

*State Aquatic Nuisance Species Management Plans in
the Great Lakes Region*

August 2007

Prepared by:

Kathe Glassner-Shwayder, Senior Project Manager, Great Lakes Commission

Lisa Butch, 2005-2006 Great Lakes Commission-Sea Grant Fellow

Erika Jensen 2006-2007 Great Lakes Commission-Sea Grant Fellow

State Aquatic Nuisance Species Management Plans in the Great Lakes Region

Table of Contents

Executive Summary	1
Introduction.....	2
Aquatic Nuisance Species (ANS)	2
Statutory Framework for Prevention and Control of ANS	3
Aquatic Nuisance Species Task Force and Regional ANS Panels.....	4
Great Lakes Panel on Aquatic Nuisance Species.....	5
State ANS Management Plans	6
ANS State Management Planning in the Great Lakes Region	8
SMP Funding Capacity and Obstacles.....	8
ANS Task Force Funding	8
Funding Sources for Plan Development	9
Great Lakes Commission Efforts to Advance State Management Planning.....	9
Model Comprehensive State Management Plan	9
Collaborative State Management Plan Project.....	9
Future Directions in the Prevention and Control of ANS	11
Great Lakes Regional Collaboration.....	11
Aquatic Invasive Species Strategy Team.....	11
Great Lakes Water Quality Agreement Review.....	12
Significant Legislative Initiatives	12
Comprehensive Federal Legislation.....	12
Ballast Water Management.....	13
Regional ANS Management	14
Assessment of State ANS Management Plans	14
Program Evaluation Overview.....	14
Adaptive Management	15
Evaluation in Practice	15
Literature Cited	18
Appendix A. Great Lakes State Management Planning Summaries (2005).....	20
Guidance for Summary of State Management Plan for ANS Prevention and Control	20
Illinois SMP Summary.....	22
Indiana SMP Summary	23
Michigan SMP Summary.....	24
Minnesota SMP Summary	26
New York SMP Summary	26
Ohio SMP Summary	32
Pennsylvania SMP Summary.....	33
Wisconsin SMP Summary	35
Appendix B. Hawaii State Management Plan Summary	37

Executive Summary

A grant from the National Oceanic and Atmospheric Administration's National Sea Grant College Program, has provided an opportunity for the Great Lakes Commission to work in collaboration with the Great Lakes Sea Grant Network and state Natural Resource agencies on building capacity for aquatic nuisance species (ANS) prevention and control in the Great Lakes region. The project funded under this grant, *A Collaborative Approach to Advance Implementation of State Management Plans for Prevention and Control of Aquatic Nuisance Species in the Great Lakes Region*, invests in the ANS state management plan (SMP) process to address the steep challenges posed by ANS introduction and spread. Toward this end, state-specific workshops have been conducted in six Great Lakes states followed by a culminating regional summit to share lessons learned from the workshops. Outcomes from the SMP project will provide the basis for recommendations to strengthen the process of state management planning on a state and regional level.

As a supplemental product of this project, Great Lakes Commission staff have prepared this briefing paper to provide background material and serve as a comprehensive reference for those involved in the development, implementation, evaluation, or revision of an ANS SMP. The paper provides an overview of the ANS issue, explains the legislative framework for ANS management on a state, regional and federal level, describes state management planning programs for ANS in the Great Lakes region, and discusses future directions for ANS management.

The ecological and economic impacts caused by ANS introduction and spread in Great Lakes and inland waters has led to significant ANS prevention and control efforts in the Great Lakes region since the early 1990s. The Great Lakes Commission has taken a lead role in building partnerships among Great Lakes governmental agencies, public and private entities and a wide array of stakeholders to more effectively address ANS issues on a regional basis. Commission initiatives related to the ANS issue are discussed in this paper, providing insight to the SMP process and the efforts of the Great Lakes states in their ANS planning efforts.

It is important to consider progress that has been achieved thus far in tandem with the emerging issues that may influence or determine future directions of ANS management. New information, political pressures and resource availability are significant variables influencing the context for ANS management. This paper presents and discusses these trends to increase awareness and prepare managers for future work on ANS prevention and control, featuring the value of the SMP process.

Introduction

Aquatic Nuisance Species (ANS)

Throughout history, human settlement and trade have caused the introduction of non-native aquatic species, often to the detriment of native ecosystems. These species are introduced and spread through mechanisms, or vectors, such as maritime commerce, canals and waterways, organisms in trade, recreational activities, and public and private aquaculture. While many non-native aquatic species are known to have caused significant ecologic and economic damage upon introduction into new ecosystems, there are other species that have had little to no readily apparent impact on their new surroundings. Further, some species have been intentionally stocked as desirable for sport fishing or other beneficial uses, or have existed for a long enough period of time that they are fully integrated into the non-native ecosystem. These species pose significant management challenges in terms of determining which and to what extent the species should be controlled or eradicated. Considering these factors, classifying a nonindigenous, species as a “nuisance” species is a challenging and often times controversial process.

A widely accepted definition of an “aquatic nuisance species” is that of the national Aquatic Nuisance Species Task Force (ANSTF), which states:

“Aquatic Nuisance Species (ANS) are aquatic and terrestrial organisms, and plant species that have been introduced into new ecosystems throughout the United States and the world and are having harmful impacts on the natural resources in these ecosystems and the human use of these resources” (ANS Task Force 2005a).

Alternatively, a 1999 Executive Order signed by President Clinton defined aquatic nuisance species as a non-native, or nonindigenous species “whose introduction does or is likely to cause economic or environmental harm or harm to human health” (Office of the President 1999). The economic and environmental damages referred to in these definitions, widely documented in the U.S. and the world, provides compelling rationale as to why non-native ANS are considered a significant issue requiring the attention of decision-makers and environmental managers at all levels of government.

Introduction and spread of ANS is causing a multitude of problems in waters worldwide. Algae, fish, invertebrates, and plants are all transported to waters where they are not native through a variety of vectors. Human activities associated with commerce and trade, in addition to improved measures for early detection and monitoring for ANS, have contributed to the steady increase in non-native species discoveries in the Great Lakes. Maritime commerce, specifically the ballast water of ships, has been a primary vector for ANS since opening of the St. Lawrence Seaway in 1959. Ballast water is water taken up or released by a ship to provide stability and is held in a ballast tank. In many cases, ballast water is taken up from a water body different than the one into which it is released. The opening of the Seaway allowed for an increase in the size and number of ships coming into the region, thus dramatically increasing the amount of ballast water released into the lakes. It is estimated that nearly 30 percent of Great Lakes invasions occurred after the opening of the Seaway (Mills et al. 1994) and of all those, 75 percent have been explained by ballast water (MacIsaac et al. 2001). Research has also shown that vessels not carrying ballast water, or declaring “no ballast on board” (NOBOB), are a significant threat to the region. NOBOB vessels may carry “unpumpable residual ballast water and sediment that contain viable organisms” and continue to pose a threat to the Great Lakes (Grigorovich et al. 2003). Models assessing the risk of species introductions via ballast water in BOB versus NOBOB vessels have predicted that NOBOB vessels pose a greater risk to the Great Lakes because they represent approximately 90 percent of the trade in the region (Grigorovich et al. 2003).

Other vectors of ANS introduction and spread include aquaculture, canals and waterways, recreational activities, and trade of live organisms. Some of the first known invasive species having significant impact on the Great Lakes have been introduced via an extensive canal system that was begun in the northeastern

portion of North America in the late 1700s. For example, the Erie and Welland Canals have replaced natural barriers between watersheds with corridors facilitating greater dispersal of aquatic organisms such as the sea lamprey (Mills et al. 1993). Connecting waterways continue to be a concern given potential harmful invaders such as the Asian carp making their way up the Mississippi River towards the Great Lakes. The invasion risk from the live organisms in trade vector stems from a variety of pathways including the aquarium and pet trade; nursery and water garden trade; aquaculture; live food fish industry; and the live bait industry, among others. Intentional and unintentional releases of live organisms through these vectors pose a significant risk to the ecologic and economic health of the region.

About 10 percent of the non-native species that have thus far been discovered in the Great Lakes have been classified as “nuisance” species due to their significant ecological or economic impacts. Other species may also be causing impacts that are not as well known or understood. ANS introduced in to the Great Lakes also have a high likelihood of spreading to inland and other waterways through many of the same vectors and pathways that led to their initial introduction, yielding an ever-expanding range for many non-native species. When invasive species are introduced into an ecosystem where they did not formerly exist, the pressures of natural predators with which they have coevolved are frequently absent. Further, there may not be any indigenous species in this new ecosystem that will take on the predator role to keep invasive species populations in check. This can alter ecosystem dynamics by significantly reducing populations of certain species which ANS prey on or out-compete. Studies have shown that ANS invasions are threatening biological diversity and ecosystem integrity not just in the Great Lakes, but worldwide. Scientists agree that non-native species invasions are the second leading cause of biodiversity decline following habitat destruction (Wilcove et al. 1998). Approximately 49 percent of threatened or endangered species listed under the Endangered Species Act are at least partly in danger due to ecosystem pressures exerted by aquatic invasions (Wilcove et al. 1998). Despite these significant threats posed by ANS to aquatic ecosystems, the issue is not receiving the level of attention deserved.

In addition to ecological impacts, economic costs associated with ANS in the Great Lakes have been staggering. Cost estimations for the prevention and control of ANS range from the millions to billions of dollars each year (Lovell and Stone 2005). It has been said that ANS are the greatest environmental threat to the national economy (City of Chicago 2005). The sea lamprey, a parasitic eel-like fish, was one of the first species recognized as a Great Lakes invader and has caused significant economic and ecologic costs. Introduced through the Welland Canal, the sea lamprey is indigenous to the Atlantic Ocean and feeds on the blood and tissue of large fish, often killing them. Populations of many large sport and commercial fish have plummeted since the sea lamprey invasion, severely impacting Great Lakes fisheries valued at over \$4.5 billion annually (Great Lakes Panel 1998). Adding to these costs, approximately \$20 million dollars are spent each year on various methods to control the sea lamprey (Lovell and Stone 2005). The zebra mussel is another species that has caused great ecological and economic harm to the region. The zebra mussel, endemic to the Caspian Sea, was transported to the Great Lakes in ship ballast water. This filter feeder has excellent reproductive capabilities and can spread quickly once introduced. Zebra mussels filter plankton out of the water, thus reducing food supply and potentially having significant impacts on sport and commercial fisheries and the rest of the ecosystem. The invasion of zebra mussel in the Great Lakes have also lead to the near extinction of native unionid clams in some regions of the Great Lakes by attaching to established clam beds and smothering them (USGS Great Lakes Science Center 2004). Private and public water intake pipes are also easily clogged by the zebra mussel. Municipalities and industries drawing water from the Great Lakes spend an average of \$360,000 per year to keep pipes free of zebra mussels (Great Lakes Panel 1998). In some instances, pipes are not salvageable and new infrastructure has to be built. The zebra mussel and sea lamprey are just two examples of the many species invasive to the Great Lakes that have brought about pervasive economic and ecologic costs.

Statutory Framework for Prevention and Control of ANS

The Nonindigenous Aquatic Nuisance Prevention and Control Act (NANPCA) of 1990 (16 USC, 1001-2009) provides a federal statutory framework for ANS prevention and control activities in the United

States. It was passed by Congress in large part due to the discovery of zebra mussels in the Great Lakes in 1988 (Great Lakes Information Network 2005). The case of the zebra mussel served as a tangible event demonstrating the economic as well as ecological impacts caused by the introduction of one nonindigenous species. It served as a primary force in pushing this key piece of legislation through Congress, raising the profile of ANS to the level of toxic pollution or habitat destruction as an environmental issue. NANPCA defines nonindigenous species as any species that enters an ecosystem beyond its historic range. It defines ANS as a nonindigenous species that, by entering the ecosystem, may cause harm to any native species, the stability of the ecosystem, commerce, agriculture, aquaculture, or recreation (USGS 2005). The five main goals of NANPCA, as provided in the Act, are:

- to prevent unintentional introduction and dispersal of nonindigenous species into waters of the United States through ballast water management and other requirements;
- to coordinate federally conducted, funded or authorized research, prevention control, information dissemination and other activities regarding the zebra mussel and other aquatic nuisance species;
- to develop and carry out environmentally sound control methods to prevent, monitor and control unintentional introductions of nonindigenous species from pathways other than ballast water exchange;
- to understand and minimize economic and ecological impacts of nonindigenous aquatic nuisance species that become established, including the zebra mussel; and
- to establish a program of research and technology development and assistance to States in the management and removal of zebra mussels.

NANPCA also authorized the National Ballast Water Control Program and established the national ANS Task Force to work on preventing new ANS invasions and further dispersal of existing ones. NANPCA called for research and distribution of information on ANS environmental and economic risks, primary means of introduction and dispersal, methods for prevention, monitoring, and control, and assessment of prevention, monitoring, and control programs. The statute further required a Zebra Mussel Demonstration Program to study the species, ways to control it, and prevent future infestations (USGS 2005). Finally, NANPCA mandated the development and implementation of state ANS management plans (SMPs) to advance state efforts on prevention and control.

In 1996, NANPCA was amended and reauthorized by Congress as the National Invasive Species Act (NISA) (16 USC, 4701-4751). Despite amendments, ANS remain the focus of the legislation which does not include the issue of terrestrial invasive species. NISA recognized the difficulty of containing ANS which can spread through a variety of pathways once introduced and are difficult if not nearly impossible to eradicate once established. Given these findings, NISA takes a proactive, preventative approach not as clearly emphasized in NANPCA. NISA also amends the ballast water requirements and control strategies created under NANPCA to include additional requirements for record keeping, monitoring, and reporting for vessels (NOAA Coastal Services Center 2002).

