

INVADERS

in the commonwealth

Pennsylvania Invasive Species Management Plan

Developed by the Pennsylvania Invasive Species Council, May 2009

This comprehensive invasive species management plan for Pennsylvania was prepared for submission to Governor Edward G. Rendell on behalf of the Pennsylvania Invasive Species Council.

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Table of Contents

Executive Summary	3
Introduction	5
What is a Nonnative Invasive Species?	6
Why the Current Concern?	7
How Do Invasive Species Get Here?	7
Examples of Invaders in Pennsylvania	9
Aquatic Invasive Species (AIS)	9
Terrestrial Invasive Species (TIS)	10
The Need for an Invasive Species Management Plan	12
Traditional Roles of Government	12
Non-Traditional Roles: Addressing the Issue of Invasive Species	12
The Framework for Response	13
Preliminary Risk Assessments	13
Prevention	14
Early Detection and Rapid Response	15
Control	16
Restoration	17
Survey and Monitoring	17
Data Management	18
Research	19
Key Personnel	19
Education and Outreach	20
Communication and Coordination	21
Funding	22
Recommendations	23
Recommended Actions	24
Moving Forward	26
Appendix 1 – Glossary	27
Appendix 2 – References	29
Appendix 3 – Council Members	30
Appendix 4 – Regulatory Authorities	32
Appendix 5 – Plan Development	36

Executive Summary

Invaders in the Commonwealth

Pennsylvania, the Keystone State, is well-known for its beautiful scenery. From the piedmont and coastal plains in the southeast corner of the state, to the peaks of the Allegheny Mountains running diagonally through the middle, to the lowland shores of Lake Erie, Pennsylvania’s diverse geography is home to thousands of different plant, animal, and invertebrate species. Unfortunately, not all of these organisms are beneficial. Pennsylvania’s natural resources and economy are threatened from unwanted invaders in the commonwealth – nonnative invasive species.

From kudzu to zebra mussels, emerald ash borer to feral swine, nonnative invasive species are constantly making their way into Pennsylvania. Often, they are unintentionally introduced through the every day activities of citizens – hiding in firewood, attached to boats and other gear, concealed in merchandise. Sometimes they are deliberately introduced. Sometimes they make it here under their own power. However they arrive, once established they have the potential to change Pennsylvania forever.

Nonnative invasive species are a threat to Pennsylvania’s economy and environment. Commonwealth citizens pay millions of dollars to prevent, eradicate, and control invasive species each year. These invaders threaten our native wildlife and plants by outcompeting them for resources and habitat. Some invasive species even impact human health directly by vectoring diseases such as the West Nile Virus. The value of Pennsylvania’s natural and economic resources and the need to protect the health of commonwealth citizens demand a comprehensive response to the threat posed by invasive species.



The Commonwealth’s Response

The purpose of the Pennsylvania Invasive Species Management Plan is to provide a framework to guide efforts to minimize the harmful ecological, economic and human health impacts of nonnative invasive species through the prevention and management of their introduction, expansion and dispersal into, within and from Pennsylvania. This document outlines goals and actions identified by the Pennsylvania Invasive Species Council as critical to protecting commonwealth resources. It will not be possible to prevent every nonnative invasive species from entering the state, or to eradicate all of those already present, but this plan will aid Pennsylvania in decreasing the myriad of deleterious effects posed by invasive species.

Goals for the Commonwealth

Preliminary Risk Assessments: Utilize preliminary risk assessments to prioritize nonnative invasive species management and expedite response at the first indication of a new or likely introduction.

Prevention: Identify, evaluate, and address pathways used by nonnative invasive species in order to minimize their introduction and spread into and throughout the commonwealth.

Early Detection and Rapid Response: Detect new introductions of nonnative invasive species quickly and control or contain target species before they can become permanently established in the commonwealth or move into areas in which they previously did not exist.

Control: Prioritize nonnative invasive species on which to focus control and anti-dispersal efforts, and, when feasible, control established nonnative invasive species that have significant impacts in Pennsylvania.

Restoration: Integrate restoration efforts whenever feasible into control and management activities as well as other activities which may disturb ecosystems and facilitate colonization by nonnative invasive species.

Survey and Monitoring: Expand survey and monitoring efforts of nonnative invasive species in Pennsylvania.

Data Management: Develop a statewide nonnative invasive species database clearinghouse or information sharing system linking data from various state, federal, and non-governmental entities.

Research: Support research efforts on nonnative invasive species issues and impacts in Pennsylvania and work with partners to facilitate the dissemination of data and information generated from these efforts.

Key Personnel: Identify key personnel needed to coordinate nonnative invasive species issues among local, state, and federal agencies and organizations.

Education and Outreach: Educate the general public and key target audiences about nonnative invasive species issues so that they do not facilitate the introduction and spread of these organisms through their activities.

Communication and Coordination: Facilitate communication and coordination across jurisdictional boundaries to ensure that state policy effectively promotes the prevention, early detection, and control of nonnative invasive species in Pennsylvania.

Funding: Work with the Governor's office, legislature, partners, industry, and federal entities to identify permanent funding sources for nonnative invasive species programs in the commonwealth.

Introduction

The concept of a state invasive species management plan for Pennsylvania grew out of several initiatives, including the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990,¹ which called for states to develop aquatic invasive species management plans and President Clinton's 1999 Federal Executive Order 13112² which established the National Invasive Species Council. The National Council is directed to provide national leadership and oversight on invasive species, to see that Federal agency activities are coordinated and effective, to work in partnership with states, and to provide for public input and participation. Following the lead of the National Council, Governor Edward Rendell issued Executive Order 2004-1,³ creating the Pennsylvania Invasive Species Council in recognition that the commonwealth would benefit from the advice and counsel of an official body of natural resource managers, policy makers, and researchers engaged in abating the introduction and spread of nonnative invasive species. The Governor's executive order charges the council with the following:

- Advising the Governor on and directing the development and implementation of a state nonnative invasive species management plan.
- Providing guidance on prevention, control, and rapid response initiatives.

The Order also charges the council with the following responsibilities:

- Develop and implement a comprehensive nonnative invasive species management plan for the Commonwealth of Pennsylvania and revise the plan at regular five year intervals or as needed.
- Provide guidance on prevention and control of nonnative invasive species and rapid response to new infestations.
- Facilitate coordination among federal, regional, state, and local initiatives and organizations engaged in the management of nonnative invasive species.

In response to the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, the council first developed an Aquatic Invasive Species Management Plan. This plan was approved by the Federal Aquatic Nuisance Species Task Force in February of 2007. The Pennsylvania Aquatic Invasive Species Management Plan exists as a stand alone guide to aid in minimizing the harmful ecological, economic and human health impacts of aquatic invasive species through the prevention and management of their introduction, expansion and dispersal into, within and from Pennsylvania. It is intended to be a companion document to this comprehensive invasive species management plan.

Management plans that are not dynamic quickly lose their usefulness due to the inherently changeable nature of invasive species issues. This plan reflects the ongoing efforts of the council to develop a framework that identifies strategies and actions to minimize the impacts of nonnative invasive species and to facilitate addressing these threats in a logical, coordinated fashion. This plan will continue to evolve as new objectives, strategies, and recommendations are identified and as new information becomes available.

¹ 1990. Nonindigenous Aquatic Nuisance Prevention and Control Act. Public Laws No. 101-646

² 1999. Office of the President of the United States. "Presidential Executive Order 13112"

³ 2004. Office of the Governor of the Commonwealth of Pennsylvania. "Governor's Executive Order 2004-1"

What is a Nonnative Invasive Species?

A nonnative or exotic species is defined in this document as a species that is not indigenous to the ecosystem under consideration. These species can be any type of organism: plant, fish, invertebrate, mammal, bird, disease or pathogen. An invasive species, as defined by the Federal Executive Order 13112, is a nonnative species “whose introduction does or is likely to cause economic or environmental harm or harm to human health”. The term “invasive” is a biological attribute, meaning that the species under consideration can establish itself outside of its native range and effectively compete with native species, severely disrupting the stability of the affected ecosystem (Mack et al. 2000). The word “invasive” is not a legal term, unlike the words injurious, nuisance, noxious, or harmful which are regulatory terms and are defined by laws, acts, statutes or regulations.

GLOBAL CLIMATE CHANGE

Climate change is affecting the habitats and distributions of plants and animals worldwide, including those of nonnative invasive species. As the environment changes, species are able to occupy areas that used to be inhospitable. This means that species previously unable to establish populations in Pennsylvania will become able to do so, while species in Pennsylvania may find their ranges shifted. Science is only beginning to understand the long term implications of these changes, yet those engaged in managing invasive species need to be prepared.



