriculture. Over the past 10+ years, the survey position has dealt nearly exclusively with exotic invasive invertebrates either found within or threatening Pennsylvania's borders. In response to the significant threat of the introduction of the emerald ash borer (EAB), he organized the 'Pennsylvania EAB Action Team,' which he will discuss in his presentation.

John Peter Thompson is President of the Behnke Nurseries Company. The company has two garden centers in Beltsville and Potomac, Maryland, as well as a new greenhouse and nursery production facility in Lothian, Maryland. Mr. Thompson is an expert on the issues surrounding invasive plants and the aspects of invasive species that affect the green industry. He is president of the Maryland Nursery and Landscape Association. He represents M.N.L.A. as a nursery representative to the Maryland Invasive Species Council. He also represents M.N.L.A. as a member of the Mid-Atlantic Exotic Pest Plant Council, of which he is immediate past president. He was recently appointed to the Invasive Species Advisory Committee, which advises the National Invasive Species Council. He is also the nursery industry representative to the Chesapeake Conservation Landscape Council, which advocates landscaping that is beneficial to the Chesapeake Bay. He hosts a weekly radio talk show in Washington, DC, called Garden Gurus. Invasive issues are frequent topics of discussion.

Randy Westbrook was born and raised in upstate South Carolina. He received his B.S. and M.S. degrees in biology from the University of South Carolina, and his Ph.D. in Botany and Weed Science from N.C. State University. In 1978, Dr. Westbrook began his career as a Public School Science Teacher in Manning, South Carolina. In 1979, he began his federal career as a Plant Quarantine Officer with USDA APHIS at the Port of Charleston, South Carolina. In 1986, he accepted a position as a Regulatory Weed Specialist with APHIS in Whiteville, NC, and served as the APHIS National Weed Coordinator from 1996-1999. In 2000, Dr. Westbrook was selected as the USGS National Invasive Plant Coordinator. He is currently an Invasive Plant Specialist with the USGS National Wetlands Research Center, and is still based in Whiteville, North Carolina. Dr. Westbrook is the author of numerous publications, including the FICMNEW Weed Fact Book, and is now leading a national effort to develop and field test the FICMNEW National Early Detection and Rapid Response System for Invasive Plants. In developing the National EDRR System for Invasive Plants, Dr. Westbrook has become an

outspoken advocate for the development of a coordinated framework of interagency partner groups at the local, state, regional, and national levels to more effectively address invasive species. Over the past decade, Dr. Westbrook has become a familiar figure in the Mid-Atlantic Region, having helped to establish the Delaware Invasive Species Council, the Pennsylvania Noxious Weed Task Force, and the West Virginia Invasive Species Working Group.

Sarah Whitney serves as a coastal outreach specialist for Pennsylvania Sea Grant where she works on Delaware Estuary water quality issues such as aquatic invasive species and recreational boating pollution prevention. Ms. Whitney has a B.S. in Biology from Bates College and a master's degree in forestry from the Yale School of Forestry and Environmental Studies. She previously was employed by the Great Lakes Commission, working on watershed management issues and providing support to the Great Lakes Panel on Aquatic Nuisance Species. Prior to that Ms. Whitney was communications director for the New Hampshire Timberland Owners Association.

John Young is a Research Biologist with the US Geological Survey's Leetown Science Center in Leetown, West Virginia. His research focuses on predicting the distribution of species and their habitats through application of GIS, remote sensing, and spatial modeling. He also has particular interest in developing tools that can be used by managers to track the spread of invasive species and to assess impacts to rare and threatened species.

Appendix III

SETTING THE ROAD MAP: A WORKSHOP FOR DEVELOPING PENNSYLVANIA'S INVASIVE SPECIES MANAGEMENT PLAN

Participants List

John Arway
PA Fish and Boat
Commission
450 Robinson Lane
Bellefonte PA, 16823
814-359-5140
jarway@state.pa.us

Douglas Austen
Pennsylvania Fish and Boat
Commission
PO Box 67000
Harrisburg PA, 17106-7000
717-705-7801
dausten@state.pa.us

Todd Bauman
Hawk Mt. Sanctuary
1700 Hawk Mt. Road
Kempton PA, 19529
610-756-6961
bauman@hawkmountain.org

Steven Bernardi
PA Game Commission
PO Box 57
Penns Creek PA, 17862
570-837-1613
sbernardi@state.pa.us

John Booser
Pennsylvania DEP, Water
Planning Office
400 Market Street
15th Floor
Harrisburg PA, 17105-2063
717-772-1101
jbooser@state.pa.us

Angie Bridge
Natural Biodiversity
Conservation Strategy
430 Main St.
First Floor
Johnstown PA, 15901
814-532-5049
abridge@naturalbiodiversity.org

Lisa Butch
Great Lakes Commission
2805 S. Industrial Hwy.
Suite 100
Ann Arbor MI, 48104
734-971-9135
lbutch@glc.org

Heather Chepko-Albertson
Penns Valley Conservation
Association
PO Box 165
Aaronsburg PA, 16875
hvalbert@verizon.net