Aquatic Nuisance Species Task Force and Regional ANS Panels

The ANS Task Force (Task Force) established under NANPCA is the primary body coordinating federal ANS management activities. It is dedicated to the prevention and control ANS and the implementation of NANPCA. The Task Force consists of 10 Federal agency representatives and 12 Ex-officio members, and is co-chaired by the U.S. Fish and Wildlife Service (FWS) and National Oceanic and Atmospheric Administration (NOAA). The Task Force includes five standing committees to address priority areas of ANS management: control; research; communication, education and outreach; detection and monitoring; and prevention. Within these committees, working groups address specific issues such as ballast water, specific species control (e.g., brown tree snake, zebra mussel, mitten crab), risk analysis, pathways and aquatic organism screening.

Recognizing the value of a multijurisdictional approach to ANS prevention and control, the Task Force also incorporates representation from six regional ANS panels also established under NANPCA to

operate under the auspices of the Task Force. Membership of the regional panels includes representation from state and federal government, tribes, non-government organizations, commercial and environmental interests, as well as neighboring countries. The role of the regional panels is to identify regional ANS priorities; coordinate ANS program activities in the region; make recommendations to the Task Force; and provide advice to public and private interests concerning methods of ANS management and control. The six regional panels are the Great Lakes Panel, Northeast Panel, Mid-Atlantic Panel, Gulf of Mexico and South Atlantic Regional Panel, Mississippi River Basin Panel, and Western Regional Panel.

The Task Force engages governmental agencies, stakeholders from the public and private sector, and representatives from the regional ANS panels to facilitate coordination of ANS prevention and control programming across the United States. The five primary goals of the Task Force as identified in their 2007 Strategic Plan are:

1. Develop strategies to identify and reduce the risk of harmful aquatic species being introduced into waters of the United States;
2. Minimize the harmful effects of ANS already introduced into the waters of the United States;
3. Facilitate research to address the threat and harmful effects of ANS;
4. Increase public understanding of the importance of reducing the introduction, spread, and impact of ANS and recommend appropriate domestic and international actions; and
5. Maximize the organizational effectiveness of the Aquatic Nuisance Species Task Force.

Great Lakes Panel on Aquatic Nuisance Species

The Great Lakes Panel on ANS (Panel) was the first regional panel established under the Task Force as required by NANPCA. The mission of the Panel, as stipulated in NANPCA is to:

- Identify ANS priorities for the Great Lakes;
- Develop regional position statements on ANS priorities;
- Make recommendations to the national ANS Task Force;
- Assist the ANS Task Force in coordinating federal ANS program activities;
- Provide advice to public entities, private sector groups and other interested parties concerning ANS prevention and control;
- Coordinate ANS program activities in the Great Lakes in areas related to information and education, research, policy and other areas; and
- Provide a forum for interagency/organizational communication and serve as a vehicle for regional dialogue and discussion on ANS issues.

Regular membership on the Panel is made up of representatives from U.S. and Canadian federal agencies, Great Lakes states and the provinces of Ontario and Quebec, tribal authorities, regional entities (e.g. Great Lakes Commission), stakeholder groups, local government, and the university/research community. Alternate members can also be appointed and can represent absent regular member at meetings. At-Large members are appointed for three year staggering terms to ensure there is additional and balanced representation of all stakeholders, and hold the same voting and other privileges afforded to other members. Additionally, Interested Parties and Observers may be designated by member suggestion and approval. Interested Parties and Observers may attend any Panel meeting and participate in discussion but have no voting privileges. Officers include a Panel Chair and Vice Chair. As mandated in NANPCA, the Great Lakes Commission (Commission) provides staff support to the Panel in the form of a Panel Administrator and additional personnel as needed (Great Lakes Panel 2007).

The Panel works to accomplish its mission and advance ANS priorities through three standing committees: Information/Education, Research Coordination, and Policy Coordination. The Information/Education (I/E) Committee works to coordinate educational outreach activities throughout the Great Lakes region and build a collaborative partnership between educational entities to promote consistency in ANS related messages communicated to the public. The Research Coordination Committee provides a forum for dialogue among research scientists or those sponsoring ANS research in the Great

Lakes region to enhance communication and coordination of ANS research. The Policy Coordination Committee develops and promotes policy positions on ANS issues, shares information about ANS legislative and appropriations issues, promotes the development and implementation of SMPs, and coordinates Panel involvement in regional legislative and policy related ANS initiatives. Each committee establishes regional priorities for work in their area (Great Lakes Panel 2007) and can be found on the Panel website at <http://glc.org/ans/panel.html#committees>. For further details on the Panel, refer to the document, *Great Lakes Panel Guidance for Operations* (<http://glc.org/ans/panel.html#guide>)

State ANS Management Plans

Section 1204 of NANPCA encourages states to develop a state management plan (SMP) for ANS prevention and control that would allow the state to receive technical, enforcement, or financial assistance to reduce the risk of invasions. In order to receive federal assistance, a state must submit a prepared ANS SMP to the Task Force for review and approval. The ANS SMP must have undergone a public comment period and received the Governor's signature before submission to the Task Force. Upon SMP approval by the Task Force, the state is then eligible to receive federal assistance, including funding for implementation of the SMP. NANPCA outlines four primary areas that should be addressed by an SMP:

- 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 aquatic nuisance species 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 (or any State or Indian Tribe involved in the interstate organization) does not have at the time of the development of the plan that may be necessary for the State (or any State or Indian Tribe involved in the interstate organization) to protect public health, property, and the environment from harm by aquatic nuisance species; and
- a schedule of implementing the plan, including a schedule of annual objectives, and enabling legislation (NANPCA 1990).

NANPCA also states that SMPs should identify areas and activities within the state or interstate region, other than public facilities, that federal support in the way of funding, technical support, or enforcement will help with the prevention and/or spread of ANS. Only public facilities requiring technical/financial assistance for zebra mussel control should be identified. Further, NANPCA encourages states to collaborate with local and regional governmental organizations, tribes, and public and private organizations with knowledge of ANS during both the development and implementation phase. Upon request, the Task Force may also provide assistance to the states in the development of their plans. The Task Force *Guidance for State and Interstate Aquatic Nuisance Species Management Plans* provides examples of how plans can be laid out and what they should contain (ANS Task Force 2005b).

States eligible for federal assistance may apply to the Director of the U.S. Fish and Wildlife Service for funding to support SMP implementation. In their application, states must identify and describe the best management practices that will be used in SMP implementation. They must also show that the federal share of implementation funding will not exceed 75 percent of the total implementation costs and not more than 50 percent with regards to zebra mussel control on public facilities. States are required to use in-kind fund matching for their share against the federal grant. Of the federal grant money given, no more than 5 percent is allowed to be used for administrative costs. The Task Force may provide additional aid to the states with enforcement issues if it is critical to successful SMP implementation (NANPCA 1990).

The Task Force reviews submitted SMPs based on twelve criteria during a 90 day review process as required by NANPCA. The criteria, available as part of the Task Force *Guidance for State and Interstate Aquatic Nuisance Species Management Plans*, are:

- Do goals reflect the intent of the Act [NANPCA] and address the problems within the geographic scope of the plan?

- Do objectives support goals and address priority concerns and problems?
- Are problems defined and described?
- Is an overview of specific problems and issues provided?
- Is a list of problem and potentially problematic species provided?
- Are gaps in Federal, State, local/tribal/non-governmental authorities presented?
- Is the geographic scope of the plan appropriate?
- Is coordination with other ANS management plans in the same drainage basin or adjacent States demonstrated?
- What matching funds are provided by the requesting entity (expressed in terms of a percentage)?
- What portion of the matching funds are cash contributions (as opposed to in-kind contributions)?
- Are the strategies, actions and costs accurate?
- Will they achieve the desired objectives? (ANS Task Force 2005b)

Submitted plans are presented at one of two annual Task Force meetings. Each Task Force member is given a copy of the proposed SMP as well as a checklist for help in determining if all twelve criteria are met. Task Force members then fill out a form recommending whether or not the Task Force should approve the SMP and if implementation funding should be awarded.

Based on the outcome of the Task Force Assessment, plans will be approved, conditionally approved with identified areas for improvement, or denied. If a plan is denied it may be revised to address gaps and resubmitted. Approved plans are approved for a maximum of five years at which point they are reexamined. States are encouraged to review their plans annually to make any necessary updates or revisions. Approved plans that receive funding are regularly monitored to ensure they are being implemented properly. If SMPs are not being adequately implemented, the Task Force may at any time revoke approval and funding of the plan. If the state then corrects its implementation failures, approval and funding may be reinstated (ANS Task Force 2005b).

When a state decides to revise their SMP, they must first determine if the revisions they will make fall into the category of minor technical revisions, major technical revisions, or complete plan overhaul. Minor technical revisions do not require approval from the Executive Secretary of the Task Force, and include only very minor changes such as correcting typographical errors or minor mistakes and updating contact information. Major technical revisions require approval and include changes such as the addition of a priority species, laws, or management techniques; the addition of issues not addressed in the original plan; and new or revised objectives. If a state determines that major technical revisions are necessary, they should conduct a scoping exercise to determine what changes are needed and then provide the Executive Secretary with an outline of the proposed revisions as well as a summary and justification. Plan revisions do not require the signature of the Governor or a public comment period.

To be considered a complete plan overhaul, changes to the original SMP must be extensive in format, content, management approaches, priority species, or a combination thereof. Most plan revisions will qualify as technical revisions unless the resulting plan is significantly different than the original. If revisions are determined to qualify as a complete overhaul, the process for submission is identical to the process for submitting the original plan, including gubernatorial signatures (ANS Task Force 2005b). In addition to the revised plan, a document focusing on only the specific changes made should be submitted to the Executive Secretary. If this requirement is not met, the review will be conducted as it would for a new plan. A preliminary response to plans that are considered new will be completed within 45 days and within 30 days if the plan is only a revision (ANS Task Force 2005b).

Any revised SMP must still include all the components set by the Task Force and it is strongly encouraged that a rapid response component be included as well. While a rapid response component is not currently required for Task Force approval, it likely will be in the future when Task Force criteria are updated (ANS Task Force 2005b). The Commission has prepared a *Model Rapid Response Plan for*

Great Lakes Aquatic Invasions (Model RR Plan) that will be useful for states in preparing this portion of their plan. The Model RR Plan lays out components that should be incorporated into a rapid response which include communication/organizational structure, outreach, detection and monitoring, decision support and rapid scientific assessment, management options for control/eradication, implementation, and adaptive management (Great Lakes Commission 2003). This resource is available online at <http://glc.org/ans/pdf/06-12-12-RR-Plan-Iteration-III-Dec06-NT2.pdf>.

ANS State Management Planning in the Great Lakes Region

The first state to have a Task Force approved ANS SMP was New York in 1994. The New York plan is currently being revised to update the plan, to allow for more public input, and to bring it into compliance with Federal guidance released after plan completion. Michigan received approval in 1996 and made revisions in 2002. The state of Ohio is, as of July 2007, considering revisions to their SMP which was approved in 1997. Illinois has had an approved SMP since 1999. Both Indiana and Wisconsin received approval in 2003. Most recently, Pennsylvania's SMP was approved in 2007. As of July 2007, Minnesota is the only Great Lakes state without an approved SMP. The state has focused its efforts on creating a comprehensive SMP, to include both aquatic and terrestrial invasive species, which has made the process more complex. Pennsylvania began their SMP development with similar goals, but later decided to submit an aquatic species only SMP. It should be noted that states with comprehensive SMPs are still eligible for federal assistance through the Task Force; the funds however can only be used for implementation of the aquatic species component of the plan.

Each state has used differing approaches to development of their ANS SMP, usually to comply with state mandates. Indiana's process is one that provides a useful example of an effective development process and plan. Indiana used a Steering Committee comprised of a wide array of stakeholders to guide SMP development. Included in this steering committee were state resource agencies, environmental groups (e.g., The Nature Conservancy), aquaculture groups, aquarium groups, museums and zoos, pet retailers, shipping associations, universities, and community foundations. Indiana's approach provided an opportunity to educate stakeholder groups that may be responsible for part of the ANS problem and allowed them to brainstorm ways they can alter business or behavioral practices voluntarily with little or no financial impact. Participating in this exercise may also have educated them on ways ANS are damaging their respective industries and interests, thus increasing support for ANS prevention and control efforts. The result of this collaborative effort is a more robust and more effective, publicly accepted SMP. For information on SMP development strategies other states have used, please refer to Appendix A.

Summaries of state management planning efforts in each state were compiled in 2005 by the Commission as part of research for an SMP project described later in this document. The summaries were obtained by sending a list of questions to key contacts involved in state ANS management to provide an overview of the status of SMP development/implementation and identify state needs to advance SMP progress. Each summary and associated guidance materials have been included in Appendix A. In addition, Hawaii's completed and approved SMP has also been included as an example of a well written plan from outside the Great Lakes region (Appendix B).

SMP Funding Capacity and Obstacles

ANS Task Force Funding

Congress has appropriated \$1.1 million to the Task Force annually for the past several years. This appropriation is meant to cover all expenses associated with Task Force duties and functions, after which remaining funds are allocated among the states with approved SMPs. Noteworthy is the steadily increasing number of approved SMPs and relatively static funding level which has resulted in an annual decrease in the amount of funding available to individual states. This has driven states to lobby Congress to increase the level of funding appropriated to the Task Force and strategize alternative sources of

funding for SMP implementation activities. States applying for Task Force funding must submit a Governor signed budget request indicating the level of funding required to fully implement its SMP. This information could be used in lobbying efforts. Ultimately, Congress must be convinced that an increase Task Force funding is necessary to accommodate the increasing number of approved SMPs and ensure their implementation.