Starting in the late 16th century, the Spanish, British, French, Swedes, and Dutch began to colonize North America bringing with them many nonnative plant species such as wheat, rice and other food crops as well as cattle, poultry, and other livestock. These exotic species are now considered an integral part of our way of life and make up most of the United States agricultural system. Settlers to North America also brought with them many landscape plants from their countries of origin. We continue to introduce exotic species for production agriculture and through the horticulture industry. Exotic plant species are now being evaluated as potential sources for biofuel, which is considered a viable alternative to fossil fuels. It is important to understand that not all nonnative species become invasive pests.

There are approximately 50,000 exotic species in the United States. Researchers at Cornell University estimated that one in seven of these exotic species become invasive pests once established (Pimentel et al. 2000). Another commonly used device is the “Tens Rule” estimate, which is based on the statistical analysis of a number of British animals and plants. The rule states that, on average, one in 10 species introduced (either intentionally or accidentally) will escape from cultivation. One in 10 of these escaped species will become naturalized and establish a population. In turn, one in 10 of these naturalized species will likely become invasive (Williamson and Fitter 1996).

Why the Current Concern?

Nonnative invasive species may adversely impact Pennsylvania's economy, environment or the health of commonwealth citizens. There is every indication that this problem will continue to worsen through growing numbers of introductions. Increases in global trade have created opportunities for many organisms to be transported to new countries where they can establish. As recently as the end of 1999, goods worth \$6.2 trillion were traded globally per year (World Trade Organization 2000). By 2007, trade volume doubled with more than 10 billion tons of merchandise worth \$13.6 trillion circulated yearly (World Trade Organization 2008). Global climate change is also contributing to the introduction and establishment of new pests by changing maximum and minimum seasonal temperatures in regions of the world. By giving introduced species an earlier start, and increasing the magnitude of their growth and recruitment relative to natives, global climate change may facilitate a shift to dominance by nonnative species, accelerating the homogenization of the global biota (Stachowicz et al. 2002). Problems caused by invasive species will multiply as global trade and global climate change continue to increase.

Prevention and immediate action is more economically and environmentally feasible than delaying action until after an invasive species has established. For example, \$65 million was spent to eradicate Asian longhorned beetle from Chicago, but the estimated cost to North American forests if action was not taken could have been \$350 billion (Government Accountability Office 2006). Unfortunately, Asian longhorned beetle is still present elsewhere in North America. In order to protect the stonefruit industry in the commonwealth, Pennsylvania has spent \$4.5 million since 1999 in efforts to eradicate the plum pox virus. Since 2000, Pennsylvania has spent more than \$39 million on the West Nile Virus Surveillance Program to protect the health of commonwealth citizens. Prevention, defined as the actions necessary to keep potentially invasive species from entering previously uninfested areas, is the most cost effective and least environmentally damaging approach. This is accomplished through disrupting the pathways invasive species utilize to spread.

How Do Invasive Species Get Here?

Although extremes in weather and the movement of wind-borne or water-borne organisms are recognized pathways of invasion, most new introductions of invasive species occur as a result of human activity. Expanded shipping and air traffic over the last century has facilitated the movement of nonnative species. The establishment of canals opened pathways between previously unconnected bodies of water, allowing introduced species ready access to new ecosystems. Today the movement of organisms continues, only at a much faster pace (Wittenberg and Cock 2001, Liebhold et al. 2006). The growing volume of transported goods, increasing efficiency and speed of transportation, advancing technologies for transportation, and expanding international trade agreements are all key factors in this increase (Loope and Howarth 2002). As the United States continues to import more goods, invasive species will continue to have opportunities to find their way into Pennsylvania.

The following is a list of some of the known pathways related to human activity that can transport and spread invasive species into the United States and Pennsylvania:

Contamination of products in channels of trade: Products themselves may unintentionally transport organisms. Shipments of food or trade items can be contaminated with undetected organisms or pathogens, and items such as packing materials shipped along with the cargo may unintentionally transport invasive species by harboring organisms. Containerized cargo provides additional opportunities for organisms to hitchhike to new ecosystems with a decreased likelihood of being intercepted at ports of entry.

Hull fouling can occur on any kind of boat, not just commercial boats. Recreational boaters should also be aware of the danger of accidentally transporting aquatic invasive species.



Hull fouling: Aquatic organisms can attach to ships' hulls or become entangled in submerged components of ships and be transported, creating the potential to become dislodged in a new area.

Ship ballast: This is a primary pathway for long distance movement of aquatic organisms. Aquatic organisms ranging from microscopic plants and animals to fish and associated pathogens can be transported to new areas through release of ballast water.

Discarded live fish bait: The movement and eventual discarding of live fish bait may introduce species and the pathogens they may harbor into new bodies of water.

Intentional release: Releasing pets, plants, and other organisms into the wild, rather than disposing of them in a proper manner, can introduce a new species into an area.

Escape from Cultivation: Species introduced for cultivation may escape management and the traits that were desirable in captivity may facilitate invasion of the natural environment.

Movement of materials and equipment: Soil, compost, tanbark, firewood, nursery stock, watercraft, construction equipment, fishing and hunting gear and other commonly transported items can harbor numerous insects, disease agents, plant seeds, and other undesirable organisms, allowing for accidental long distance movement. Travelers can even unintentionally move life forms on the soles of their shoes or the wheel wells of their cars.

Unregulated sale of organisms: Major unregulated sources for live organisms include mail order and internet sales, flea markets and farmers' markets. These activities can pose a major threat for long distance movement of organisms.

Smuggling activities: When entering another country, people may purposefully conceal organisms in baggage, vehicles, or on their person.

Hobby trading: Hobbyists and collectors often have opportunities to trade specimens (both plants and animals), and such activities can result in long distance movement of nonnative organisms.

Examples of Invaders in Pennsylvania

There are two main subsets of nonnative invasive species in Pennsylvania that impact two very distinct types of ecosystems: aquatic and terrestrial. Below are examples of invaders from each subset. Unfortunately, they are by no means the only invasive species present in the commonwealth. For more information on invasive species found in Pennsylvania, visit the Pennsylvania Invasive Species Council web site (www.agriculture.state.pa.us/pisc).

Aquatic Invasive Species (AIS)

Aquatic invasive species are defined in this document as nonnative species that threaten the diversity or abundance of native species, the ecological stability of the infested waters, human health and safety, or commercial, agriculture, aquaculture, or recreational activities dependent on such waters. The commonwealth's varied geology and topography contribute to the large variety of aquatic and estuarine habitats. Pennsylvania encompasses six different landforms, ranging from coastal plain to the Appalachian Mountains. The commonwealth hosts more than 84,000 miles of streams and shares five major watersheds with other states and Canada. According to the National Wetland Inventory, there are a total of 729,535 wetland acres found in more than 160,000 wetlands across Pennsylvania. The following species of limited distribution are included as examples of invertebrates, fish, aquatic plants, and viruses that are affecting aquatic ecosystems in the commonwealth:

Zebra and Quagga mussels are fingernail-sized freshwater mollusks native to the Black and Caspian Sea drainages of Eastern Europe and Western Asia. Both are highly opportunistic, reproduce rapidly, consume microscopic aquatic plants and animals from the water column in large quantities, and colonize several substrate types. Zebra mussels are established in several water bodies in northwestern Pennsylvania, including Lake Erie, Edinboro Lake, Conneauttee Creek, Sandy Lake, Conewango Creek, and the upper Allegheny River. Zebra mussels are also present in the Susquehanna watershed, lower Allegheny, Monogahela and upper Ohio rivers near Pittsburgh and even in a few diving quarries located hundreds of miles from the original source populations. In Lake Erie, the quagga mussel is now present in higher numbers than the zebra mussel. It is illegal in Pennsylvania to sell, purchase, barter, possess, introduce, import, or transport zebra or quagga mussels.



Northern snakehead is a predatory fish that will compete with other fish for forage and habitat at such an aggressive rate that destabilization of the local native fish population is possible. Northern snakeheads are air breathers; this trait allows them to survive for a time out of water and increases the risk of spread to new bodies of water. Northern snakehead was first confirmed in Pennsylvania in July 2004 in a park in South Philadelphia. Since then, northern snakeheads have also been caught in the lower Schuylkill and Delaware rivers. It is illegal in Pennsylvania to sell, purchase, barter, possess, introduce, import, or transport northern snakehead.