Charlie Conklin
Pennsylvania Dept. of
Agriculture
PO Box 584
Effort PA, 18330
570-460-0804
charlieconklin@verizon.net

Don Dagnan
U.S. Forest Service
11 Campus Blvd.
Newtown Square PA, 19803
610-557-4213
dcdagnan@fs.fed.us

Joseph Demko
PENNDOT
PO Box 2857
Harrisburg PA, 17105-2857
717-783-9453
jodemko@state.pa.us

Don Eggen
Pennsylvania DCNR, Forest
Health
208 Airport Dr., 2nd Floor
Middletown PA, 17057-5027
717-948-3941
deggen@state.pa.us

Jack Farster
Pennsylvania DEP
400 Market Street
PO Box 2063
Harrisburg PA, 17105-2063
717-705-4093
jfarster@state.pa.us

Ann Faulds
Pennsylvania Sea Grant
1450 Edgmont Ave.
Suite 150
Chester PA, 19013
215-806-0894
afaulds@psu.edu

Chris Firestone
Pennsylvania DCNR, Bureau
of Forestry
One Nessmuk Lake
Wellsboro PA, 16901
570-724-8149
cfirestone@state.pa.us

Chad Forcey
Pennsylvania Landscape and
Nursery Association
1707 South Cameron Street
Harrisburg PA, 17104-3100
717-238-1673
cforcey@plna.com

Ann Glaser
Penns Valley Conservation
Association
129 Young Lane
Centre Hall PA, 16828
814-364-2339
bruceann@chilitech.com

Kathe Glassner-Shwayder
Great Lakes Commission
2805 S. Industrial Hwy.
Suite 100
Ann Arbor MI, 48104
734-971-9135
shwayder@glc.org

Art Gover
Penn State University
LMRC-Orchard Road
University Park PA, 16802
814-863-1184
aeg2@psu.edu

Jim Grazio
Pennsylvania DEP
301 Peninsula Drive
Erie PA, 16505
814-217-9636
jagrazio@state.pa.us

Desiree Henning Dudley
Pennsylvania DEP, Southeast
Regional Office
2 East Main St.
Norristown PA, 19401
484-250-5826
dhenningdu@state.pa.us

Hagan Hetz
Fairview Evergreen Nurseries,
Inc.
7263 West Ridge Road
Fairview PA, 16415
814-474-5772
hagan@velocity.net

George Hildenbrandt
145 Spring Street
State College PA, 16801
814-571-6839
grh3@psu.edu

Kristen Hironimus
Natural Biodiversity
Conservation Strategy
430 Main St.
First Floor
Johnstown PA, 15901
814-532-5049
khironimus@naturalbiodiversi
ty.org

Jennifer Hoffman
Susquehanna River Basin
Commission
1721 North Front Street
Harrisburg PA, 17102
717-238-0426 ext. 111
jhoffman@srbc.net

Gregory Hoover
Penn State University, Dept.
of Entomology
543 ASI Building
University Park PA, 16802
814-865-3256
gah10@psu.edu

Larry Hurley
Behnke Nurseries
11300 Baltimore Ave.
Beltsville MD,
301-937-1100
lhurley@behnkes.net

Jon Johnson
Penn State University
102 Tyson Bldg.
University Park PA, 16802
814-863-1184
jmj5@psu.edu

Karen Johnston
Skelly and Loy, Inc.
2601 North Front St.
Liverpool PA, 17110
717-232-0593
kjohnston@skellyloy.com

Sally Just
Pennsylvania DCNR, Office
of Conservation Science
PO Box 8764
Harrisburg PA, 17105
717-787-9755
sjust@state.pa.us

Jennifer Kagel
US Fish and Wildlife Service
315 S. Silen Street, #322
State College PA, 16801
814-234-4090
jennifer_kagel@fws.gov

Ke Chung Kim
Penn State University, Center
for Biodiversity Research,
Institutes of the Environment
501 ASI
University Park PA, 16802
814-863-3863
kck@psu.edu

Paul Lyskava
Pennsylvania Forest Products
Association
545 West Chocolate Ave.
Hershey PA, 17033
717-312-1244
plyskava@hlma.org

Jonathan MacDonogh-Dumler
Great Lakes Commission
2805 S. Industrial Hwy.
Suite 100
Ann Arbor MI, 48104
734-971-9135
jonmacd@glc.org

Jonathan McKnight
Maryland Dept. of Natural
Resources
580 Taylor Avenue
Annapolis MD, 21401
410-260-8539
jmcknight@dnr.state.md.us

Wayne Millington
National Park Service
209A Ferguson Building,
University Park PA, 16802
814-863-8352
wayne_millington@nps.gov

Fred Mohr
Seedway LLC
5901 Vera Cruz Road
Emmaus PA, 18049
610-967-4131
fmohr@seedway.com

Robert Morgan
PA Fish and Boat
Commission
450 Robinson Lane
Bellefonte PA, 16823
814-359-5129
robmorgan@state.pa.us