Funding Sources for Plan Development

The majority of Great Lakes states with completed plans were able to fund SMP development through state resource management agencies, as indicated by SMP summaries gathered by the Commission (Appendix A). Two states, Michigan and Ohio, participated in the SMP development process early enough that they were able to obtain small grants from the Task Force to assist them in the process. Those grants were available separately from implementation funding and are no longer available. In some cases, such as Pennsylvania, the development process was initiated using funding from a Commission project focusing on state management planning, as described in the following section. Other alternative funding sources for SMP development and/or implementation that states have utilized include boat gasoline taxes, trailer taxes, fishing license taxes, lake association grants, voluntary boater decal purchasing program, and state-local cost share programs.

Great Lakes Commission Efforts to Advance State Management Planning

Model Comprehensive State Management Plan

In 1996, the Great Lakes Commission provided a report to assist the Great Lakes states on SMP development. The *Model Comprehensive State Management Plan for the Prevention and Control of Nonindigenous Aquatic Nuisance Species* (Model Plan) was developed by Katherine Glassner Shwayder, Commission Project Manager, with guidance from the Great Lakes Panel. The components of the report include an introduction and instructions for using the Model Plan and lays out recommended components for an SMP, including ANS background information, policy background, intended management actions, implementation measures and timeframe, program monitoring and evaluation, a glossary, and appendices. Also provided are examples and explanations for each recommended component which are laid out in the suggested SMP format. Most Great Lakes states that have developed a SMP thus far have used the Model Plan to assist in their plan development. Further information on the Model Plan is available online at <http://www.glc.org/ans/pdf/modelbmp.pdf>.

Since development of the Model Plan, knowledge on the ANS issue has expanded, particularly regarding impacts, species characteristics and the numerous vectors facilitating ANS introduction and spread. There has also been an increasing shift in focus towards prevention and rapid response. It is anticipated that SMP guidelines provided by the Task Force will be revised based on these new developments.

Collaborative State Management Plan Project

In 2003, NOAA's National Sea Grant College Program provided the Commission with project funding to hold SMP related workshops in each of the Great Lakes states. The purpose of the workshops was to assist the states in the development, implementation, evaluation, or revision of their SMP, dependent on the state's needs. Workshops were planned and conducted by the Commission in collaboration with the Great Lakes Sea Grant Network and state environment/natural resource agencies. This collaborative effort brought together the strengths and expertise of each organization in efforts to advance management efforts to prevent and control ANS. Involvement of the state agency provided the key authority and management expertise to develop and implement ANS management strategies. State agency involvement provided the input needed to prioritize the needs of the state with regards to ANS management planning. Sea Grant Program involvement provided access to facilitation and outreach expertise as well as a wide array of resources and stakeholders to facilitate public education and involvement. As administrator for the Great Lakes Panel and grantee for this project, the Commission provided a regional perspective and expertise in coordination and building partnerships.

Providing the foundation for work conducted under this project, a Memorandum of Agreement (MOA) was established for each workshop between the three sponsoring organizations. The primary function of the MOA was to provide a mechanism for the pass through of funds from the Commission to the state Sea Grant office. The state Sea Grant Program was then charged with using the funds to organize and arrange logistics of the workshop with assistance from Commission staff. Overall, the MOA clarified roles, designated responsibilities, facilitated dialogue between the organizations, and laid the groundwork for future collaborative ANS management efforts. The collaborative work of these partners under the MOA yielded a series of workshops held in six Great Lakes states during the period between 2005 and 2007. As part of the MOA, Commission staff prepared a summary document of each state's workshop, available online at <http://glc.org/ans/initiatives#advance>.

Throughout these workshops, a number of common themes began to emerge. Commission staff found that despite the differing priorities and contexts for ANS management among the states, the workshop and associated funding provided a catalyst for advancing the SMP process within each state. In addition, project partners found that stakeholder involvement was essential to having a robust and effective process of SMP development and/or implementation. This project served not only to educate stakeholders of the risks and impacts associated with ANS, but also to engage them, thus encouraging their investment in the outcomes of state management planning. Another significant theme was the value of relationships between state agencies and Sea Grant programs, and between the states and the Commission. This collaboration allowed the leveraging of critical resources and expertise to advance the SMP process and has laid the foundation for future collaborative efforts to prevent and control ANS in the Great Lakes region. Given the limited resources available to states for ANS management efforts, the cooperation between these organizations contributed significantly to the success of this project.

At the conclusion of the workshops and as states progressed through the SMP process, the Commission organized a special one-day session as part the May 2007 joint meeting of the ANS Task Force and Great Lakes Panel to share project outcomes. Project partners were eager to share their experiences, particularly with the members of the ANS Task Force. This session provided a forum for the states to exchange ideas and lessons learned from each of the workshops and provided an opportunity to develop recommendations for improving and advancing ANS management planning at a regional and federal level. The discussions that took place during this session generated strategies that could be used to overcome certain obstacles states were experiencing, such as the limited availability of resources and the lack of public/political support for ANS management initiatives. Concern was expressed that the typical approach for outreach efforts conveying information on ANS issues has been "fear-based" and that this negativity may not be most effective means of garnering support. It was suggested that there be a shift to frame the discussion in terms of positive outcomes to stakeholders (citizens or legislators), showing them how they benefit from SMP and related ANS prevention and control activities. Participants thought it important to demonstrate a promising outcome when attempting to secure funding investments for priority ANS issues, as well as to have a financial plan to aid in identifying potential funding sources.

A variety of creative funding strategies were suggested including using a consultant to develop a long-term funding strategy and financial management plan; applying to other federal grant programs; prioritizing activities at which to direct funds; leveraging private funding sources with the aid of the regional panels; and utilizing lobbying resources of the Sea Grant Network to advocate for increased appropriations. Session participants also expressed a desire and need for strong federal leadership to increase the amount of funding provided for SMP work. Participants recommended states develop an evaluation process to ensure funding is spent wisely and states can communicate success. Also identified were needs to determine the value and feasibility of developing a combined aquatic and terrestrial invasive species plan and to improve capacity to respond to ANS invasions. Discussion regarding a regulatory approach to ANS management suggested that a strong foundation of support is needed to establish the enabling legislation (e.g., listing process for prohibited ANS) and that states and federal representatives need to work together on regulatory issues.

Additional outcomes of this session yielded further recommendations including regional panel review of current Task Force SMP guidelines and suggestions for their revision; increasing regional coordination on certain aspects of ANS management planning such as rapid response and monitoring; strengthening communication between the regional panels identifying common issues and associated needs; finding ways to measure success; and investigating the potential for establishing a time limit on the use of SMP funding and associated reporting. A summary of this session and associated outcomes can also be found at <http://glc.org/ans/initiatives#advance>.

Future Directions in the Prevention and Control of ANS

Great Lakes Regional Collaboration

The Great Lakes Regional Collaboration (GLRC) was established in May 2004 by an Executive Order issued by President Bush (USEPA 2005). The Executive Order recognized the Great Lakes as a national treasure, stating the necessity of collaboration among the numerous federal, state, tribal, local, and intergovernmental bodies currently addressing resource management in the Great Lakes ecosystem. Toward this end, it established the Great Lakes Interagency Task Force (GLITF), a team of ten U.S. Cabinet and Agency heads to coordinate restoration of the Great Lakes. The GLITF was assigned to work with all government entities and interested parties in the Great Lakes basin, as well as with Canada and its two provinces with jurisdictions in the basin to create consistent federal policies and activities for addressing Great Lakes basin issues, develop science based goals for the region, and establish a working group to make recommendations (USEPA 2005).

In response to the Executive Order, the GLITF with support from the Council of Great Lakes Governors, the Great Lakes Cities Initiative, Great Lakes tribes and the Great Lakes Congressional Task Force moved to convene a group now known as the Great Lakes Regional Collaboration (GLRC). The Collaboration included the GLITF, the Great Lakes states, local communities, tribes, non-governmental organizations and other interests in the Great Lakes region. The GLRC was officially launched with the first Conveners Meeting in December 2004 and was attended by approximately 400 regional leaders and stakeholders. An outcome of these meeting was the creation of eight issue area strategy teams to address a specific threat to the Great Lakes. The eight Strategy Teams included: aquatic invasive species; habitat and species; coastal health; areas of concern; non-point source pollution; toxic pollutants; information and indicators; and sustainability. Teams were made up of subject-matter experts from a diversity of backgrounds and were responsible for drafting action items and recommendations to their issue area. In addition, the teams were asked to address several overarching considerations and topics: human health impacts and priorities; tribal interests and perspectives; and research and monitoring (USEPA 2005). In December 2005, the GLRC submitted to the President the *Great Lakes Regional Collaboration Strategy to Restore and Protect the Great Lakes*, a comprehensive report detailing priority near-term actions recommended by each strategy team. Since its release, this report has provided direction and support to significant restoration activities in the Great Lakes basin and will likely continue to be a rallying point for the region into the future.

Aquatic Invasive Species Strategy Team

The AIS Strategy Team was charged with developing an action plan to stop the introduction and spread of AIS/ANS (used interchangeably here) into the Great Lakes. The team addressed a wide range of issues, including ballast water management; implementation of NANPCA; Asian carp barriers and related issues; rapid response; prevention and mitigation; outreach and education; and applied research, among others. Development of the AIS action plan was divided into five sections, each addressing one of the primary vectors identified as accountable for Great Lakes aquatic invasions: maritime commerce, canals and waterways, organisms in trade, aquaculture and recreational activities. Drafting teams developed comprehensive reports on each of the vectors which were summarized in a five-page action plan with the primary goal of preventing “all new introductions of AIS into the Great Lakes” and stopping, extirpating, and/or controlling harmful AIS populations to levels that “ensure sustainable ecosystems and the social,

economic and cultural uses they support.” A complete copy of the AIS Strategy Team plan, and the overarching report, can be found at <http://www.glrc.us>. The vector-based approach to management, as evidenced in the organization of the AIS Strategy Team’s action plan, represents an emerging trend in ANS prevention and control. While the GLRC ultimately supports a comprehensive approach to ANS management, other recent ANS prevention and control initiatives in the region have focused on specific, high-risk/high-priority vectors.

Great Lakes Water Quality Agreement Review

The Great Lakes Water Quality Agreement has guided the cleanup and restoration of the Great Lakes by providing the vital framework for binational cooperation, consultation and action since 1972. The International Joint Commission (IJC), a binational agency of the United States and Canada, is the entity responsible for monitoring the implementation of the GLWQA, including reporting on accomplishments and failures in meeting its goals. While the Agreement currently does not address the AIS issue directly, the IJC has recently recommended that AIS management activities be included. In October 2006, the IJC released a special report recommending that the two federal governments replace the current GLWQA with a shorter and more action-oriented document. The report was the product of a comprehensive review of the operation and effectiveness of the Agreement, launched earlier in 2006 by the national governments (IJC 2006). The GLWQA has not been revised nor updated since 1987. As part of its report, the IJC recommends the development of a Binational Action Plan that would include activities to control and prevent invasive species. As AIS are considered a form of biological pollution and have known impacts on water quality and beneficial use impairments, they can be considered to fall under the purview of the Agreement. Incorporating clear goals and accountability mechanisms for AIS management in the GLWQA would provide the foundation for binational coordination and uniformity, thus strengthening implementation and enforcement of prevention and control efforts related to existing or future rules related to AIS vectors (Special Issues Work Group 2006).

Significant Legislative Initiatives

Comprehensive Federal Legislation

Since 2002, bills have been introduced in both the House and Senate each session of Congress to revise and reauthorize NANPCA (as amended by NISA) and have yet to pass. This particular piece of legislation was endorsed with the release of the GLRC Strategy in 2005, which incorporated the reauthorization of NANPCA/NISA in its comprehensive recommendations. The bill, commonly known as the National Aquatic Invasive Species Act (NAISA), addresses each of the high priority vectors of AIS introduction and spread. It was reintroduced in the Senate in 2007 with the following major provisions included:

- Require all ships, with limited exceptions, to meet an environmentally protective performance standard for ballast discharge by 2012 or treat to the best performance level available;
- Establish a mandatory ballast water management program that includes on-board invasive species management plans, ballast management reporting requirements, and best management practices for all ships in U.S. waters;
- Require NOBOB ships to flush tanks in the high seas before entering the Great Lakes;
- Authorize the improvement and operations of the ANS dispersal barriers in the Chicago Ship & Sanitary Canal;
- Increase resources for the citing and construction of additional dispersal barrier projects and establish a monitoring program;
- Create a screening process for planned importations of live aquatic organisms not yet in trade;
- Direct the IJC to analyze the prevention efforts in the Great Lakes;
- Create education and outreach programs to inform the public on preventing transfers of AIS;
- Supports the development and implementation of ANS SMPs, including early detection, screening and rapid response activities by states and regions;

- Steps up research on high-risk invasion pathways and alternative prevention and control technologies as well as ecological surveys for early detection of AIS and analysis of invasion rates and patterns; and
- Makes available \$150 million per year in federal funds for AIS prevention, control, and research.

The comprehensive approach of this legislation has been supported by the GLRC and a majority of stakeholders in the region, including the Great Lakes states. Unfortunately, a lack of political will given other high priority national concerns has stalled its passage. In the interim, focus on high profile ANS issues such as ballast water has led to other actions addressing specific vectors.