Water chestnut is an annual aquatic plant with both surfacing and submersed leaves. Fruits are nut-like and “woody” with typically four barbed spines that are sharp enough to penetrate shoes. Long cord-like stems can attain lengths of up to 16 feet, forming dense floating mats and making the waters inaccessible to recreational activities. The plant also severely limits the passage of light into the water, reduces water oxygen levels, out-competes native vegetation, and is of little value to wildfowl. Water chestnut grows in freshwater lakes and ponds and slow-moving streams and rivers. As of 2006, water chestnut infests six water bodies in eastern Pennsylvania.



Viral hemorrhagic septicemia (VHS) is a federally regulated animal disease of freshwater fish in the Great Lakes region of the U.S. and Canada. VHS is caused by a rhabdovirus and has caused great damage to fisheries in Europe. While VHS has not yet been documented in Pennsylvania waters, the Great Lakes isolate may be a new substrain of the North American genotype and has caused mortality in Muskellunge, Drum, Walleye, several salmonid species, and several species of bait fish in the Great Lakes. Emerald Shiners, an abundant nonnative bait fish present in the Great Lakes, have been discovered to be infected with VHS and may pose an additional concern as a vector to spread this disease through the bait industry. To prevent VHS from spreading into new waters, federal and state governments have imposed stringent restrictions on the export and movement of fish from and within Great Lakes states.

Terrestrial Invasive Species (TIS)

Terrestrial invasive species are defined in this document as nonnative species that complete their lifecycle on land instead of in an aquatic environment and whose introduction does or is likely to cause economic or environmental harm or harm to human health. Pennsylvania has three general climate regions and its 44,817 square miles are located in the mid temperate zone of North America making it a habitable place for invasive species whose cold tolerance ranges from -20° F to 0° F. Terrestrial ecosystems in Pennsylvania include a rich variety of community types and cover a range extending from nearly aquatic wetlands along our coasts and rivers, lakes and streams, to mountain tops. Four groups of organisms have been particularly successful in adapting to terrestrial environments: arthropods, vascular plants, higher vertebrates and pathogens. We have included the following invasive species of limited distribution in the commonwealth as examples of invertebrates, plants, vertebrates and viruses that can affect terrestrial ecosystems:



Emerald Ash Borer (David Cappaert, Michigan State Univ., Bugwood.org)

Emerald ash borer (EAB) is a federally-regulated woodboring beetle that was first found in Detroit, MI in June of 2002. EAB attacks all native species of ash and has a 99.2 percent mortality rate on infested trees. As of 2008, more than 35 million ash trees have been killed in North America. If discovered in an area, immediate quarantines of all ash related materials have been implemented. In 2007, EAB was discovered in Pennsylvania. As of March 2009, five counties in western Pennsylvania (Allegheny, Beaver, Butler, Lawrence, and Mercer Counties) and one county in central Pennsylvania (Mifflin County) are quarantined because of the threat EAB poses to the commonwealth's 323 million ash trees.

Kudzu is a perennial, semi-woody climbing leguminous vine originally introduced into the United States as an ornamental plant at the Philadelphia Centennial Exposition of 1876. It was heavily planted in the 1950s throughout the U.S. to prevent erosion, particularly in the south, until its tendency to completely replace existing vegetation was noted. Kudzu was added to the state noxious weed list in 1989 and a pilot eradication program was launched in 2006. As of 2008, more than 89 spatially distinct populations of kudzu have been confirmed at sites throughout Pennsylvania.



Kudzu (Ted Bodner, Southern Weed Science Society, Bugwood.org)

Feral swine cause considerable damage following accidental or intentional introductions. Since 2007, the United States Department of Agriculture has gathered evidence that feral swine are establishing small breeding popula-



Feral Swine (USDA)

tions in at least five Pennsylvania counties. There is concern that their numbers may be increasing by escapes from shooting preserves within the commonwealth and through deliberate importation and illegal and intentional release of swine brought from other states. In addition, several feral swine populations in other states have proven to be infected with brucellosis and pseudorabies. The Secretary of the Pennsylvania Department of Agriculture and the Executive Director of the Pennsylvania Game Commission co-chair a task force to address this serious threat. Jurisdictional authority for feral swine was delegated to the Pennsylvania Game Commission by a Pennsylvania Supreme Court Ruling.

Plum pox virus is one of the most destructive viral diseases of stone fruit crops worldwide. The federally regulated plant pathogen was detected for the first time in North America in Adams County, PA in September 1999. Tree yields can be severely affected - some reports claim 80-100 percent reductions in yield. Infected fruit may be unsightly and difficult to sell. If the virus is discovered in a state, export of fruit is difficult and export of budwood and nursery stock is next to impossible. Pennsylvania has had two consecutive years of negative plum pox survey results. After a third year, the commonwealth can declare plum pox has been successfully eradicated.



Plum Pox Virus Symptoms (John Hammond, USDA Agricultural Research Service, Bugwood.org)

The Need for an Invasive Species Management Plan

Invasive species do not recognize jurisdictional boundaries, thereby creating a need for enhanced coordination between local, state, regional, and federal entities to respond to new discoveries effectively and expediently. Disseminating up-to-date information regarding invasive species across those jurisdictional lines to field staff, key stakeholders and the general public is crucial to the successful implementation of invasive species programs. Another challenge is that there are a growing number of nonnative invasive species that fall outside the parameters of existing statutes, laws, acts, and regulations, in addition to the many species already being addressed by regulatory authorities. A comprehensive approach is needed to address these challenges and prevent unnecessary expenditure and duplication of efforts that drain the budgets and staff resources of state and federal agencies.

Traditional Roles of Government

There is no single state statute that deals specifically with the management and control of invasive species in Pennsylvania. Responsibilities for protecting Pennsylvania from organisms or pests deemed

injurious, nuisance, noxious, or harmful are shared by several state agencies. The commonwealth is governed by multiple separate legislative and regulatory provisions, the majority of which are derived from agencies' general statutory authority. As far back as 1862, state government was charged with the destruction, detection, and prevention of foreign pests deemed injurious to Pennsylvania's agricultural system. State and Federal agencies with regulatory authority regarding invasive species are discussed further in Appendix 4.



Non-Traditional Roles: Addressing the Issue of Invasive Species

There are a growing number of invasive species that fall outside the traditional role that state agencies have in protecting the resources of the commonwealth. It is impossible for state agencies to address all invasive species alone, especially those that have become widely established. This nonnative invasive species management plan, developed by the Pennsylvania Invasive Species Council, will aid in facilitating rapid, coordinated actions among state agencies, private industry, public stakeholders, and individual land owners engaged in preventing the introduction and spread of invasive species. This plan reflects the ongoing efforts of the council to develop a framework that identifies strategies and actions to minimize the impacts of nonnative invasive species and facilitate addressing species that fall outside of traditional jurisdictions.

The Framework for Response

The Pennsylvania Invasive Species Council developed this framework for response that will aid in minimizing the harmful ecological, economic, and human health impacts of nonnative invasive species through the prevention and management of their introduction, expansion and dispersal into, within and from Pennsylvania. This framework represents the council's ongoing efforts to outline responsibilities, standardized actions, and communication for managing current invasive species infestations and for responding when a new invasive species is identified within the commonwealth. The Pennsylvania Invasive Species Council recommends that the commonwealth work with all relevant stakeholders to accomplish the following objectives:

Preliminary Risk Assessments

Goal: Utilize preliminary risk assessments to prioritize nonnative invasive species management and expedite response at the first indication of a new or likely introduction.

Background: Risk assessment is a science-based process commonly used to predict the potential establishment, spread, and impacts of invasive species. Risk assessments can be used to aid in prioritizing prevention, early detection, control and restoration efforts. Species-specific risk assessments already developed by experts elsewhere should be reviewed first. If unavailable, preliminary species-specific risk assessments should be developed to determine the threat level of the invasive species to the commonwealth. If needed, species-specific task forces should be formed to facilitate this process.

Proposed Actions

1. Assess and utilize previously developed risk assessments from international, federal, state, and local sources to guide development of risk assessments for invasive species and pathways in Pennsylvania.
2. Use monitoring data collected within Pennsylvania, neighboring states, and elsewhere in the United States to formulate the development of risk assessments for invasive species and their pathways.
3. Evaluate organisms sold in commercial trade that have the potential to persist in Pennsylvania outside of captivity or cultivation.
4. Using the above information, prioritize invasive species and develop preliminary risk assessments for species which are currently not established in Pennsylvania or which are widely recognized as threats to human health, ecological, or economic resources.