Jamie Myers
National Park Service, Upper
Delaware Scenic and
Recreational River
274 River Road
Beach Lake PA, 18405
570-729-7842
jamie_myers@nps.gov

Brad Myers
PA Game Commission
2001 Elmerton Ave.
Harrisburg PA, 17110
717--787-9612
bramyers@state.pa.us

Eric Obert
Pennsylvania Sea Grant
301 Peninsula Drive
Suite 3
Erie PA, 16505
814-898-6453
eco1@psu.edu

Mandy Painter
Natural Biodiversity
Conservation Strategy: Juniata
Watershed
416 Penn Street
Huntingdon PA, 16652
814-506-1194
apainter@naturalbiodiversity.
org

Stephanie Perles
Pennsylvania Natural Heritage
Program, The Nature
Conservancy
208 Airport Road
Middletown PA, 17055
717-948-3846
sperles@tnc.org

Jessica Peterson Smith
Clearwater Conservancy
132 1/2 East Prospect Ave.
State College PA, 16801
814-237-8915
jpsmith24@gmail.com

Pat Pingle
Pennsylvania DCNR
PO Box 8764
Harrisburg PA, 17105-8764
717-214-4615
ppingel@state.pa.us

Ron Ramsey
The Nature Conservancy
500 N. Third Street
Harrisburg PA, 17101
717-232-6001 ext. 106
rramsey@tnc.org

Carl Richardson
PA Fish and Boat
Commission
PO Bx 67000
Harrisburg PA, 17106-7000
717-705-7848
crichardso@state.pa.us

Gregg Robertson
Pennsylvania Landscape and
Nursery Association
1707 South Cameron Street
Harrisburg PA, 17104-3100
717-238-1673
grobertson@plna.com

Kristen Saacke Blunk
Penns Valley Conservation
Association
c/o PVASD
4545 Penns Valley Road
Spring Mills PA, 16875
814-422-8696
ksaackeblunk@pennsvalley.org

Adam Smith
US Fish and Wildlife Service
315 South Allen Street
State College PA, 16801
814-880-1832
adam_smith@fws.gov

Jessica Sprajcar
Pennsylvania DCNR, Office
of Conservation Science
PO Box 8764
Harrisburg PA, 17108-8764
717-214-7511
jsprajcar@state.pa.us

Mary Beth Steisslinger
Pittsburgh Parks Conservancy
2000 Technology Drive
Pittsburgh PA, 15219
412-682-7275
mbsteisslinger@pittsburghparks.org

Jim Stimmel
Pennsylvania Dept. of
Agriculture
2301 N. Cameron Street
Harrisburg PA, 17110
717-772-5228
jstimmel@state.pa.us

Sue Thompson
Pennsylvania Biodiversity
Partnership
16 Terminal Way
Pittsburgh PA, 15219
412-481-4100
thompson@pabiodiversity.org

Jeffrey Thompson
Pennsylvania Landscape and
Nursery Association
1039 Cathy Drive
Leesport PA, 19533
610-926-1554
jeff@eatonfarms.com

John Peter Thompson
Behnke Nurseries
11300 Baltimore Ave.
Beltsville MD,
301-937-1100
jpeter@behnkes.net

Christopher Tracey
Western Pennsylvania
Conservancy
209 4th Avenue
Pittsburgh PA, 15222
415-586-2326
ctracey@paconserve.org

Melinda Turner
PA Game Commission
RD 1 Box 7C
Huntingdon PA, 16669
814-627-1626 ext. 113
melinda.farr@pa.usda.gov

Karl Valley
Pennsylvania Dept. of
Agriculture
2301 N. Cameron St.
Harrisburg PA, 17110
717-772-5226
kvalley@state.pa.us

Bill Wells
Pennsylvania Landscape and
Nursery Association
190 Woodcrest Road
West Grove PA, 19390
610-869-3883
wdwells@wdwells.com

Melanie Wertz
Pennsylvania DEP
Rachel Carson State Office
Building
P.O. Box 8555
Harrisburg PA, 17105-8555
717-772-5647
mwertz@state.pa.us

Randy Westbrooks
U.S. Geological Survey
233 Border Belt Drive
Whiteville NC, 28472
910-648-6762
rwestbrooks@usgs.gov

Kellie Westervelt
Partnership for the Delaware
Estuary
110 South Poplar Street
Suite 202
Wilmington DE, 19801
302-655-4990, ext. 111
kwestervelt@delawareestuary.
org

Sarah Whitney
Pennsylvania Sea Grant
1450 Edgmont Ave.
Suite 150
Chester PA, 19013
610-304-8753
swhitney@psu.edu

Karen Williamson
Heritage Conservancy
85 Old Dublin Pike
Doylestown PA, 18901
215-245-7020 ext. 115
kwilliamson@heritageconserv
ancy.org

John Young
U.S. Geological Survey
11649 Leetown Road
Kearneysville WV, 25460
304-724-4469
jyoung@usgs.gov

Ephraim Zimmerman
Western Pennsylvania
Conservancy
209 Fourth Ave
Pittsburgh PA, 15222
412-586-2334
ezimmerman@paconserve.org