Ballast Water Management

Federal Legislation

Given that Congress has failed to act on comprehensive AIS legislation, interest and engagement has been focused on preventing the introduction and spread of AIS through ship ballast water. As with NAISA, legislation to tackle the ballast water issue has repeatedly been introduced in Congress. Versions of this legislation fluctuate around several common core issues that continue to be a point of discussion and contention among stakeholders and have prevented its passage. These core issues are summarized as follows:

- What treatment standard should ballast water discharge be required to meet?
- What is an appropriate timetable for application of the standard?
- Should intra-lake shipping be treated differently (i.e. should regulations apply to “lakers”)?
- Should the legislation pre-empt the authority of the EPA under the Clean Water Act to regulate discharge from ships?
- Should regulations under the federal legislation pre-empt State authority to impose state rules or programs?
- Should a Great Lakes specific approach be taken (i.e. should certain rules, programs or provisions apply only to the Great Lakes)?
- Should the region continue to support comprehensive federal legislation to address the release of AIS from all vectors, or support a solution for ballast water only?

The GLRC, while overall supporting a comprehensive approach to AIS management and the NAISA bill, makes specific recommendations regarding ballast water management. The GLRC supports federal regulation of ballast water including the implementation of “environmentally protective” ballast water standards, effective ship-board treatments and management measures that include NOBOB vessels and best-performing ballast water management practices for non-ocean going vessels operating exclusively within the Great Lakes (“lakers”). National and regional concern over this issue is significant enough to spur significant Congressional action.

Great Lakes State Efforts

The lack of federal ballast water standards has compelled certain states to enact ballast water treatment requirements on their own. The states of Washington, Oregon and California have undertaken efforts to control and, in the case of California, stringently regulate ballast water discharges on the West Coast. Great Lakes states are now moving forward with similar initiatives. Several Great Lakes have introduced ballast water legislation, including Wisconsin, Minnesota, Pennsylvania, Indiana and Ohio; however as of August 2007, Michigan is the only state to successfully pass such regulations.

In 2005, the Michigan legislature passed a bill requiring all oceangoing vessels to obtain a permit from the Michigan Department of Environmental Quality (MDEQ) before entering a port in state waters beginning January 1, 2007. Subsequently, the MDEQ drafted and finalized a general permit which is issued if the applicant can prove that the vessel will not discharge ANS or will utilize environmentally sound technology and methods, as determined by MDEQ, to prevent the release of ANS. The permit provides that one of several types of ballast water treatment is required. Any oceangoing vessel that enters

a Michigan port must use one of the approved treatment types or must apply for an individual permit which will be reviewed on a case by case basis. Since the permit has gone into effect, a number of companies have applied for and received permits. In March 2007, however, several international shipping companies filed suit against MDEQ and the state Attorney General challenging the Michigan regulation as unconstitutional because it interferes with interstate commerce. In August 2007, the federal court judge dismissed the lawsuit and ruled that the Michigan law is constitutional. The outcome of this suit supports the ability of states to protect their waters from ANS and will likely drive action by other states to pass ballast regulation in the absence of a federal program.

Regional ANS Management

Some recent consideration and discussion has been devoted to the development ANS management plans on a regional basis. Given that ANS is a region-wide issue and not just a state issue, it follows that the best results will come when states implement similar programs and work together on common problems. ANS Task Force guidance for state and interstate ANS management plans issues in 2005 sets forth several recommendations for the development of an effective regional plan which include:

- fostering interjurisdictional cooperation and collaboration during the planning process with participation and support from any applicable stakeholder groups;
- prioritization of issues;
- determination of the agency or organization responsible for specific implementation actions;
- public education and participation; and
- information sharing, and collaboration with national, state, and local ANS control efforts (ANS Task Force 2005a).

Task Force approval and funding requirements for regional ANS management plans are the same as for an SMP. Potential benefits of a regional plan include increased coordination of ANS control efforts on a watershed basis and additional availability of federal funding for the region.

Regional ANS management planning was discussed at the aforementioned 2007 spring meeting of the ANS Task Force and Great Lakes Panel during the special SMP session. Comments during these discussions indicated that coordination of SMPs at the regional level should be a responsibility of the regional panels. Specific areas were identified that participants thought would benefit most from regional planning such as rapid response, species-specific management, and monitoring using a standardized, regional approach. It was suggested that increased regional planning and support could also have the potential to leverage more funding from federal agencies to implement management activities. While potential advantages to regional planning were expressed, there was also concern about regional planning efforts drawing funding away from state efforts. Overall, it seems that there is a need to at least strengthen consistency among state plans.

Assessment of State ANS Management Plans

Program Evaluation Overview

A final emerging trend in ANS state management efforts is that of program assessment, or evaluation. Given the limited availability of funding and other resources for ANS SMPs, it is important to determine the efficacy of management efforts being implemented under the plan to ensure resources are expended wisely. One way to accomplish this is through development of mechanisms for evaluation leading to adaptive management for improved results. Program evaluation, as defined by the U.S. Government Accountability Office (GAO), is used to “assess how well a program is working” and is “often conducted by experts external to the program, either inside or outside the agency, as well as by program managers” (GAO 2005). The GAO identifies four different types of program evaluation:

- **Process (or implementation) evaluation:** used to determine if a program is being carried out in the way it was intended;

- **Outcome evaluation:** used to determine whether the goals and objectives of the program were achieved and the reasons for success or failure;
- **Impact evaluation:** used to compare the outcomes of the program based on predictions of what probably would happen in the absence of the program, by isolating from all other external factors in order to determine its benefit; and
- **Cost-benefit and cost-effectiveness analyses:** used to compare the cost of implementing the program with the benefit of the program. Cost-benefit focuses on all relevant costs and benefits and cost-effectiveness focuses on the lowest cost alternative.

Explained further, program evaluation allows entities to measure performance as well as examine a broader range of information on performance and context to provide an overall assessment of whether the program works. This leads to the identification of adjustments that can be made to improve performance which is critical to increasing the success of ANS management plans and creating a culture of adaptive management. An alternative to comprehensive program evaluation is performance measurement. According to the GAO, performance measurement should be conducted by the lead agency regularly and on an ongoing basis to determine if the program is moving sufficiently towards its goals and objectives. It should address the process, outputs, and outcomes of a program. While performance measurement is generally less in depth than program evaluation, it gives ongoing information on the successes and failures of a program in order to keep it on the right track (GAO 2005).

Adaptive Management

Adaptive management gives program managers the ability to revise and update a given plan as needed as a result of “constantly changing environmental conditions, sudden shifts in political interests and objectives, and a continuous barrage of new and often ambiguous information” (Brody 2003). The ability for adaptation must be incorporated into a plan for it to be fully comprehensive. A plan must be flexible due to ever-present ambiguity and uncertainty, allowing for managers to change the course of action when new information becomes available, such as the impact of global climate change on ANS. Resource managers must consistently make decisions with uncertain science, and adaptive management gives them a process to help react more quickly when new information is discovered. Plans written to incorporate adaptive management considerations facilitate necessary adjustments without excessive lag-time that would potentially lead to a worsening of the problem before it can be resolved. This ability is important for plans focusing on ANS as newly introduced species, or species found to cause harm, may establish beyond the eradication or control point if managers are not equipped to respond to the newly discovered threat rapidly.

A potential problem with adaptive management, however, is a lack input from stakeholders. If a stakeholder advisor group was used to assist in plan formation, an opportunity for approval of any changes in the plan may be expected by stakeholders. Thus, efforts should be made to balance adaptive management needs with stakeholder interests. A provision for this balance should be explicit in the plan so response is not hindered. A possible strategy is the formation of an advisory group sub-committee to examine and approve or disapprove changes to the management plan.

Evaluation in Practice

Integral to the effort of evaluation is the methodology by which the evaluation takes place. Evaluation must include a systematic method for judging the effectiveness and success of management plans. In their *Evaluation Handbook*, the W.K. Kellogg Foundation recommends development of an evaluation team or task force comprised of a “manageable subset of stakeholder representatives” to aid in the design and implementation of an evaluation. Consultation of this team throughout the evaluation process will help to “increase the amount and reliability of information collected” and “the likelihood that recommendations will be accepted and implemented” (W.K. Kellogg Foundation 1998). Further, the U.S. Department of Health and Human Services recommends using the following steps to conduct an evaluation:

Step 1: Assemble an evaluation team. Planning and executing an evaluation should be a team effort. Even if you hire an outside evaluator or consultant to help, you and members of your staff must be full partners in the evaluation effort.

Step 2: Prepare for the evaluation. Before you begin, you will need to build a strong foundation. This planning phase includes deciding what to evaluate, building a program model, stating your objectives in measurable terms, and identifying the context for the evaluation. The more attention you give to planning the evaluation, the more effective it will be.

Step 3: Develop an evaluation plan. An evaluation plan is a blueprint or a map for an evaluation. It details the design and the methods that will be used to conduct the evaluation and analyze the findings. You should not implement an evaluation until you have completed an evaluation plan.

Step 4: Collect evaluation information. Once you complete an evaluation plan, you are ready to begin collecting information. This task will require selecting or developing information collection procedures and instruments.

Step 5: Analyze your evaluation information. After evaluation information is collected, it must be organized in a way that allows you to analyze it. Information analysis should be conducted at various times during the course of the evaluation to allow you and your staff to obtain ongoing feedback about the program. This feedback will either validate what you are doing or identify areas where changes may be needed.

Step 6: Prepare the evaluation report. The evaluation report should be a comprehensive document that describes the program and provides the results of the information analysis. The report should also include an interpretation of the results for understanding program effectiveness. (U.S. Department of Health and Human Services 2003).

In a publication entitled *Seeking Signs of Success: A guided approach to more effective watershed programs*, Beyer et al. (2001) discuss how to build a watershed management plan from the ground up, incorporate evaluation measures into its design, and evaluate the success of an established management plan. The guide is laid out in an interactive workbook format to help managers plan their activities on a guided step-by-step basis. Though the workbook is designed for watershed management programs, it can be used as assistance in developing any type of successful environmental management program. The following is a brief overview of this publication; a complete copy can be obtained at www.rivercare.org.

Success can be easily defined in many settings, such as businesses using profits to define of success. Defining the success of an environmental management program, however, poses a much greater difficulty. In this case, success can only be measured if the plan has outlined a clear vision (Beyer et al. 2001). In an effective plan, a clear vision leads to specific goals, leading to specific actions, leading to the anticipated outcomes and impacts. In this instance, success is achieved when this path leads to the desired outcomes, as defined by the program, in actuality. The evaluation and determination of this success includes defining, measuring, assessing, and valuing the outcomes, impacts, and actions of a program. Gathering and measurement of scientific data on changes in the ecosystem is one way to accomplish this; however it can be a slow, expensive, and difficult process which generally includes some amount of uncertainty surrounding the cause and effect relationship. That is, it can be difficult to confirm that changes which occurred were a result of actions taken under the plan or were more a result of natural fluctuations or other contributing factors. Specific guidelines or criteria must be established in order to determine success. Based on these guidelines or criteria, a variety of methods that are quantitative, qualitative, or descriptive can be used to measure success. Tools for measurement could include monitoring, observation, focus group discussions with stakeholders, stakeholder interviews, and surveys.

To best and most easily measure success, the methods and tools used for the evaluation should be chosen based on the program and evaluation objectives (Beyer et al. 2001).

Program evaluation, conducted on a regular basis, can greatly improve the management and effectiveness of SMPs and associated management activities. To do so will require commitment and understanding from both managers and stakeholders involved in the process. Given the different approaches and priorities of states in SMP efforts, it is expected that one size will not “fit all” when it comes to assessing the effectiveness and success of management plans; however, the overarching principles presented here should provide guidance for entities preparing to undertake a program evaluation. It is important to note that program evaluations can be used not only to improve management activities, but also to demonstrate the successes and strengths of state management activities at addressing ANS prevention and control. These successes can then be used to make a case for increased funding and support for continued implementation of ANS management activities.