The Pennsylvania Feral Swine Task Force developed a preliminary risk assessment for feral swine at the request of the council in 2007.



Prevention

Goal: Identify, evaluate, and address pathways used by nonnative invasive species in order to minimize their introduction and spread into and throughout the commonwealth.

Background: Prevention, defined as the actions necessary to keep potentially invasive species from entering previously uninfested areas, should serve as the first line of defense as it is the most cost effective and least environmentally damaging approach. Once a species becomes established in an area, control will likely require significant and sustained expenditures. A recent study on the weed risk assessment process used in Australia to restrict the entry of invasive species into the country has

shown that the cost of the program is more than paid for by saving the country the costs of treating those invasive species (Keller et al. 2007).

Investment in prevention tools, resources, and infrastructure are indispensable in protecting human health, agriculture and natural resources.

Aquatic Invasive Species Biosecurity Protocols

The Pennsylvania Fish and Boat Commission formed an Aquatic Invasive Species Work Group in 2008 to develop procedures to minimize the accidental movement of aquatic invasive species through routine staff activities. Fish and Boat Commission field staff regularly move boats and sampling equipment between water bodies.

The biosecurity protocols being developed will ensure that, to the extent practical, all equipment being moved will be properly washed and disinfected to prevent the introduction and spread of aquatic invaders. The protocols will be shared with other state agencies and members of the general public that are at risk of accidentally transporting aquatic invasive species.



Didymo – an Invasive Algae Easily Transported on Boats and Equipment (Tim Daley, Pennsylvania Department of Environmental Protection)

Proposed Actions

1. Review existing programs and policies which address the prevention of invasive species and the mitigation of pathways in Pennsylvania and identify opportunities for improving their effectiveness.
2. Improve regional coordination in the development and implementation of risk management partnerships at all ports of entry and other suitable pathway points.
3. Encourage state agencies, industry, and user groups to adopt sound nonnative invasive species prevention practices for their own operations.
4. Encourage immediate preemptive action when new pathways are identified.
5. Identify a short list of invasive species considered to be the most significant or harmful to the commonwealth.

Early Detection and Rapid Response

Goal: Detect new introductions of nonnative invasive species quickly and control or contain target species before they become permanently established in the commonwealth or move into areas in which they previously did not exist.

Background: Even the best prevention efforts cannot stop all nonnative invasive species from entering the commonwealth. Early detection of and rapid response to new infestations greatly increases the possibility that localized invasive populations will be contained and eradicated from areas before they can spread. Early detection and rapid response are the most cost-effective and environmentally sound methods for responding to new invasions as they reduce the scale of expensive, long-term control efforts and minimize impacts on ecosystem health and function. Early detection and rapid response can also slow the spread of invasive species established in one region from expanding into new areas of the commonwealth.

Proposed Actions

1. Create watch lists of invasive species not yet known or of limited distribution in the commonwealth.
2. Establish a hotline number or web site for the public to report sightings of suspected invasive species.
3. Establish a simple, coordinated reporting system for managing invasive species sightings and disseminate data to relevant agencies, partners, and stakeholders in a timely fashion.
4. Develop specific action plans for species and locations.
5. Identify and involve stakeholders in early detection and rapid response planning efforts.
6. Identify and support personnel training needs and interagency partnerships for successful early detection and rapid response operations.
7. Develop quarantine orders when and where needed for successful rapid response. Have licenses and permits necessary for specified control techniques (mechanical, biological and chemical), and contract authority required for purchased services and agreements necessary for mutual aid with other states and federal agencies for successful rapid response.
8. Identify gaps in existing early detection efforts.

Emerald Ash Borer Detection

Emerald ash borer was first detected in Mifflin County, PA by a home owner who contacted the Pennsylvania Department of Agriculture's hotline. He had obtained information on emerald ash borer from the website of a Master Gardner trained through Pennsylvania State University's Cooperative Extension Program. This detection, far from other known infestations, demonstrates the value of outreach in the early detection of invasive species.



Control

Goal: Prioritize nonnative invasive species on which to focus control efforts, and when feasible control established nonnative invasive species that have significant impacts in Pennsylvania.

Background: Eradication should always be considered when an invasive species is first detected in a new area of the commonwealth. Unfortunately, the eradication of invasive species that are well established and widespread is generally not economically or environmentally feasible. Instead, long term management efforts that attempt to slow the rate of spread or suppress widespread populations, thus lessening environmental and economic impacts over time, should be considered.

Proposed Actions

1. Review ongoing management programs to increase program efficiency and routinely evaluate non-target impacts. Disseminate evaluations to relevant agencies, partners, and stakeholders in a timely fashion.
2. Develop species-specific or location-specific action plans that include control measures.
3. Support the development of control and containment techniques which include a comparison to the potential economic, environmental, and/or human health impacts of a “no action” alternative.
4. Support the development of special use permits for control options that are not currently authorized in Pennsylvania.
5. Recommend a statewide strategy to facilitate coordination and cooperation on invasive species control among all stakeholders whose rights-of-way, or personal, business, or state owned properties border highways, byways and riparian corridors.
6. Where lacking, compile, consolidate, and distribute literature to assist the public in control efforts.
7. Create a master directory of contractors, analysts and consultants in private, public and non-profit sectors who can provide technical services or recommendations for an identified invasive species management problem.

Gypsy Moth

The Pennsylvania Department of Conservation and Natural Resources' Bureau of Forestry is responsible for coordinating the statewide gypsy moth control program. The program, in existence since 1972, is voluntary; private landowners and cooperating agencies request enrollment. The gypsy moth spray program is designed to protect trees in the forested landscape from sustaining moderate to severe defoliation. Spraying is considered a suppression program, not an attempt to eradicate the insect.



Restoration

Goal: When feasible, integrate restoration efforts into control and management activities as well as ecologically disruptive activities that may be conducive to invasive species colonization.

Background: The term restoration encompasses the activities required to reinstate ecosystem structure and function in habitats that have been disrupted by invasive species. With effort, ecosystems can sometimes recover following the eradication or control of invasive species. It is both cost-effective and environmentally sound to integrate restoration efforts into control and management plans since without the stability afforded by restoration, areas may become re-infested by the same or additional nonnative invasive species.

Proposed Actions

1. Review contracts, partnerships and projects to incorporate restoration measures wherever possible to prevent colonization by invasive species.
2. Develop possible incentive programs for private landowners for the restoration of ecosystems vulnerable to invasion and make recommendations to establish/enhance these programs.
3. To utilize their expertise and resources, create a master directory of existing efforts and key groups that focus on restoration of native habitats.

Survey and Monitoring

Goal: Expand survey and monitoring efforts of nonnative invasive species in Pennsylvania.

Background: Survey and monitoring efforts provide the data necessary to make informed decisions about programs targeting nonnative invasive species. Surveying helps to determine where populations of invasive species are located geographically as well as the extent of the infestations. Monitoring populations of invasive species targeted by prevention, rapid response, control, and restoration programs aids in determining the impact of those programs. Survey and monitoring efforts are an integral part of any targeted invasive species program.

Proposed Actions

1. Prioritize survey and monitoring efforts.
2. Conduct monitoring surveys to assess the threat to critical habitats and their species from invasion and address their protection through policy when needed.
3. Incorporate long term monitoring into eradication and control programs to ensure success.
4. Encourage data sharing.

Data Management

Goal: Develop a statewide nonnative invasive species database clearinghouse or information sharing system linking data from various state, federal, and non-governmental entities.

Background: Accurate and current data are a critical need of managers, researchers, and decision makers dealing with nonnative invasive species. Access to statewide information and databases, especially geographic location of invasive species data, is critical to the prevention, detection, survey, management, and restoration components of an invasive species program.

Currently in Pennsylvania, data on invasive species are collected by single agencies or organizations to meet their own objectives; the data are often not easily accessible to others who may have a need for it. To illustrate, the Pennsylvania Department of Conservation and Natural Resources is beginning to collect geo-referenced information on invasive plants. The Western Pennsylvania Conservancy also collects information on invasive plants, as does the Morris Arboretum and the Pennsylvania Department of Agriculture. Program managers in these agencies have a difficult time knowing what data and information exist in other agencies. A role of the clearinghouse data base would be to provide contact information for the program managers, researchers and personnel who work with the various invasive species in Pennsylvania as well as providing links to useful technical information. For specific invasive species of critical importance, data from various agencies would be combined into a geographic information system (GIS) format to allow for analysis, mapping, predicting rates of spread and developing risk assessments.

The National Invasive Species Council is charged with establishing a coordinated information sharing system that emphasizes the use of the internet for documenting, evaluating and monitoring invasive species. To assist in the national effort, Pennsylvania will need to inventory the various databases that already exist within the commonwealth and to facilitate the coordination of this data with federal, state, and non-governmental organizations. Because these factors are highly variable, readily available data from relevant sources are critical if intervention is to be both effective and economical.

Proposed Actions

1. Support the development of a central clearinghouse database, including geo-referenced data, technical information and contact information.
2. Inventory the various databases that already exist within the commonwealth.
3. Facilitate the coordination of data management with federal, state, and non-government organizations.

Research

Goal: Support research efforts on nonnative invasive species issues and impacts in Pennsylvania and work with partners to facilitate the dissemination of data generated from these efforts.

Background: New invasions of invasive species often require novel ways to effectively address them. Continued research on the impacts of invasive species on biodiversity and on control and eradication methodologies specific to the geography, climate and ecology of Pennsylvania is needed. Because of the lack of data about invasives in the commonwealth, research projects ranging from basic investigations with broad application to highly targeted applied efforts are required to enable invasive species programs and actions.

Proposed Actions

1. Encourage and support collaboration on scientific research between state and federal agencies, universities, and other non-governmental organizations.
2. Facilitate the collection and dispersal of information, research and data about Pennsylvania invasive species.

Key Personnel

Goal: Identify key personnel needed to coordinate nonnative invasive species issues among local, state, and federal agencies and organizations.

Background: Invasive species programs are impossible to develop and implement in an efficient and coordinated manner without enough knowledgeable personnel to support them. Lack of available staff is often cited as a reason for program failure. In the past decade, hiring freezes and complement issues have left vacant key positions in the commonwealth. In other cases, state agencies do not have relevant positions within their complement and need support to create them.

Proposed Actions

1. Identify gaps in personnel in state agencies and public and private organizations and support the creation of permanent positions to address them.
2. Create and permanently fund positions to facilitate outreach and education about invasive species.
3. Identify existing personnel resources for regional or county-level invasive species coordinator positions through agreements between the Pennsylvania State University Cooperative Extension Service and local and state government to meet the demand for expertise at the local level for implementing rapid response measures as well as outreach and education strategies.
4. Establish permanent funding for the Pennsylvania Invasive Species Council Coordinator position.

Education and Outreach

Goal: Educate the general public and key target audiences about nonnative invasive species issues so that they do not facilitate the introduction and spread of these organisms through their activities.

Background: Education is critical to preventing and limiting the spread of invasive species. Many people are unaware that that their own actions can result in the introduction and spread of these organisms. Raising awareness of the problem is a critical component of any prevention, early detection, control, or monitoring program of invasive species. Persuading people to act in ways that reduce the threats posed by invasive species and to avoid contributing to the problem is the key to long-term success in invasive species programs.

Proposed Actions

1. Develop unified messages regarding invasive species prevention and control.
2. Develop educational materials and create fact sheets specific to Pennsylvania on invasive species and distribute them to target audiences.
3. Support and encourage local, community based programs that target invasive species.
4. Encourage the development of training modules for volunteer programs that can assist with invasive species prevention, identification, monitoring, and control with the appropriate oversight.
5. Encourage citizen groups in Pennsylvania to become active in outreach and education about invasive species. They should be encouraged to address their legislators about concerns in their communities.
6. Support the development of training programs to certify field staff in identification and reporting of invasive species. Eventually, this training should be required for all appropriate state agency field staff.
7. Provide educational briefings on the threats, economic impacts and solutions to decision-makers, legislators and advisory councils and keep them abreast of invasive species issues and concerns. Encourage legislators and decision makers to meet with the Pennsylvania Invasive Species Council on an annual basis to be brought up-to-date on invasive species issues.

Identification Training

The Northeastern Weed Science Society, in partnership with Pennsylvania State University and the Pennsylvania Department of Agriculture, developed a short course addressing invasive vegetation which focuses primarily on noxious and invasive weed identification, management and control.



Communication and Coordination

Goals: Facilitate communication and coordination across jurisdictional boundaries to ensure that state policy effectively promotes the prevention, early detection, and control of nonnative invasive species in Pennsylvania.

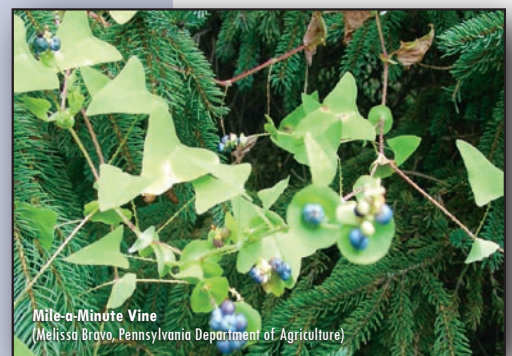
Background: Invasive species do not recognize political boundaries and frequently cross jurisdictional lines. This necessitates enhanced communication and coordination for successful prevention, response and control efforts. Many gaps currently exist in the communication process. There is confusion even among state agencies about who to contact when unidentified organisms are discovered. State agencies typically have response procedures in place within their own organization, but those procedures are not always known to other agencies within the state or to other states. As a result, regional coordination with adjacent states does not always occur in a timely fashion.

Proposed Actions

1. Create a communications flowchart detailing appropriate contacts when a new invasive species is discovered within the commonwealth.
2. Partner with neighboring states to share data and coordinate management activities.
3. Partner with the National Invasive Species Council and regional invasive species panels in order to coordinate with national and regional programs and efforts.
4. Expediently review, edit, revise and adopt laws, regulations, statutes, acts and/or quarantines that facilitate prevention, early detection and rapid response to introductions of invasive species.
5. Support the formation of local Cooperative Weed Management Areas (CWMAs) to address identified problems in regions of the commonwealth. For more information, please visit <http://mipn.org/cwma.html>.

Sinnemahoning Creek Cooperative Weed Management Area

A cooperative weed/invasive plant management area was recently formed for the Sinnemahoning Creek Watershed area to address known infestations, restore areas impacted by noxious plants, and protect areas of special ecological concern and weed free areas from future invasions. The group is composed of representatives from state agencies, local watershed associations, local conservation districts and private land owners. The CWMA will also involve local government, non-profit organizations, universities, outdoor recreation clubs, local businesses, and private land owners in their efforts.



Funding

Goal: Work with the Governor's office, legislature, partners, stakeholders, and industry and federal entities to identify and establish permanent funding sources for nonnative invasive species programs in the commonwealth.

Background: Efforts to prevent the entry of and respond to newly detected invasive species are often greatly hindered by the lack of adequate funding. As it currently stands, most funds are allocated to specific, established species and programs and cannot be used for other efforts. Prevention, the most economically and environmentally feasible approach to dealing with invasive species, requires funding to be effective, yet no monies are dedicated to the prevention of new invasions. Early detection of new invasions and monitoring efforts require funding for equipment, personnel and training. Current funding levels are inadequate. Rapid response requires funding, often significant amounts, and the commonwealth often lacks the ability to respond quickly and effectively because there are no funds to do so.

There is no adequate source of funding for long term management activities to mitigate the impact of established populations and there is often little money left for the restoration of damaged ecosystems. Education and outreach also require funding for implementation of successful social marketing campaigns and the development and distribution of materials.



Pennsylvania State Capitol
(T.S. Custadio, Wikimedia Commons)

Proposed Actions

1. Request that the Governor's office, legislators, partners and stakeholders collaborate to establish permanent funding for the prevention, control and management of invasive species.
2. Create an emergency fund for rapid response activities that can be directed by request of the council to the appropriate lead agency.
3. Provide funding for the development and implementation of training for appropriate field staff, key stakeholders and volunteers in the identification and early detection of invasive species.
4. Encourage and develop research funding sources.
5. Make funding available for organizations that work in the restoration of damaged ecosystems.
6. Facilitate a request to the Legislative Budget and Finance Committee to create a report on the economic impacts of nonnative invasive species on the commonwealth.

Recommendations

The Pennsylvania Invasive Species Council has identified the following objectives for the comprehensive management of nonnative invasive species in the commonwealth: Preliminary Risk Assessments, Prevention, Early Detection and Rapid Response, Control, Restoration, Survey and Monitoring, Data Management, Research, Key Personnel, Education and Outreach, Communication and Coordination, and Funding. These objectives contain goals and proposed actions and are covered in greater detail in the section entitled “The Framework for Response” (see page 13). For the purpose of providing direction and guidance to the commonwealth, the council has identified four essential objectives to address this issue in the immediate future:

Prevention: The commonwealth should continue to investigate and address the introduction of individual species as well as pathways of introduction such as containerized cargo, hull fouling, ship ballast, intentional release of unwanted pets and plants, the unintentional release through the movement of materials and equipment (soil, firewood, gear, etc.), and sales of live organisms in commercial trade.