Literature Cited

- Aquatic Nuisance Species (ANS) Task Force. 2005a. What are ANS? <<http://www.anstaskforce.gov/ans.php>>
- Aquatic Nuisance Species (ANS) Task Force. 2005b. ANS Task Force Guidance for State and Interstate Aquatic Nuisance Species Management Plans. <<http://www.anstaskforce.gov/stateplans.php>>
- Beyer, Amy S., C.K. Contant, and M.J. Donahue. 2001. Seeking Signs of Success: A guided approach to more effective watershed programs. Harbor House Publishers. Boyne City, MI.
- City of Chicago Department of Environment and United States Fish and Wildlife Service. 2005. Closing the Revolving Door: Summary of the Aquatic Invasive Species Summit Proceedings.
- Grigorovich, I.A., R.I. Colautti, E.L. Mills, K. Holeck, A.G. Ballert, and H.J. MacIsaac. 2003. Ballast-mediated animal introductions in the Laurentian Great Lakes: retrospective and prospective analyses. *Can. J. Fish. Aquat. Sci.* 60: 740-756.
- Glassner-Shwayder, Katherine. 2000. EPA Briefing Paper: Great Lakes Nonindigenous Invasive Species. Resource Management Program, Great Lakes Commission. Prepared for the U.S. Environmental Protection Agency Great Lakes National Program Office.
- Great Lakes Commission. 2003. Draft Model Rapid Response Plan for Great Lakes Aquatic Invasions. <<http://www.glc.org/ans/pdf/06-12-12-RR-Plan-Iteration-III-Dec06-NT2.pdf>>
- Great Lakes Information Network. 2005. Zebra Mussels in the Great Lakes Region. <<http://www.great-lakes.net/envt/flora-fauna/invasive/zebra.html#resources>>
- Great Lakes Panel on Aquatic Nuisance Species. 1998. Biological Invasions: How aquatic nuisance species are entering North American waters, the harm they cause and what can be done to solve the problem.
- Great Lakes Panel on Aquatic Nuisance Species. 2007. Guidance for Operations. <<http://glc.org/ans/documents/07-04-27OpsGuidanceFinal-FINAL.pdf>>
- International Joint Commission (IJC). 2006. IJC recommends a new Great Lakes Water Quality Agreement for the 21st Century. Media release. October 24, 2006.<http://www.ijc.org/rel/news/061024_e.htm>
- Lovell, Sabrina J. and Susan F. Stone. 2005. The Economic Impact of Aquatic Invasive Species: A Review of the Literature. National Center for Environmental Economics.
- MacIsaac, H.J., I.A. Grigorovich, and A. Ricciardi. 2001. Reassessment of species invasion concepts: the Great Lakes basin as a model. *Biological Invasions* 3: 405-416.
- Mills, E. L., J. H. Leach, J. T. Carlton, and C. L. Secor. 1993. Exotic species in the Great Lakes: A history of biotic crises and anthropogenic introductions. *J. Gt. Lakes Res.* 19(1): 1-54.
- Mills, E.L., J.H. Leach, J.T. Carlton, and C. L. Secor. 1994. Exotic species and the integrity of the Great Lakes: lessons from the past. *BioScience* 44.n10 (Nov 1994): 666(11).
- National Invasive Species Act of 1996. 16 USC, 4701-4751.
- NOAA Coastal Services Center. 2002. National Invasive Species Act of 1996. <http://www.csc.noaa.gov/cmfp/reference/National_Invasive_Species_Act_1996.htm>
- Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990. Public Law 101-646. 16 USC, 4701-4741.
- Office of the President. 1999. Presidential Documents, Executive Order 13112 of February 3, 1999: Invasive Species. *Federal Register* V. 64. No. 25. Monday, February 8, 1999. p. 6183-6186.

- Special Issues Working Group (SIWG). 2006. Great Lakes Water Quality Agreement Review Special Issues Working Group Final Report. Unpublished report. December 19, 2006.
- U.S. Department of Health and Human Services. 2003. Chapter 2: What is program evaluation? The Program Manager's Guide to Evaluation. <http://www.acf.hhs.gov/programs/opre/other_resrch/pm_guide_eval/reports/pmguide/chapter_2_pmguide.html>
- U.S. Environmental Protection Agency (USEPA). 2005. Regional Collaboration: Making the Great Lakes Greater. <<http://epa.gov/glnpo/collaboration/>>
- U.S. Government Accountability Office (GAO). 2005. Performance Measurement and Evaluation: Definitions and Relationships. <<http://www.gao.gov/new.items/d05739sp.pdf>>
- United States Geological Survey (USGS). 2005. Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (P.L. 101-646). <<http://nas.er.usgs.gov/links/control.asp>>
- USGS Great Lakes Science Center. 2004. Invasive Invertebrates: Zebra Mussel. <http://www.glsc.usgs.gov/main.php?content=research_invasive_zebramussel&title=Invasive%20Invertebrates0&menu=research_invasive_invertebrates>
- W.K. Kellogg Foundation. 1998. Evaluation Handbook. <<http://www.wkkf.org/Pubs/Tools/Evaluation/Pub770.pdf>>
- Wilcove, David S., D. Rothstein, J. Dubow, A. Phillips, E. Losos. 1998. Quantifying Threats to Imperiled Species in the United States: Assessing the relative importance of habitat destruction, alien species, pollution, overexploitation, and disease. *BioScience*. v. 48

Appendix A. Great Lakes State Management Planning Summaries (2005)

The following guidance outlines the information requested of state ANS representatives regarding the status of their state management plan. The questions were originally sent out via email and were answered either through a written reply or a phone interview. Compiled summaries follow the guidance and reflect the status of state management planning in the Great Lakes states as of 2005. Significant progress has since been made by several states since this information was collected and is not reflected in the following summaries. Additional information on ANS state management planning efforts for each state can be found on the Commission's website can be found at <http://glc.org/ans/initiatives#advance>.

Guidance for Summary of State Management Plan for ANS Prevention and Control

We ask that you consider the following questions in the outline below as guidance in developing a summary of the status of the state management plan (SMP) in your jurisdiction. You are encouraged to cover any other relevant issues not identified below.

- ❖ Introduction
 - Describe the basis of the state management plan, including history and background.
- ❖ Plan Development
 - Describe the processes utilized in the development of the SMP.
 - Identify the entities involved in the plan development (e.g., state natural resource agencies, Sea Grant agencies, national ANS Task Force (ANSTF), National Invasive Species Council, other groups (formal and informal).
 - What resources (e.g., financial, staff and others) are being (will be) used in the development of the SMP?
 - What obstacles have you faced in this process thus far?
- ❖ Goals and Objectives
 - What are the primary goals and objectives for the SMP?
 - What would help your state in reaching these goals and objectives?
 - What criteria have been established to determine if the goals and objectives address the challenges of ANS prevention and control in your jurisdiction?
- ❖ Implementation
 - What are the perceived obstacles and constraints?
 - Partnership interactions (government, public, private)
 - What partnerships have been pursued or intend to be pursued in the state planning process?
 - If pursued, how have the partnerships been helpful?
 - What factors would facilitate SMP implementation (e.g., stronger partnerships; state, regional, and/or national coordination; research; funding)?
- ❖ Evaluation
 - Is SMP implementation being measured for success? If so, what mechanisms and/or criteria will be applied to measure success?
 - Have the guidelines of the national ANSTF (www.anstaskforce.gov/state_guidance.htm, section VII) been integrated into the SMP?
- ❖ Funding
 - Is funding available for SMP planning? If so, what is (are) the source(s) of the funding?
 - Is funding available for implementation processes in addition to funding provided by the ANSTF? If so, what is (are) the source(s) of alternative funds?
 - Have prospective funding sources been identified and/or pursued for further plan development/updating and implementation?
- ❖ Status of the SMP process:
 - What is the timeframe of SMP development?

- What is the planning horizon for implementation?
- Describe the level of communication between the state agencies involved in the SMP process and the ANSTF.
- What factors could strengthen the relationship between your state and the national ANSTF?
- Describe the next steps in the SMP process.
- How could institutional, economic and/or political factors contribute to successful SMP development and implementation?
- What priorities in areas of outreach, research and policy/legislation could support the SMP planning and implementation process (e.g., invasive species life history, ecosystem function and food web disruptions, information/education, management/control options, vector analysis, regional coordination of invasive species policy)?
- ❖ Regional Planning
 - Has communication been established with neighboring jurisdictions in the process of SMP development and implementation?
 - If so, how have these regional perspectives been included in the development of your SMP?

To assist with planning the SMP workshops, please indicate the areas that your state considers most important to address. Please elaborate as appropriate and suggest other areas for consideration.

- Plan development and associated funding
- Goal development
- Implementation issues
- Financial
- Political
- Other priorities in areas of outreach, research, policy, legislation to support SMP development and implementation
- Evaluation criteria development
- Partnership development
- Regional collaboration

Illinois SMP Summary

Provided by Mike Conlin, Director, Office of Resource Conservation, Illinois Dept. of Natural Resources.

Introduction

Development of the plan began in 1998 when funding was made available through the US Fish and Wildlife Service and closely followed the model plan developed by the Great Lakes Panel under the federal ANS Task Force. The development stage took over a year and was submitted on October 25, 1999 for approval.

Plan Development

During the process of developing the plan, a committee was used which was comprised primarily of Department of Natural Resources (DNR) and Illinois Natural History Survey (INHS) personnel. Illinois - Indiana Sea Grant personnel also played an important role in the committee and development of the plan. Staff time was the major contribution as implementation of the plan didn't begin until after acceptance by the Task Force. The major obstacle in this process was the lack of information available and limited coordination among other state and federal agencies.

Goals and Objectives

The Illinois' plan has three main goals: 1) preventing new introductions of ANS; 2) limiting the spread of established ANS; and 3) abating harmful ecological, economical, social, and public health impacts from ANS infestations. Reaching these goals and objectives has been challenging. Several aspects of the program have been addressed through legislation and administrative rule development. The most significant obstacle to successful and complete implementation is the lack of available funds at both the state and federal level.

Implementation

Again, the lack of funds is the greatest obstacle for successful implementation. However, in the past year, there has been an increase in the amount of associated paperwork which must be completed in order to spend the limited funds available. This presents a significant and growing obstacle as well.

Evaluation

The electric barrier in the Chicago Sanitary and Ship Canal is being evaluated by use of fish stocked with implanted transmitters. Several lakes (treated through a program to control Eurasian Water milfoil) are being evaluated for percentage of reduction (coverage) of the invasive species. These data will be published when available. Outreach portions of the plan have measurable outcomes such as numbers of control plans developed (HACCP), number of organizations / societies which help spread the message through partnerships, and direct boater surveys. Further, there is a model study by Daniel Schneider that predicts where zebra mussels should be in throughout the state. , and in reality they're not as widespread as predicted. Whether this is a result of a successful outreach campaign cannot be predicted with certainty, but a survey of anglers has shown an increase in the number of anglers/boaters that take some sort of action to reduce the introduction and spread of invasive species, including zebra mussels. In fact, 84% of recreational water users now take proactive steps to reduce the spread of ANS, which is an increase of 15% over the past three years.

Funding

Funding implementation of the plan presents continuing challenges. In addition to funds provided by the Task Force through the US FWS, the State of Illinois provides additional funds through staff time, equipment, purchase of supplies and outreach materials, and direct costs for many projects. The DNR's Office of Water Resources has contributed over \$1.8 million to construction of the permanent electric barrier. State funds have been used to evaluate the existing barrier and provide design updates for the new system. The State of Illinois also contributes to regional programs, panels, rapid response, control and

management plans, all of which make the ANS program a significant expense. Future funding sources have been discussed, but their potential to absorb the growing costs of the program are unknown.

Status of SMP Process

The SMP process has been completed for the State of Illinois. As a result of a thorough legal review, the legislature has recently passed legislation which gives DNR better control on various introduction pathways and provides for increased penalties. The next major undertaking in the program is a five-year update to the existing management plan. Many of these areas will be addressed during the revision process.

Indiana SMP Summary

Provided by Doug Keller, Aquatic Invasive Species Coordinator, Indiana Dept. of Natural Resources.

Summary of Indiana Aquatic Nuisance Species Management Plan

Indiana's ANS Management Plan was developed by D.J. Case and Associates under contract to Indiana DNR, Division of Fish and Wildlife. The plan was developed by a multi-agency task force. There were 44 members on the work group who assisted in developing the plan including members from six DNR Divisions, U.S. Fish and Wildlife Service, Sea Grant, environmental consultants, The Nature Conservancy, three Indiana universities, ANS task force, Sierra Club, Aquaculture, Aquarium groups, Indiana Department of Environmental Management, Army Corps of Engineers, U.S. Dept of Agriculture, Bass Angler Sportsman Society (BASS), IN Dept of Transportation, IN Dept of Health, IN State Chemist, parks departments, and IN Lake Management Society.

Indiana's ANS Management Plan was completed and approved by Governor Kernan on November 1, 2003. The plan was approved by the National ANS task force on November 5, 2004 which made the state eligible for federal funding. Once all approvals of the plan were received, an Aquatic Invasive Species Coordinator position was sought in order to implement the plan. That position was filled in January of 2005. To view the Indiana ANS Management Plan you can go to <http://www.in.gov/dnr/invasivespecies/inansmanagementplan.pdf>.

There are seven goals listed in the management plan:

1. Coordinate all efforts among agencies and organizations both within Indiana and with other states and nations to manage ANS.
2. Prevent new introductions of ANS into the Lake Michigan and Mississippi River basins of Indiana.
3. Conduct monitoring programs to enhance early detection of introductions or invasions.
4. Institute rapid response objectives to limit the cost of controlling new introductions.
5. Limit the spread of established populations of ANS into uninfested waters of the state.
6. Mitigate harmful ecological, economic, social, and public health impacts resulting from infestations of ANS.
7. Evaluate the effectiveness of the plan and use adaptive management strategies to update the plan during initial implementation and after the five-year period of use.

Implementation of the ANS management plan hinged on the creation of a position fully dedicated to coordinating ANS activities. Funding was also necessary to pay for AIS activities, including funding the coordinator position. As mentioned earlier, an AIS coordinator position was approved and filled. The first year funding was approved by the Fish and Wildlife Service for \$72,023 and the second year funding is \$70,303.

In order to effectively implement the Indiana ANS Management Plan, some partnerships must be developed as most of the ANS issues cannot be solved by one state working alone. Rather, they should be dealt with on a regional or national level. The northern portion of the state lies in the Great Lakes

drainage. Indiana will participate with the Great Lakes ANS panel to address issues facing that region. The largest portion of Indiana lies within the Mississippi River drainage, so Indiana will also participate in the Mississippi River ANS panel. The coordinator will also stay abreast of national AIS issues and legislation as they arise. One area where Indiana still needs to foster a relationship to create dialogue is in the area of the aquarium/water garden industry. Some of the AIS introductions are a result of these vectors, so discussions are necessary to figure out how to lessen this threat. Partnerships must also be developed with universities to help guide necessary research projects that relate to AIS.