Education and Outreach: The commonwealth should create unified messages for use by all state agencies regarding the prevention and control of invasive species and proactively educate the public and people involved in business, trade, research and government so that these groups do not accidentally facilitate the introduction or spread of invasive species.

Communication and Coordination: The commonwealth should provide leadership and coordination for aquatic and terrestrial invasive species issues and ensure that state policy effectively promotes the prevention, early detection, rapid response and control of invasive species in Pennsylvania. The commonwealth should coordinate and provide leadership within the region in order to address nonnative invasive species issues more effectively.

Funding: Work with the Governor’s office, legislature, partners, industry and federal entities to identify permanent funding sources for nonnative invasive species programs in the commonwealth.

As the first step towards achieving the above objectives, the following recommended actions have been identified as priorities by the Pennsylvania Invasive Species Council. These recommended actions will assist in developing guidance for the prevention and control of invasive species and early detection and rapid response to new infestations and will therefore be the focus for immediate action.

Recommended Actions

Prevention

1. Establish a simple, coordinated reporting system for managing invasive species sightings and disseminate data to relevant agencies, partners, and stakeholders in a timely fashion.
2. Establish a hotline number or web site for the public to report sightings of suspected invasive species.
3. Create watch lists of invasive species not yet known to occur or to be of limited distribution in the commonwealth.
4. Facilitate the review of the biosecurity protocols developed by the Pennsylvania Fish and Boat Commission for possible adoption by all state agencies and other entities whose field staff might accidentally transport aquatic invasive species during their normal activities.
5. Evaluate organisms sold in commercial trade that have the potential to persist in Pennsylvania outside of captivity or cultivation.
6. Conduct monitoring surveys to assess the threat to critical habitats and species from invasion and address their protection through policy when needed.

Education and Outreach

1. Identify a short list of invasive species considered to be the most significant or harmful to the commonwealth.
2. Create fact sheets specific to Pennsylvania on invasive species and distribute to target audiences. Where lacking, compile, consolidate and distribute literature to assist the public in control efforts.
3. Create a current efforts fact sheet to summarize and report successes and activities within the commonwealth that target invasive species.

Example of a fact sheet developed to educate Pennsylvania campers about the dangers of moving firewood.



Communication and Coordination

1. Develop a statewide strategy to facilitate coordination and cooperation for control activities among all stakeholders whose rights-of-way, or personal, business, or state-owned properties border highways, byways and riparian corridors.
2. Create a communications flowchart detailing appropriate contacts when a new invasive species is discovered within the commonwealth.
3. Create a master directory of contractors, analysts and consultants in private, public, and non-profit sectors who can provide technical services or recommendations for an identified invasive species management problem.
4. Expediently review, edit, revise and adopt laws, regulations, statutes, acts and/or quarantines that facilitate prevention, early detection and rapid response to introductions of invasive species.
5. Support the formation of local Cooperative Weed Management Areas to address identified problems in regions of the commonwealth.



Funding

1. Assess the economic impact of terrestrial and aquatic invasive species in Pennsylvania. Determine not only what is currently being spent on prevention, control and eradication, but also the impact on recreation, tourism, property values, utilities, horticulture, aquaculture, etc.
2. Request that the Governor's Office, legislators, partners, and stakeholders collaborate to establish permanent funding for the prevention, control, and management of invasive species.
3. Create an emergency fund for rapid response activities that can be directed by request of the council to the lead agency in response to a newly detected infestation in the commonwealth.
4. Provide funding for the development and implementation of training for appropriate field staff, key stakeholders and volunteers in the identification and early detection of invasive species.

Moving Forward

Management plans that are not dynamic quickly lose their usefulness due to the inherently changeable nature of invasive species issues. It is the responsibility of the Pennsylvania Invasive Species Council to review and update the comprehensive invasive species management plan in its entirety at least every five years. Recommendations of prioritized actions to aid the effective management of invasive species issues will be updated at least every two years to ensure that they reflect current goals and objectives. Revisions and recommendations will be developed through the following processes:

Quarterly Business Meetings of the Pennsylvania Invasive Species Council

The quarterly business meetings of the council provide members with a forum to discuss actions their agencies or organizations are taking and to discuss how they align with the plan. Council meetings also afford the opportunity to develop new recommendations when obstacles are encountered throughout the implementation process.

Council Work Groups

The terrestrial and aquatic work groups of the council will be given specific tasks to facilitate implementation of the plan. Work group chairs should rely on the council coordinator to direct the flow of communications to and from the council. It will be up to the work groups to implement tasks. Recently four new work groups were created to address education and outreach, funding, reporting and tracking, and Asian longhorned beetle.

Council Progress Reports

Biennial reports will continue to be submitted to the Governor. Eventually, progress reports are to be submitted to the legislature within the commonwealth to keep them abreast of activities and needs regarding invasive species. These progress reports will also be incorporated into the council website.

Current Efforts Fact Sheet

The council will create an annual current efforts fact sheet summarizing and reporting on successes and activities within the commonwealth that target invasive species. This will provide an opportunity to give positive feedback to agencies and organizations that make exceptional efforts in invasive species program areas as well as highlight areas that need more attention. This fact sheet will be incorporated into the council website.

Council Website

The council website will continue to evolve to reflect the management plan objectives, actions and recommendations and will continue to dispense information on current invasive species activities in the commonwealth. Most importantly, the website will be the tool to provide outreach and education on invasive species as Pennsylvania specific fact sheets and watch lists are developed.

Appendix 1 – Glossary

The following terms are used in this document:

Alien: a species that is not indigenous to the ecosystem under consideration.

Aquatic invasive species: non-native species that threaten the diversity or abundance of native species, the ecological stability of infested waters, human health and safety, or commercial, agricultural, aquacultural or recreational activities dependent on such waters.

Baitfish: fish species commonly sold for use as bait for recreational fishing.

Ballast water: any water and associated sediments used on-board a ship to manipulate the trim and stability of a vessel.

Biological control (or Biocontrol): the use of living organisms, such as predators, parasites, parasitoids and pathogens to control pest species.

Control: as appropriate, eradicating, suppressing, reducing or managing invasive species populations, preventing spread of invasive species from areas where they are present and taking steps such as restoration of native species and habitats to reduce the effects of invasive species and to prevent further invasions.

Ecosystem: the complex of a community of organisms and its environment.

Eradicate: the act or process of eliminating a nonnative invasive species.

Exotic: a species that is from another country or that is not native to the ecosystem under consideration.

Great Lakes: Lake Ontario, Lake Erie, Lake Huron (including Lake St. Clair), Lake Michigan, Lake Superior, and the connecting channels (Saint Mary's River, Saint Clair River, Detroit River, Niagara River, and Saint Lawrence River to the Canadian Border), and includes all other bodies of water within the drainage basin of such lakes and connecting channels.

Infested: any unmanaged area where a population of nonnative invasive species is known to occur.

Introduction: the intentional or unintentional escape, release, dissemination or placement of a species into an ecosystem as a result of human activity.

Invasive species: an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.

Native species: with respect to a particular ecosystem, a species that, other than as a result of an introduction, historically occurred or currently occurs in that ecosystem.

Nonnative invasive species: with respect to a particular ecosystem, a species that, other than as a result of an introduction, historically did not occur in that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health.

Nonnative species: with respect to a particular ecosystem, a species that, other than as a result of an introduction, historically did not occur in that ecosystem.

Pathways: natural and human connections that allow movement of organisms, or their reproductive materials, such as seeds, spores or eggs from place to place.

Pathogen: a microbe or other organism that causes disease.

Pest: An organism that causes or is capable of causing injury or damage.

Risk assessment: a science-based process to evaluate the economic and/or environmental risk(s) of invasive species.

Species: a group of organisms all of which have a high degree of physical and genetic similarity, generally interbreed only among themselves, and show persistent differences from members of allied groups of organisms.

Stakeholders: state, tribal, and local government agencies, academic institutions, the scientific community, nongovernmental entities including environmental, agricultural and conservation organizations, trade groups, commercial interests, private landowners and other interested parties.

Terrestrial invasive species: a species living or growing on land that is 1) non-native (or alien) to the ecosystem under consideration and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

United States: the 50 States, District of Columbia, Puerto Rico, Guam and all possessions, territories, and the territorial sea of the United States.

Watershed: the geographic area that drains to a single water body or hydrographic unit such as a lake, stream reach or estuary.

Appendix 2 – References

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Appendix 3 – Council Members

The Pennsylvania Invasive Species Council is chaired by the Secretary of Agriculture and includes agency heads of this commonwealth responsible for the conservation of agriculture and natural resources, and the protection of public health, and public members representing agriculture and natural resource organizations and educational institutions conducting invasive species research and outreach.

Heads of State Agencies

- Dennis C. Wolff, Secretary, Department of Agriculture
- Douglas J. Austen, Executive Director, Fish and Boat Commission
- Allen D. Biehler, Secretary, Department of Transportation
- John H. Quigley, Acting Secretary, Department of Conservation & Natural Resources
- Everette James, J.D., Secretary, Department of Health,
represented by Dr. James Rankin Jr., State Public Health Veterinarian
- John Hanger, J.D., Acting Secretary, Department of Environmental Protection
- Carl Roe, Executive Director, Game Commission

Public Members

- Bruce A. McPheron, Ph.D, Dean of College of Agricultural Sciences, Pennsylvania State University
- Eric Obert, Associate Director and Extension Director, Pennsylvania Sea Grant
- Lisa A. Murphy, VMD, Assistant Professor of Toxicology, University of Pennsylvania
- Charles W. Bier, Director/Zoologist, Western Pennsylvania Conservancy
- Ronald Ramsey, Director of Government Relations, The Nature Conservancy
- Frederick S. Mohr, Jr., Turf Seed Business Manager, PennAg Industries Association
- Gloria Day, board member, Pennsylvania Landscape and Nursery Association
- Paul Lyskava, Executive Director, Pennsylvania Forest Products Association
- Andrew L. Ernst, member, Pennsylvania Farm Bureau

State Agencies Council Voting Members & Alternates

- Pennsylvania Department of Agriculture
 - Russell C. Redding, Deputy Secretary for Administration
 - Michael L. Pechart, Deputy Secretary for Marketing and Economic Development and Director of Policy
 - Charles A. Conklin II, Aquaculture Coordinator
- Pennsylvania Fish and Boat Commission
 - Timothy D. Schaeffer, Bureau of Policy and Planning and Communication
 - Robert T. Morgan, Conservation Planning Biologist, Bureau of Fisheries
- Pennsylvania Department of Transportation
 - Joseph S. Demko, Roadside Unit Manager
 - Bruce J. Harter, Roadway Programs Manager

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- Pennsylvania Department of Conservation and Natural Resources
 - Sally J. Just, Director, Office of Conservation Science
 - Donald A. Eggen, Ph.D, Chief, Division of Forest Pest Management
 - Patricia A. Pingel, Conservation Program Manager, Office of Conservation Science
 - Pennsylvania Department of Health
 - Not yet designated
 - Pennsylvania Department of Environmental Protection
 - John T. Hines, Executive Director, Water Planning Office
 - John C. Booser, Associate Director for River Basin Cooperation, Water Planning Office
 - Kevin R. Kelly, Aquatic Biologist, Division of Watershed Assistance
 - James L. Grazio, Great Lakes Biologist, Office of the Great Lakes
 - Pennsylvania Game Commission
 - Gary R. Camus, Chief, Federal Aid and Grant Coordination
 - Benjamin C. Jones, Wildlife Biologist, Bureau of Wildlife Habitat Management

Public Council Member Alternates

- Western Pennsylvania Conservancy
 - Jeffrey Wagner, Director, Pennsylvania National Heritage Program
- The Nature Conservancy
 - Not yet designated
- Pennsylvania Landscape and Nursery Association
 - Gregg Robertson, President
 - Chad Forcey, Director, Government Relations
- Pennsylvania Forest Products Association
 - Not yet designated
- Pennsylvania State University
 - Melissa Bravo, Extension Associate, Department of Weed Science
- Pennsylvania Sea Grant
 - Sarah Whitney, Associate Director, Susquehanna River Watershed Office
 - Sara Grise, Coastal Outreach Specialist
- PennAg Industries Association
 - Amy Bradford, Assistant Vice President
- Pennsylvania Farm Bureau
 - Not yet designated
- University of Pennsylvania, Morris Arboretum
 - Timothy Block, Ph.D, Director of Botany

Council Support

- Karl R. Valley, Advisor to the council
- Ashley D. Walter, Council Coordinator
- Melissa A. Bravo, Terrestrial Work Group chair
- Sarah Whitney, Aquatic Work Group chair
- OITS Web Group, Webpage Administrator

Appendix 4: Regulatory Authorities

State Agencies

Pennsylvania Department of Agriculture (PDA)

The 1895 legislation that created the Department of Agriculture transferred to it the three basic functions the state board of Agriculture had previously held: law enforcement, education and prevention of plant and animal disease. The department provides services to maintain and protect Pennsylvania agriculture through consumer protection and product regulation. This includes detection, identification and control of destructive plant pests (diseases, pathogens, insects and weeds - both native and exotic). Among others, the department administers the state's Noxious Weed Control Law, the Plant Pest Act, the Seed Act, and the commonwealth's Domestic Animal Law.



Pennsylvania Game Commission (PGC)

The Game Commission is responsible for enforcing the commonwealth's game laws relating to the management, protection and preservation of game, birds and fur-bearing animals. The commission regulates the hunting and trapping of game, sets bag limits, operates game farms and employs game protectors. Created in 1895 as the Board of Game Commissioners, it was renamed the Pennsylvania Game Commission in 1937. The commission is authorized to prohibit the introduction, sale and release of any wildlife species of birds or mammals which are considered harmful to the public or wildlife of Pennsylvania under Title 34 Game and Wildlife Code and Title 58 Pennsylvania Code.



Pennsylvania Fish and Boat Commission (PFBC)

The Fish and Boat Commission has its origins in legislation from 1866 designed to protect fish. The legislation created a Commissioner of Fisheries empowered to force dam builders on the Susquehanna to pay for passageways through which anadromous fish, especially shad, could continue their natural annual upstream spawning journey. The commission is charged through Title 58 Pennsylvania Code Part II with ensuring the protection, propagation, and distribution of game fish, fish bait, baitfish, amphibians, reptiles and aquatic organisms and managing recreational boating in the commonwealth.



Pennsylvania Department of Environmental Protection (DEP)

The Department of Environmental Protection was created by Act 1995-18 which split the Department of Environmental Resources into the Department of Environmental Protection and the Department of Conservation and Natural Resources. The Department of Environmental Protection is charged with responsibility for development of a balanced ecological system incorporating social, cultural, and economic needs of the commonwealth through development and protection. It is responsible for the state's land, air and water management programs, as well as other aspects of environmental protection and the regulation of mining operations.



Pennsylvania Department of Conservation and Natural Resources (DCNR)

The Department of Conservation and Natural Resources was created by the Act 1995-18 on June 28, 1995. Act 18 gives the Bureau of Forestry the responsibility for the protection of “all forestland” in the



commonwealth from “fungi, insects, and other enemies”. The Wild Resource Conservation Act directs the Department of Conservation and Natural Resources to conduct an investigation to determine the status of wild

plants, creates an enforcement system to protect endangered, threatened, and vulnerable wild plant species, creates a permit procedure for persons interested in wild plant management, creates a commercial license procedure for persons who purchase vulnerable plants with the intent to sell them, and authorizes the agency to create a statewide system of private wild plant sanctuaries. The department has also created an agency-wide invasive species management plan available on their website (www.dcnr.state.pa.us/ocs/invasivespecie/invasiveplan).

Pennsylvania Department of Health (DOH)

The Department of Health was created by the Act of April 27, 1905 (P.L. 312) to replace the State Board of Health and Vital Statistics that was originally established in 1885. The department has

the authority to enforce all statutes pertaining to public health and the rules and regulations passed by Pennsylvania’s Advisory Health Board. In addition to enforcing statutes and regulations



pertaining to public health matters, the department works to prevent and suppress outbreaks of disease. Through the use of community-based strategies, the department of Health has successfully reduced the number of serious illnesses, injuries and deaths due to major health threats, tobacco-related diseases, infectious diseases, and accidental injuries.