Over \$70,000 of federal money has been made available in the first two budget years to implement the Indiana ANS Management Plan. This funding requires a 25% state match which will likely come from the state Fish and Wildlife Fund and other non-federal reimbursable projects that deal with AIS. Another funding source (and match money if necessary) for dealing with aquatic invasive plants comes from the Lake and River Enhancement Program. Over \$400,000 is available each year for lake associations to develop and implement vegetation management plans to control exotic plants in their bodies of water.

Indiana's ANS Management Plan will be evaluated annually to monitor the progress toward prevention, limitation, and abatement of AIS. Recognizing the volatile and unpredictable nature of AIS, it is reasonable to believe that the plan will require periodic mid-course changes. An interagency advisory council will be formed to examine the progress on strategic management actions. An annual review will also attempt to identify funding needs to successfully accomplish goals and associated tasks. Performance measures will be used to assess the effectiveness of management objectives. For instance, this might include:

- Rate of spread along a river reach or coastline;
- Change in total acreage of habitat occupied by the AIS or the displaced native species;
- Changes in abundance of an invader and directly or indirectly impacted species;
- Changes to federal and state threatened, endangered, extirpated, and extinct species lists due to AIS.

It is recognized that unforeseen factors may impact the progress of remedying a problem and this would be evident through program monitoring and evaluation. This information will prove useful in future program planning processes. Evaluation should also incorporate information from those groups affected by plan implementation. These include organizations or individuals involved with the responsibility of implementing management actions and resource user groups.

Michigan SMP Summary

Compiled with information from the 1996 & 2002 Michigan ANS State Management Plan and input provided by Roger Eberhardt, Office of the Great Lakes, Michigan Dept. of Environmental Quality.

Introduction and Plan Development

The Michigan ANS State Management Plan was originally completed in 1996 and was updated in 2002. The original plan was prepared by the Michigan Department of Natural Resources and the Michigan Department of Environmental Quality. The updated version was a collaborative effort among the Michigan Department of Environmental Quality, the Michigan Department of Natural Resources, and the Michigan Department of Agriculture in consultation and partnership with other interested parties.

The original SMP served as a preliminary document, outlining issues that needed to be researched, such as funding sources for implementation beyond that provided by the ANS Task Force. The 1996 plan was based on and developed concurrently with the Model Plan prepared by Glassner-Shwayder (1996). According to Eberhardt, no real obstacles were faced in the development of the original plan or the update due to widespread and strong support.

Goals and Objectives

The objectives listed in the original SMP include: prevent new introductions of ANS into the Great Lakes and inland waters of Michigan; limit the spread of established populations of ANS into uninfested waters of Michigan; and abate harmful ecological, economic, social, and public health impacts resulting from infestation of ANS. These objectives were based off the suggestions in the Model Plan. More specific goals were laid out along with plans for implementing them. The goals include information and education, research and monitoring, and regulation and policy. The updated plan contains the goal of prevention and control of all ANS in Michigan's waters. The implementation measures, however, are much more specific in the updated plan, even though the goal is general.

Implementation

The goals discussed above are listed in conjunction with implementation tables that discuss specific implementation activities, the lead agency in charge of implementation, cooperating organizations, and the needed funds. Also included is a goal timeline for each action item to be completed. Implementation of the new plan also circles around the three key ideas of information and education, research and monitoring, and regulation and policy. These three areas are then broken down into sub-goals underneath each category and specific implementation action items are then listed under each of these sub-goals.

Though no obstacles were faced during the SMP development process, the implementation phase has proven to be another story, for both financial and political reasons. Funding is always a limiting factor in implementation, and Michigan is consistently seeking out new funding options. Political limitations are based on what is currently seen as an important issue within the state as a whole. Eberhardt mentioned that ballast water management is currently a major issue politically within the state, and one the governor is concerned about. Therefore, legislation has recently been passed developing standards for ballast water within Michigan waters. Other issues that are also important in controlling ANS have not received as much attention, but those agencies working on ANS issues within the state are constantly pushing for legislation on these issues seen as current gaps, and Eberhardt believes that some legislation will be introduced and passed giving DEQ and other agencies more authority and funding on some of these issues that have been ignored, such as rapid-response.

Evaluation

Michigan's original plan contained no process for plan evaluation. Michigan's updated SMP calls for monitoring, under its list of implementation measures, as a way to determine if management actions are having an impact. Other than this, the new plan also does not contain a detailed outline for evaluating the plan through either performance measurement or program evaluation.

Funding

Though the Task Force no longer provides funding for development of a SMP, Eberhardt said a small amount of grant money was available back when Michigan was developing its plan. This money was separate from the implementation money that a state could apply for after having an approved SMP.

The 1996 Michigan SMP requested \$466,700 for implementation over a 3 year period. It is interesting to note that Michigan's original SMP mentions that the passage of NANPCA and the prospect of federal funding facilitated their SMP development. It was noted that after the plan was developed it was going to be a plan that Michigan would follow, even if federal funding fell through. It also states that an increase in both federal and state funding is necessary to get ANS under control and that other sources of public and private funding will be sought.

The revision of the plan was funded by both Task Force implementation funds as well as state funding. In addition to the federal money being received, the revised plan lists several other sources of funding that have been established as well as plans for seeking additional funding through private sources, fees, and taxes. The Michigan Department of Agriculture has provided money to Michigan State University for

research on biological control of Purple Loosestrife, and the Michigan Great Lakes Protection Fund has provided funding for a variety of research projects. Grants are also actively sought from sources such as the Environmental Protection Agency's Great Lakes National Program Office and NOAA.

One creative initiative that was put forth in October of 2004 was the creation of a voluntary boater decal program for boaters registering or re-registering their boat. For a \$35 fee, boaters can obtain a decal that they can place on their boat showing that they are aware of ANS issues and take care to ensure they do not transport them. Non-boaters that are interested in supporting the program are also welcome to purchase a decal.

Regional Planning, Interaction, and Collaboration

Michigan has made an effort to collaborate with other Great Lakes states when possible. Some examples include the electrical barrier separating the Mississippi River basin from the Great Lakes basin that all Great Lakes states worked on and provided funding for. Another example is a collaborative information and education program with Wisconsin that focused on controlling the spread of the spiny water flea. Michigan agreed to place a decal, designed by Wisconsin, warning about the spiny water flea and its pathways for spread on all boat launch signs in the state.

SMP Workshop

Michigan has put planning for its workshop temporarily on hold (as of October 2005). Many pieces of ANS related legislation have either recently been passed in the state or may be passed in the near future. All the state agencies want to work out how these pieces of legislation will be handled internally before proceeding with a state workshop after which planning for the workshop will continue. It is expected that the workshop will be used as a forum to help rewrite the SMP based on the new legislation.

Minnesota SMP Summary

Provided by Doug Jensen, Aquatic Invasive Species Program Coordinator, Minnesota Sea Grant

Currently, a draft Minnesota Comprehensive Invasive Species State Plan is under review by an ad hoc committee of the Minnesota Invasive Species Advisory Council (MISAC). This group has been meeting to develop the draft plan framework and implementation plan since January. To further develop the plan, we will hold a workshop of MISAC members and special invited stakeholders from across the state. A copy of the draft plan will be distributed in advance of the workshop to invitees. The workshop will involve discussions about the plan's framework, gaps and needs, timing and responsibilities, and ways to leverage community support to implement the plan. The workshop will be held in the Twin Cities on September 28, 2005.

New York SMP Summary

This summary was provided by Tim Sinnott of the New York Division of Fish, Wildlife, and Marine Resources, Bureau of Habitat.

Introduction and Plan Development

Upon passage of the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA), the New York Legislature passed Chapter 456 of the Laws of 1991. That bill required the New York State Department of Environmental Conservation (NYSDEC) to develop the Aquatic Nuisance Species (ANS) state management plan (SMP) and public facilities management plan described in NANPCA. The task of producing the SMP was assigned to the NYSDEC's Bureau of Habitat (BoH) of the Division of Fish, Wildlife, and Marine Resources¹ (DFWMR).

¹ Those are the current names. At the time (July 1991), organizations were known as the Bureau of Environmental Protection in the Division of Fish and Wildlife. The Division of Fish and Wildlife was merged with the Division of

Work was begun by creating an ad hoc committee of parties interested in and/or affected by ANS, particularly zebra mussels. The ad hoc committee included representatives from the NYSDEC Bureau of Fisheries², NYS Department of Health, Monroe County Water Authority, City of Rochester Water Authority, New York State Power Pool (electrical generation industry), Great Lakes United (NGO environmental group), State University of New York at Brockport (research and academic interests), U.S. Fish and Wildlife Service, and New York Sea Grant. From the ideas advanced by the ad hoc committee, a draft plan was produced. It was reviewed by the ad hoc committee, then internally by the NYSDEC. After the comments received were addressed, the draft plan was released for public review and comment. The public comments received were addressed in a responsiveness summary which was appended to the draft plan. The plan was completed in November 1993, and submitted to the Federal Aquatic Nuisance Species Task Force. In March 1994, the NYSDEC Nonindigenous Aquatic Species Comprehensive Management Plan was approved by the Federal Aquatic Nuisance Species Task Force, making it the first SMP to be approved under NANPCA.

In 1995, New York State received its first funding grant from the ANS Task Force via the U.S. Fish and Wildlife Service. Since that time to the present, New York State has received a total of \$422,070 from the ANS Task Force for implementing the ANS SMP. Some of the projects funded include:

- Development and/or purchase of numerous brochures, pamphlets, watch cards for education and outreach, to include the producing signs for use at boat launch sites;
- Funding two ANS research studies by Cornell University;
- Purchase of and subsequent release of herbivorous insects for purple loosestrife control;
- Funding development of an ANS display in the New York State Museum;
- Funding travel for BoH staff to participate in regional ANS activities, to include the Grant Lakes Regional ANS Panel, and the Northeast ANS Panel, and working with Vermont staff to develop the Lake Champlain Basin ANS Management Plan;
- Purchase of equipment used by the NYSDEC for ANS management activities, including diving gear for monitoring zebra/quagga mussel colonization of spawning reefs, microscope for veliger and plant identification;
- Funding support to New York State Museum Science Service staff involved in a project of developing a biological control agent for zebra mussels from common soil bacteria (Dr. Daniel Molloy);
- Contracting for revision and update of the New York State ANS management Plan (discussed below);
- The biggest single item funded with ANS money was the Finger Lakes Zebra Mussel Monitoring and Ecological Assessment Project (FLZMMEAP). This program was a 10 year study to collect baseline ecological water quality from New York States Finger Lakes. The Finger Lakes are a series of morphologically similar long, narrow, generally oligotrophic - mesotrophic lakes across central New York that resemble “fingers” on a hand. At the onset of the project, only a few of the lakes were colonized by zebra mussels. The purpose of the project was to monitor the lakes for water quality changes as zebra mussel colonization progressed in order to determine if changes in fisheries management strategies were warranted. The project was also able to capture the effects of two invasive cladocerans (spiny waterflea, *Bythotrephes longimanus*; fishhook waterflea, *Cercopagis pengoi*) as well as those from zebra/quagga mussels.

Marine Resources in January 1997. The Bureau of Environmental Protection was renamed the Bureau of Habitat in July 1997.

² Michael Gann was the leader of the Pubic Access Section of the Bureau of Fisheries, and in that role, represented the boating community as well as Fisheries interests.

It is important to bear in mind that when New York State was in the process of developing the ANS SMP, there was no federal guidance available regarding the form or substance of state ANS management plans. In March 1998, the Federal Aquatic Nuisance Species Task Force released draft guidance for SMPs. It was necessary to revise New York's SMP to bring it into compliance with the Federal ANS Task Force's draft guidance. DFWMR leadership determined that it was not possible to commit staff to a full-time project of revising the ANS SMP, so permission was requested from the ANS Task Force to request federal ANS funds to revise and update the ANS SMP. This action was authorized, and a contract was let to find a consultant to make the necessary revisions. Unfortunately, the contractor that won the bid proved to be largely ineffective, and DFWMR did end up committing a large amount of staff time to revising the plan.

Work on revising the plan was begun by conducting a series of public meetings at three different locations across the state. The ANS issue was explained to attendees, and their input was sought regarding what should be included in the revised ANS SMP. The input was then used to develop a draft. The draft was reviewed, accepted, and modified by a BoH staff committee. After the revised draft ANS SMP was finalized, it was reviewed internally by the DFWMR. After DFWMR comments were addressed, the revised draft ANS SMP was reviewed by a select group of other NYSDEC divisions, and other state and federal agencies. The external agency review was completed in January 2003.

In the summer of 2003, the New York State Legislature passed Chapter 324 of the Laws of 2003. This legislation called for the establishment of a state Invasive Species Task Force (ISTF). The purpose of the task force is to:

prepare a report to the governor and the legislature that provides specific recommendations regarding: existing state laws, regulations, programs, policies, practices, and resources available to prevent the introduction of invasive species; the detection and rapid response to and control of populations of such species in a cost-effective and environmentally sound manner; the monitoring of invasive species populations accurately and reliably; the restoration of native species and habitat conditions in ecosystems that have been invaded; research on invasive species and development of technologies to prevent introduction and provide for environmentally sound control of invasive species; the promotion of public education on invasive species; and the means to foster greater coordination between state agencies, and the public.

Because of the broad mandate of the ISTF, the leadership of the DFWMR decided to suspend work on the revised Draft ANS SMP. This decision was made in order to insure that when the draft ANS SMP was submitted to the Federal ANS Task Force, it would be entirely consistent with the recommendations of the ISTF. The final report of ISTF is due no later than December 2005. Once the report is released and approved/accepted by the Governor and the State Legislature, the revised draft ANS SMP will be revised further to insure consistency with the ISTF report. After public review, it will be submitted to the Federal ANS Task Force as a revision of the current existing, 1994 ANS SMP.

Goals and Objectives

Further discussion of New York's ANS SMP presents a quandary. New York's current ANS SMP is out of date, and inconsistent with the 1998 draft Federal Guidance. The revised draft ANS SMP has not yet been approved by the Federal ANS Task Force, and is likely to undergo at least some additional revisions to make it consistent with the ISTF report. So which one should be discussed?

The current ANS SMP will be replaced. The current revised draft ANS plan is consistent with federal guidance, and is much more likely to be implemented eventually than the current plan. So, unless stated otherwise, references to New York's ANS SMP will refer to Version 3.2 of the revised draft ANS SMP rather than the existing, approved, 1994 ANS SMP.

The draft revised ANS SMP states: Five specific goals have been identified for New York State's ANS management program. These are:

Goal 1. Provide effective and efficient ANS program management

Objectives:

- A. Identify and describe the staff and resource requirements needed to implement an ANS management program and achieve the goals identified in the revised New York State ANS Management Plan.
- B. Create an ANS Advisory Council (ANSAC) to provide citizens and representatives of groups interested in or affected by ANS the opportunity for ongoing dialog and input into ANS management decisions, directions, and priorities.
- C. Organize an Interagency ANS Task Force (IANSTF) with participants from other state agencies (NYSDA&M, NYSDOT, NYDOS, NYSCC, etc) for developing interagency coordination of ANS management efforts.
- D. Develop and implement effective performance measures and feedback mechanisms in order to quantify effectiveness of the ANS program and modify or adjust objectives and tasks as needed.
- E. Provide New York representation at the Federal ANS Task Force, Great Lakes Panel for Aquatic Nuisance Species, Northeast Aquatic Nuisance Species Panel, and Mid-Atlantic Aquatic Nuisance Species Panel (when formed).
- F. Establish and document short term and long term species priorities for prevention, control, and mitigation research actions and update as required.

Goal 2. Prevent the introduction of new ANS into the waters of New York State and enforce ANS Laws and Regulations

Objectives:

- A. Participate in national or regional task forces, ANS Panels, or other coordinating groups working to propose actions to reduce the introduction of ANS via ballast water and/or other transoceanic vectors.
- B. Institute a water quality standard prohibiting the discharge of viable ANS in ballast water (or other ship-borne water) originating from outside New York State.
- C. Identify appropriate revisions or additions to state laws and regulations for preventing the introduction of ANS species and for limiting the spread of ANS already introduced.
- D. Prepare species-specific prevention plans for preventing the introduction of ANS not already present in New York waters and for the detection of and rapid response to the species should it become introduced.
- E. Utilize the IANSTF and ANSAC to identify proposals for preventing introduction of ANS species through bait industry, aquaculture, sea food industry, aquarium trade, nursery industry, and the importation of ANS, especially plants, via the internet trade. In conjunction with the task force, propose new or revised regulations and legislative initiatives as necessary to implement comprehensive State ANS management proposals.

Goal 3. Control the spread of ANS species to new water bodies within the state, and mitigate adverse ecological, societal, and economic impacts resulting from an ANS introduction.

Objectives:

- A. Prepare species-specific plans for controlling the spread of ANS already introduced into the waters of New York State, to include limiting their further spread within the water body(ies) already colonized and reducing or eradicating the population to the extent possible.
- B. Involve the public in efforts to monitor ANS introductions.

- C. Monitor the distribution of ANS in New York waters in order to assess ANS range, colonization success, control needs, and to evaluate the success of controls.
- D. Identify and document the extent of ecological, societal, and economic impact. Identify, describe, and disseminate possible means of mitigating those impacts. Prepare mitigation plans/proposals as necessary.
- E. Evaluate the possible impact of ANS introductions on any strategic management plans or commercial/recreational fisheries management goals and objectives that might exist for those waters.

Goal 4. Involve and motivate the general public to take steps to prevent new ANS introductions and control the spread of ANS through education

Objectives:

- A. Develop a public information, education, and outreach program to:
 - 1. Increase the level of general knowledge and awareness of what ANS are and how they are introduced and spread;
 - 2. Inform the public about the potential harmful ecological, societal, and financial impacts of ANS;
 - 3. Motivate the public to take action to reduce new ANS introductions and the spread of ANS already introduced;
 - 4. Support funding of ANS programs and activities.
- B. Establish an information, extension, and distribution network for reaching interested and impacted groups and individuals as well as students and the general public.
- C. Provide an early warning system to warn the public about impending ANS introductions, how they can monitor for the species, and how they can minimize potential adverse impacts.
- D. Coordinate education efforts with national, state, regional, and municipal organizations and programs.

Goal 5. Encourage, promote, and support ANS research in New York State

Objectives

- A. Identify ANS research priorities for New York State.
- B. Develop a network of researchers involved with ANS issues throughout the state.
- C. Establish a small grants program for funding short-term research projects into ANS issues of high state priority

Implementation

The ANS Coordinator was allocated about 15% (approximately 33 days per year) of available staff time on the workplan for ANS-related activities. The corresponding salary made up in-kind service for match for federal ANS grants, which were generally in the range of \$40,000 - \$60,000 annually. New York State's ANS SMP was successfully implemented to the extent possible given the resource limitations described above.

Obstacles to Implementation

- A. ANS management and control was never adopted as a NYSDEC or DFWMR high program priority. Instead it was viewed as an outside mandate. At the time (mid-1990's), the concept of ANS was largely synonymous with zebra mussels, and the departmental mindset was that introductions could not be stopped once they occurred, and that most of the effort aimed at addressing ANS issues should be directed at prevention at the Federal level

B During the mid 1990s to the present, New York State government entered a period of grater fiscal austerity, and programs were continuously assessed and reassessed. New programs, such as ANS, had to compete with existing programs and staff. Staffing and resource availability have declined continuously to the present day. New initiatives had to be accompanied by new funding sources to have a hope of becoming established. Concurrently, the availability of federal ANS funds continuously decreased as well, as more and more states came on board with approved plans, and eligibility for funds.

C. Limited staff and Resources. As stated above, the general programmatic commitment of the NYSDEC to ANS was approximately 33 days of staff time for a part time ANS coordinator³. A large portion of that time was spent managing the Federal ANS grant, and participating in regional ANS panels. Little time was left for ANS SMP implementation.

D. Lack of coordinated public support or interest. Many different groups are interested in and/or affected by ANS. However, in New York, this concern was never coordinated. The most vocal groups are local lake associations concerned about aquatic plant issues in their local lake. Such groups tend to talk to their own legislative representatives about their own problems, and no “critical mass” of public concern is achieved. The concerns of other groups, such as the boating and angling communities, are seldom assessed or communicated to policymakers. The state legislature as a whole does not have an appreciation as to how the public is affected by and concerned about ANS statewide.

E. Public support is not fostered by programs that do not actually control ANS. The public is disillusioned by programs that focus on research, education and outreach, regional coordination, etc. They want to see ANS, primarily plants, removed from “their” lake.

Partnerships

New York has not utilized partnerships in the implementation of the ANS SMP. Partnerships are an important component of the revised draft ANS SMP which is currently in a state of suspension. The State Invasive Species Task Force is in itself a partnership, as it is made up of representatives from at least 15 different agencies or groups.

The most successful partnership developed from regional ANS management activities independent of the statewide ANS SMP. Region 5, the Adirondack Mountains, developed a partnership between NYSDEC Region 5, NYS Department of Transportation, The Nature Conservancy, and the Adirondack Park Agency. This effort evolved into the successful Adirondack Park Invasive Plant Project (APIPP, see <http://www.adkinvasives.com/documents/APIPPFactSheet2004.pdf>).

Given the general lack of staff and resources, and the lukewarm attitude of policymakers to the ANS problem, effective partnerships are the only way any effective ANS management is likely to occur in New York State.

The factors most likely to facilitate full ANS SMP implementation in New York State are: a long term commitment to addressing ANS issues at the executive/policy maker level of government; and the commitment of full time staff with more than minimal resources to ANS issues. Levels of staffing and

³ Other NYSDEC staff have been involved with ANS. For example, the Division of Water has full time staff involved with aquatic vegetation management, which in New York, is largely Eurasian watermilfoil. Also, Regional biologists have been involved with ANS management as part of routine activities. In one region, fisheries biologists and technicians accomplished a limited level of water chestnut hand pulling. Other DFWMR biologists were involved with purple loosestrife control. These actions were part of routine operations, and happened regardless of the existence of the ANS SMP.

resources needed have been described in both the current, existing ANS SMP as well as the revised draft ANS SMP.

Evaluation

Effective means and measures for measuring success have not been integrated into either the current or revised draft ANS SMP. The revised draft ANS SMP discusses the need for measures of success, evaluation, reassessment, and deletion of programs that are ineffective.

The revised draft ANS SMP was developed using the 1998 Federal ANS Task Force Draft Guidelines for SMPs. It does not include the most recent requirements, such as the need for a rapid response plan.

Funding

New York's ANS program has been suspended until the report of the State Invasive Species Task Force is published. Thus, no funding is currently being applied to ANS SMP implementation.

Ohio SMP Summary

Compiled from the 1997 Ohio ANS SMP with input provided by Joe Mion, Ohio Dept. of Natural Resources (ODNR).

Introduction and Plan Development

Ohio's ANS State Management Plan was completed in 1997. The Ohio SMP was developed based on the Model Plan prepared by Glassner-Shwayder (1996) in both content and format. Many agencies were involved in the SMP creation process including the ODNR Divisions of Wildlife, Natural Areas and Preserves, Real Estate and Land Management, and the Ohio Lake Erie Office, as well as Ohio Sea Grant; the Ohio Environmental Protection Agency; and the Ohio Cooperative Fish and Wildlife Research Unit of the United States National Biological Service. Funding for the SMP development came primarily from the ODNR Division of Wildlife. Mion indicated that there were few, if any, real obstacles to developing the Ohio SMP. Since the plan was based on the Model Plan it was not a difficult task for the agencies involved to coordinate and complete the plan with relative ease.

Goals and Objectives

Three main goals were identified in the SMP and include preventing new introductions of nonindigenous ANS into the Great Lakes and inland waters of the state; limiting the spread of established populations of nonindigenous ANS into uninfested waters of the state; and abating harmful ecological, economic, social, and public health impacts resulting from infestation of nonindigenous ANS. Ohio has identified a lack of resources, including financial and personnel resources, as the biggest impediment to reaching their goals.

Mion indicated that Ohio has decided the goals they set out in the original SMP were too vague, general, and all-encompassing. Ohio is interested in updating their plan and focusing on more specific goals so that they have specific areas on which to focus their limited resources and implementation efforts.

Implementation

Some examples of implementation factors present in the current Ohio SMP include research, promoting legislation and regulation, enforcement actions, monitoring, and assessment of ecological and economic impacts of ANS. As with the goals of the Ohio SMP, the implementation measures are broad and will be made more specific when the plan is updated.

Ohio has faced many obstacles while attempting to implement their SMP. They feel that the money available is extremely limited relative to the funding needed to implement their plan. Not having or being able to work on getting the amount of research and monitoring data needed to best know how to meet the specified goals has also been an impediment to implementation. Mion also indicated that Ohio has become frustrated with the lack of action at the federal level being taken with regards to updating of

NANPCA and the passage of other introduced legislation. Another source of frustration is that the legislation being introduced is not believed to be strong enough. A primary concern is inadequate funding levels for SMP implementation and other ANS related activities. There is also concern that the standards being proposed are not strong enough.

Ohio is very interested in working on a regional level with all the other Great Lakes states as they move forward in updating their plan. Mion indicated that they believe ANS is a region-wide issue and not a state issue, and that the best results will come when states begin implementing the same types of programs and working together on their common problems.

Evaluation

Ohio's current SMP has an evaluation component built in, that focuses on periodic review and adaptive management. The evaluation process laid out includes oversight, evaluation, and dissemination of information. For the oversight process, the plan proposes putting together an oversight committee with appropriate state agencies, interested parties, a representative from the governor's office, and the authors of the SMP. The Oversight Committee's purpose is to examine the progress the Plan is making towards achieving its goals. The evaluation component includes examining progress and identifying funding needs. The dissemination of information portion takes place in the form of an annual report to include successes, failures, and future plans.

Funding

Like Michigan, Ohio received a small amount of federal money to help develop its SMP, though this money is no longer offered and plans must be created with other funding sources.. The primary source of funding for implementation has been from the Task Force. As mentioned previously, this funding is considered inadequate to meet the needs of their program.

Regional Planning, Interaction, and Collaboration

The current Ohio SMP discusses regional issues and roles as well as issues and roles specific to Ohio. It also has some implementation measures specific to regional planning and coordination. It was pointed out by Mion that the state of Ohio is interested in creating a regional plan for the Great Lakes because they believe that ANS issues are a regional issue and not a state issue, and that nothing can be solved if all the states are not working towards the same goals and objectives.

SMP Workshop

It has yet to be determined what the Ohio SMP Workshop will entail. Since Ohio has already completed a plan and is interested in regional collaboration, the workshop may focus on ways to incorporate those issues into Ohio's SMP as well as creating a Regional Plan. Mion also mentioned that it may be helpful if Commission staff reviews the Ohio Plan and makes suggestions on issues that need to be worked on in the updated plan.

Pennsylvania SMP Summary

Provided by Sarah Whitney, Pennsylvania Sea Grant, and Jim Grazio, Pennsylvania Dept. of Environmental Protection.