Pennsylvania Department of Transportation (PennDOT)

The Pennsylvania Department of Transportation is a major partner in the prevention of nonnative invasive species as our highways and byways are a

recognized pathway of spread. The Pennsylvania Department of Transportation’s history stretches back to 1903, when it was first established as the Department of

Highways. In the 1950s, the department began laying the foundation for Pennsylvania’s current interstate highway system. During the interstate project, it was renamed the Pennsylvania Department of Transportation on May 6, 1970. The Pennsylvania Department of Transportation controls noxious and problematic vegetation on rights of way across the commonwealth and actively supports research on management and control.



Federal Agencies

USDA-APHIS

“Protecting American agriculture” is the charge of the U.S. Department of Agriculture’s (USDA) Animal and Plant Health Inspection Service (APHIS). APHIS provides leadership in ensuring the health and care of animals and plants. The agency improves agricultural productivity and competitiveness and contributes to the national economy and the public health. USDA APHIS regulates pests through the Plant Protection Act, the Federal Noxious Weed Act, the Noxious Weed List and Federal Domestic Quarantines.



USDA Forest Service

The U.S. Department of Agriculture Forest Service is a Federal agency that manages public lands in national forests and grasslands. The Forest Service was authorized by the Cooperative Forestry Assistance Act of 1978 and amended by the 1990 Farm Bill to assist states in conducting forest health management activities on non-federal forest lands to achieve healthy sustainable forests. The goal is to protect state forest lands from significant loss of economic, ecological, or aesthetic value due to insects, diseases, and other stressors.



U.S. Environmental Protection Agency

The mission of the Environmental Protection Agency is to protect human health and the environment. Since 1970, EPA has been working for a cleaner, healthier environment for the American people. The EPA is currently reviewing its authorities under the Clean Water Act relative to invasive species, especially in regards to ballast water.



U.S. Coast Guard

The United States Coast Guard works to prevent future introductions of harmful aquatic non-indigenous species and control existing populations through the Non-indigenous Aquatic Nuisance Prevention and Control Act and the Federal Ballast Water Regulations.



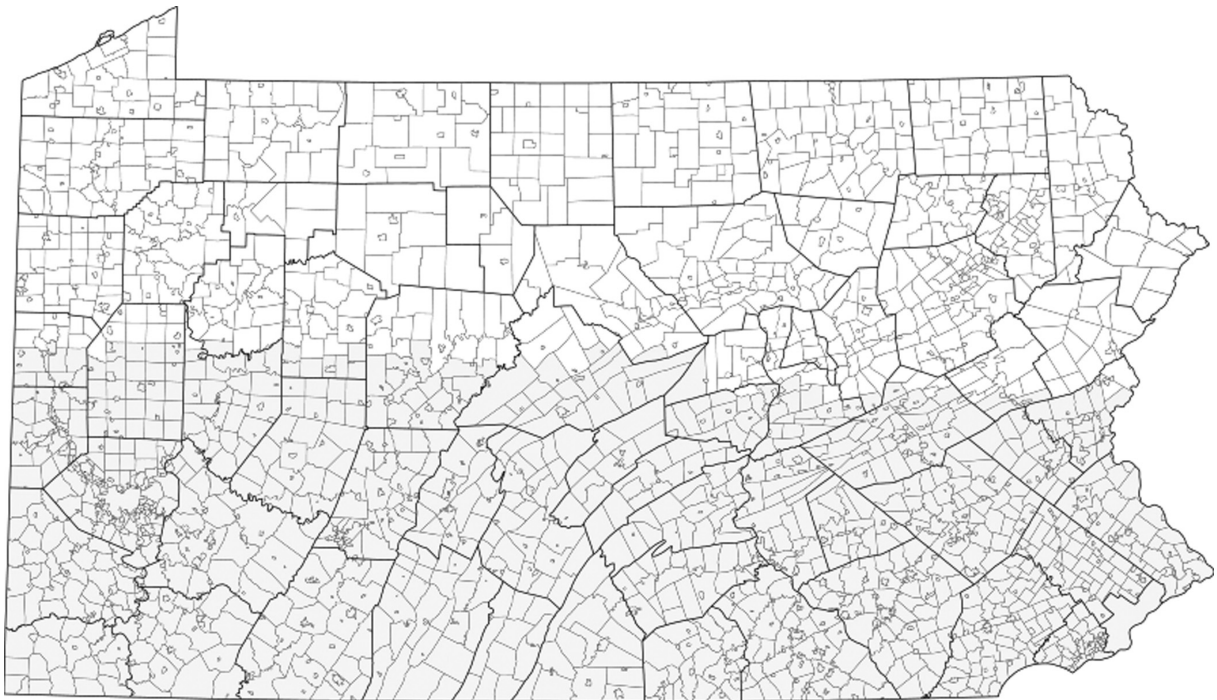
U.S. Fish and Wildlife Service

The United States Fish and Wildlife Service is the government agency dedicated to the conservation, protection, and enhancement of fish, wildlife, and plants, and their habitats. US FWS regulates the import of specified injurious wildlife species through the Injurious Provisions of the Lacey Act.



Local Authorities

Local government in Pennsylvania is a mosaic of 5,334 individual units, all established by the state or provincial government, that operate under laws of the commonwealth. Each unit is distinct and independent of other local units, although they may overlap geographically and may act together to serve the public. As of 2001, there were 67 counties, 56 cities, 964 boroughs, 1 incorporated town, 1,548 townships (91 first class, 1,457 second class), 501 school districts and 2,198 authorities (active and inactive). The number of local units has remained fairly stable for the past few decades with two major exceptions. After passage of school district legislation in 1963 and 1965, the number of school districts diminished radically. Authorities, born as local units during the depression years of the 1930s, have proliferated at a phenomenal pace since then. There are 67 counties in Pennsylvania, including the consolidated city-county of Philadelphia, and each inhabitant of the state lives in and comes under the jurisdiction of one of them. (Tostle, 2007)



Appendix 5 – Plan Development

The Pennsylvania Invasive Species Council was charged with developing a state comprehensive nonnative invasive species management plan by Executive Order 2004-1. Beginning in 2005, council members and stakeholders involved in invasive species issues in Pennsylvania have met quarterly to develop the framework of that plan. In addition, Pennsylvania Sea Grant organized the workshop “Setting the Roadmap,” in 2005 which provided additional guidance to the council. As noted in the Governor’s Executive Order, the Federal Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 provides federal funding to states with an approved aquatic invasive species management plan. In order to secure that funding, the council first developed an Aquatic Invasive Species Management Plan in 2006 which was submitted to the Federal Aquatic Nuisance Species Task Force and approved in February 2007. In preparation for the development of the commonwealth’s comprehensive management plan, a draft Terrestrial Invasive Species (TIS) Component was developed and submitted with the status report to the Governor in December 2006. The text of the TIS document became the background material for the first version of the council website¹, launched in January 2008.

This document will serve as the first submission of a comprehensive invasive species management plan for the Commonwealth of Pennsylvania. Key elements from the approved Aquatic Invasive Species Management Plan for Pennsylvania (October 2006), the draft Terrestrial Invasive Species Component (December 2006), and more recent attempts to address the issue of feral swine in the Pennsylvania Feral Swine Background Paper (April 2008) and Appendix to the Background Paper (November 2008) have been identified in this document as essential to the comprehensive management of invasive species. Efforts in other states have also been reviewed, particularly Oregon, New York, Delaware, Idaho, Virginia, Hawaii, Washington and Indiana.

The interim council coordinating team, composed of Melissa Bravo of the Pennsylvania Department of Agriculture, Sarah Whitney of the Pennsylvania Sea Grant and Melanie Wertz of the Department of Environmental Protection, began the process of developing a comprehensive invasive species management plan in 2005. In July of 2008, four state agencies (the Departments of Environmental Protection, Agriculture, Transportation, and Conservation and Natural Resources) pooled resources to hire an Invasive Species Council Coordinator to complete the development of the plan. Recently, the Pennsylvania Game Commission became the fifth state agency to commit resources for the Coordinator position.

The Pennsylvania Invasive Species Council was created to provide guidance to the Governor and the commonwealth on prevention, control and rapid response initiatives as well as to facilitate cooperation and coordination among federal, regional, state and local efforts regarding nonnative invasive species. This document reflects the ongoing efforts of the council to develop a framework that identifies strategies and actions that will minimize the harmful ecological, economic and human health impacts of nonnative invasive species in Pennsylvania and facilitate addressing these threats in a logical, coordinated fashion.

Throughout the development process of this document, it has been reviewed multiple times by the members and alternates of the Pennsylvania Invasive Species Council. We would like to take this opportunity to thank everyone for their input and hard work.

¹<http://www.agriculture.state.pa.us/PISC>



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