Pennsylvania Plan of Work and History

Proposal

Use the funds from the Great Lakes Commission grant *A Collaborative Approach to Advance Implementation of State Management Plans for Prevention and Control of Aquatic Nuisance Species in the Great Lakes Region* to support the initial convening of the Pennsylvania Invasive Species Council and beginning discussion of a Pennsylvania Invasive Species Management Plan.

Background

The Pennsylvania Invasive Species Council (Council) was established through Executive Order 2004-1 in January 2004. The Council is comprised of representatives from the departments of Agriculture, Conservation and Natural Resources, Environmental Protection, Health, and Transportation; and the Fish and Boat Commission and the Game Commission. In addition, 10 members of the public representing agriculture and natural resource organizations and educational institutions conducting invasive species research and outreach are also appointed by the Governor to the Council.

The Commonwealth has struggled with implementation of the Council, and as of July 2005 the Council has not formally met. This funding source will be used as a way to jumpstart the Council and begin development of a Pennsylvania Invasive Species Management Plan. While there are a number of activities occurring throughout the Commonwealth to prevent the introduction and spread of invasive species, Pennsylvania does not have a comprehensive plan to direct this work. It would be useful for Pennsylvania to develop and implement an invasive species management plan to coordinate and fund prevention and control actions that will augment those programs already in place.

Under Section 1204 of the National Aquatic Nuisance Prevention and Control Act, states are encouraged to develop and seek federal approval of comprehensive management plans for the prevention and control of aquatic invasive species. The Great Lakes Panel on Aquatic Nuisance Species developed A Model Comprehensive State Management Plan for the Prevention and Control of Nonindigenous Aquatic Nuisance Species to provide an outline and consistent format for states to follow during plan development. Building on this effort, the federal Aquatic Nuisance Species Task Force has developed Guidance for State and Interstate Aquatic Nuisance Species Management Plans, further refining the components in the management plan. Once a plan has been approved by the Aquatic Nuisance Species Task Force, it is eligible to apply for funds to implement the management plan.

Using Funding for Initial Workshop

This funding source would be most useful in Pennsylvania to convene an initial meeting of the Pennsylvania Invasive Species Council and begin development of the state's invasive species management plan. The funds will be used to pay for staff time, meeting costs, supplies, and materials as well as travel and hotel accommodations to the regional follow-up workshop (organized by the Great Lakes Commission as proposed in their grant). Additional funds, as available, will be used to support meetings to continue work on management plan development.

The Great Lakes Commission's Model Comprehensive State Management Plan for the Prevention and Control of Nonindigenous Aquatic Nuisance Species could be shared, as well as an overview of lessons learned by other states in the development of statewide invasive species management plans. (ISMP), to lay the groundwork for development of a Pennsylvania Invasive Species Management Plan. This will also be an opportunity for Council members to agree to organizational responsibility for specific parts (e.g., aquatic, terrestrial, bacterial, etc) within the management plan.

A possible format for the longer workshop to begin development of the SMP, as a two-day meeting, is:

Day 1

Council members and interested parties meet in the morning of the first day to introduce concept of an invasive species management plan, highlight the successes, failures, and lessons learned from efforts in other states, discuss goals of state plan and assign/agree to agency leads for specific parts (e.g., aquatic, terrestrial, bacterial, etc).

Other topics:

- Presentations about what activities state agencies are conducting regarding invasive species research and management in Pennsylvania

- Presentation of what non-agency groups (such as non-governmental organizations or academic institutions) are doing regarding invasive species research and management in Pennsylvania
- Overview of national and regional efforts with which Pennsylvania can participate (for example: funding, regional panels, national legislation, monitoring and reporting efforts)
- Brainstorming session for activities and actions that would ideally exist to support invasive species management in Pennsylvania

Afternoon: Devoted to working groups to develop a timeline and outline of the management plan's different sections.

Day 2

Continue working groups to develop a timeline and outline of the management plan's different sections, and identify the next steps for process. Report out in late afternoon.

Next steps

In order for the workshop to be successful, a number of activities must be accomplished beforehand. These activities include the following:

- Compile preliminary list of invasive species currently documented in Pennsylvania.
- Identify and confirm project commitments (financial and/or staffing resources) from agencies and organizations for invasive species management plan development
- Agencies and organizations develop list of current invasive species prevention and control activities (building on work by Kirstin Wakefield).

Wisconsin SMP Summary

Provided by Ron Martin, Wisconsin Dept. of Natural Resources (DNR)

Introduction and Plan Development

The Wisconsin ANS State Management Plan began development six years ago within the Department of Natural Resources. Various interested departments within the DNR such as the Endangered Resources Department, Fisheries Management and Habitat Protection, and the Bureau of Watershed Management all worked together on the initial draft of the plan with the help of the Model Plan. After the initial draft, the plan went through several more stages of draft and review with the help of Wisconsin Sea Grant and the Great Lakes Indian Fish and Wildlife Commission. After a public comment period, the plan was finalized in September 2003.

Goals and Objectives

The three overarching goals that were set in the Wisconsin SMP include preventing the introduction of new species, limiting the spread of species already established, and abating any ecological, economical, or human health related problems that have or may stem from ANS introductions. Another goal of the SMP that is beginning to be sought after during the newly entered implementation phase is to collect the information required to achieve the three main goals. One way Wisconsin is attempting to do this include forming a collaborative state-wide data management program that will allow all agencies and organizations within the state that collect ANS data to enter it into an online database to improve information sharing and scientific knowledge. The other way Wisconsin is attempting to increase their knowledge base is by hiring a consultant for a two year time period. The consultant will be responsible for identifying additional threats of ANS in Wisconsin waters as well as research the main vectors and pathways of introduction and suggest strategies for how to mitigate these introductions.

Implementation

Wisconsin is just beginning the implementation of its SMP. The plan, approved for five years by the ANS Task Force, is planning on dedicating the first two years to the sub-goal of additional data collection for

better management decisions, as mentioned above. Educational materials will also be developed during the first two years of implementation. One educational publication that is currently being developed is a handbook on ANS issues that will be given to agency representatives, educators, lake association members, and other concerned citizens. This publication focuses on actions that can be taken to protect lakes and other waterbodies from ANS and how concerned individuals and citizen groups can build an effective coalition.

The plan for the next three years of implementation, before the plan must be re-approved by the Task Force, is currently uncertain and will depend largely on the information gathered in the first two years. Possibilities mentioned include beginning to develop prevention strategies related to introduction as well as legislation. Wisconsin hopes to expand and update its plan during this time as well.

Evaluation

Currently, evaluation criteria are not integrated into the Wisconsin SMP.

Funding

All funding for the design of the SMP came from the state of Wisconsin in the amount of \$550,000. In addition to ongoing state funding, implementation funding is available from the Task Force. This totaled \$72,000 for the first year of implementation. State cost share for this amount must match the federal funding provided. The total annual Task Force budget is 1.1 million, out of which implementation funding and other Task Force expenses come. Wisconsin is concerned that as more and more states begin to develop plans, the amount of implementation money available will steadily decrease. They already feel that \$72,000 for a year is far too little and as a result of this local jurisdictions are paying a disproportionate amount for ANS control activities.

As a result of insufficient federal funding, Wisconsin has looked for additional funding elsewhere. The DNR budget request to the state has increased, and they are trying to get a higher percentage of the motor boat gasoline tax going towards ANS issues. The DNR is also looking at the possibility of a trailer tax or fishing license tax to go towards ANS management and control. Additionally, the state Coastal Zone Management office, within the Department of Administration, has grants available periodically for use related to coastal concerns, so the DNR is interested in applying for those as they become available.

Regional Planning, Interaction, and Collaboration

In developing the SMP, Wisconsin did not have a lot of interaction with the ANS Task Force due to concern that at the national level it was too removed from the state to be able to address its needs and concerns. Instead, Wisconsin relied heavily upon the regional U.S. Fish and Wildlife Service office for support because they believe the regional offices have a better sense of the needs of the region.

Besides the agencies mentioned, Wisconsin has had few interactions and opportunities for collaboration with other agencies on the local, state, regional, or national level. Once the consultant is hired and the data management program is in place, they hope this will change. Wisconsin is very interested in reviewing the plans of the other Great Lakes states and trying to collaborate to meld their plans together for a strong regional plan with parallel state plans. For example, they would like boat cleaning or bait disposal requirements to be standardized throughout the region to avoid confusion and keep a consistent message.

SMP Workshop

Representatives from Wisconsin DNR, Sea Grant, and the University of Wisconsin Extension are planning a series of workshops held around the state to gain comment on the educational handbook they are developing, the main implementation factor currently being focused on. They feel that this approach is more useful to them now because they are not far into their implementation process and that more general workshops focusing on the broader plan would be of more benefit when they are further along with the implementation of their plan.

Appendix B. Hawaii State Management Plan Summary

Summary of the *State of Hawai'i Aquatic Invasive Species Management Plan* (2003). The full plan is available online at <http://www.anstaskforce.gov/HAWAII%20AIS%20FINAL%20PLAN.pdf>.

Introduction and Plan Development

The Hawaii Aquatic Invasive Species Management Plan, recently approved for funding in 2003, was a collaborative project funded by the Hawaii Community Foundation. The main agencies that facilitated the SMP process included the State of Hawaii Division of Aquatic Resources, Department of Land and Natural Resources, and the Nature Conservancy of Hawaii. These agencies used a Steering Committee approach to SMP development. Agencies and organizations represented on the Committee included The Nature Conservancy; the Hawaii Tourism Authority; the USFWS; the Hawaii Department of Agriculture; Bishop Museum; Matson Shipping; the University of Hawaii; the Department of Land and Natural Resources, Division of Aquatic Resources; Pets Pacifica/Petland; Hawaii Audubon Society; Pacific Fisheries Coalition; the Aquaculture Development Program; and the Hawaii Aquaculture Association.

Many aquatic invasive species have impacted Hawaii, threatening native ecosystems, public health, and the economy- especially with impacts to tourism. One particular species, the Giant Salvinia (*Salvinia molesta*) impacted a single reservoir and cost over a million dollars to control and clean up. These issues led Hawaii to choose and approach utilizing coordination and collaboration in the design of its SMP. In efforts to create an operational state plan, Hawaii focused on the activities that each level of government or type of organization could do to advance SMP implementation.. The plan looks at practical ways to implement programs through state, federal, county, non-governmental, private, and volunteer entities. In the development of the SMP, a concerted effort was made to ensure that the Plan met the ANS Task Force guidelines to secure eligibility for federal funding.

Goals and Objectives

The goal of the Hawaii SMP is “to minimize the harmful ecological, economic, and human health impacts of AIS through the prevention and management of their introduction, expansion, and dispersal into, within, and from Hawaii.” Objectives identified as necessary to achieve this goal include coordination and collaboration; prevention; monitoring and early detection; response, eradication, and control; education and outreach; research; and policy actions. The SMP lays out more detailed strategies specific to each of the objectives. For example, one strategy listed under the objective of coordination and collaboration is “set priorities for the management of existing AIS so that local, state, and Federal resources can be directed to manage Hawaii’s highest priority AIS in a cost-effective manner.”

Implementation

The implementation portion of the Hawaii SMP takes the strategies to achieve its objectives one step further by providing specific tasks to complete that will help carry out these strategies. In this regard, the Hawaii SMP starts with a broad overarching goal and keeps narrowing down the focus until discreet tasks for implementation are identified. The SMP is written for incremental implementation and as a dynamic plan so that updates can be made easily as new priorities or information become available. The implementation table is available as a separate document from the SMP to facilitate frequent updating. Each task is also assigned a responsible party and timetable for implementation. An example set of tasks for the aforementioned strategy include:

- establish a subcommittee to formally assess the priority species to focus on, using the species presented in the AIS Management Plan as a starting point for discussion;
- develop an objective and testable risk-assessment strategy based on ecology, biology, economics, and other parameters to use as a tool in identifying priority species for management; and
- develop and implement a method to identify priority sites of concern regarding Aquatic Invasive Species.

Evaluation

As part of SMP implementation, Hawaii intends to hire a state AIS Coordinator and establish a long-term AIS Advisory Council. The AIS Coordinator and Advisory Council will be charged with annual reporting on SMP implementation as well as making regular recommendations for plan updates.

The Steering Committee charged with developing Hawaii's SMP recommended that it be formally evaluated on a regular basis, yearly at minimum. Items listed for review include plan implementation as well as objectives, strategies, and tasks given that the plan is intended to be dynamic in responding to new information and/or circumstances. The evaluation should include both public and agency input. Further, copies of the changes should be available to the public and provided specifically to key individuals such as the Governor, state legislature, agency staff, the ANS Task Force and others. A recognized strength of the Hawaii plan is the level of specificity as compared to many other SMPs. The other is its consideration of evaluation, which is absent from many plans. A related weakness, however, is the lack of guidance on a methodology for conducting an evaluation.

Funding

The Hawaii SMP states that the planning process was funded from a grant from the Hawaii Community Foundation. A request to the ANS Task Force was also submitted in an effort to receive federal funding. Several strategies and tasks provided in the SMP are focused on securing funding for implementation, including applying not only for short-term grants, but trying to secure long-term funding sources, such as appropriations from the Hawaii State Legislature.

Regional Planning, Interaction, and Collaboration

National, regional, and international collaboration are frequently mentioned as strategies of Hawaii's SMP. Currently, the state is loosely affiliated with the Western Regional Panel on Aquatic Nuisance Species and wants to remain involved. Hawaii is also interested in creating a Pacific Island Regional Panel and developing partnerships with other nations to collaboratively address ANS issues unique to Hawaii's ecosystem. One specific task mentioned is to create a centralized AIS database in addition to those maintained by Hawaii, other states and nations.