

AQUATIC INVASIVE SPECIES STRATEGY TEAM

of the

Great Lakes Regional Collaboration

Ken DeBeaussaert, Co-Chair

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October 14, 2005

Great Lakes Regional Collaboration
Executive Committee
C/o Macara Lousberg

Dear Executive Committee:

As co-chairs of the Aquatic Invasive Species (AIS) Strategy Team, we are pleased to communicate a final version of the AIS Action Plan (**attachment 1**), including a complete list of recommendations (**attachment 2**) and a list of near-term recommendations (**attachment 3**). This final version is based on discussions we have had with the AIS team after reviewing the public comments received during the period of July 7 through September 9 on the draft AIS action plan. This letter summarizes the public comments and how we addressed them, it outlines the priorities identified by the AIS Strategy Team, and it includes one issue we feel needs “elevation” to the Executive Committee—coordination with Canada.

REVIEW OF PUBLIC COMMENTS

It is our determination that the public comments fall into three general categories:

1. Comments that express satisfaction with the content of the draft and urge immediate and full implementation. These sentiments reflect the overwhelming opinion of the strategy team and the public who commented.
2. Comments that recommend specific (mostly copy editing) changes to the draft. There were a relatively small number of these types of comments, and they originated primarily from government agencies.
3. Comments that do not support the draft action plan or question tenets of the recommendations. There were very few comments of this nature, mainly regarding the desirability of promoting specific legislation.

We appreciate the excellent summary of the public comments that was produced, which helped us in our discussions.

Concerning the first type of comments—those expressing support for the plan and urging action—we stress to the Executive Committee that the Strategy Team and the public **want to see this action plan fully implemented immediately**. We heard unequivocally that AIS is on the minds of the people of the

region (the greatest number of specific comments related to the AIS Team action plan); the team feels firmly that it is presenting the Executive Committee with a road map to address these problems. A few examples of sentiments from the public illustrate the vast majority of the comments:

It's time to stop talking and start the work! **—David Lonsdale, Duluth**

The draft Aquatic Invasive Species strategy is an outstanding overall strategy which, if expeditiously adopted, funded, and implemented, would dramatically reduce threats and impacts of invasive species. It should be approved and implemented immediately. However, we are concerned about the possibility of delay in adopting the recommendations. . . . Having called for the creation of a comprehensive restoration plan for the Great Lakes, the administration has the responsibility to take a leadership role in what is arguably the number one problem now facing the Great Lakes, and one for which there is a full and cost-effective solution ready to hand. **—Alliance for the Great Lakes et al (43 concerned groups)**

We need to take a proactive approach to stop further introductions of aquatic invasive species, both plants and animals. The plan and GLRC needs to take a strong stand on this issue . . . We are hopeful Congress will enact legislation to address aquatic invasive species in the very near future. **—Gildo Tori, Ducks Unlimited**

The AIS are changing the entire face of the Great Lakes and the change is not a positive one. . . . The rationale and the solutions contained in the section addressing AIS are good. The problem is that many of these recommendations have been put forth in the past and no effort to implement them has taken place. . . Do not procrastinate on this issue, do it now! **—Ed Makauskas, Lombard IL**

We know that the door must immediately be closed to new invasive species and we trust that these recommendations are meant to achieve that goal. **—Great Lakes Indian Fish and Wildlife Commission**

The continued invasion of our Great Lakes with the unintentional introduction of non-native exotic aquatic species of fish and other organisms is a major threat to the Great Lakes. . . . While we support the passage of the National Aquatic Invasive Species Act, S. 770 and H.R. 1591 and 1592, we believe we should not wait until the recommended date of 2011 before action is taken to control ballast water. **—John Trimberger, Michigan Division and Dwight Lydell Chapter, Isaac Walton League of America**

We strongly support efforts to protect the Great Lakes from aquatic invasive species and urge our elected officials to support the quick passage of S. 770, the National Aquatic Invasive Species Act. **—City of Highland Park, IL**

These are a representative sample of the comments. In fact, nearly every comment received, in one way or another, expressed support for the plan and urged immediate action. The co-chairs conclude that any major concern about the AIS strategy is not with the content, but with the implementation. It is our opinion, based on discussions and public comments, that: (1) there is a very strong sense of urgency for action, (2) the administration should strongly support the recommendations of the AIS action plan, (3) Congress should pass immediately the provisions of the National Aquatic Invasive Species Act (S. 770 and H.R. 1591 and 1592), and (4) government and partners should fund and implement the recommendations of the plan as soon as possible.

The second category of comments—those that offered specific edits to the draft—were constructive and, to the best of our ability, incorporated into the action plan after discussions with the strategy team. In some cases, the comments were editorial, technical, or corrected errors in fact. In other cases, they clarified intent or responsibility.

Finally, the third category of comments—those that questioned the plan or elements of it—were not voluminous (just a few comments) and were discussed by the Strategy Team. If a comment in this category contradicted a specific matter discussed by the Strategy Team during the production of the draft, we deferred to the previous consensus of the team. For example, a few comments questioned whether the action plan should support the current version of the National Aquatic Invasive Species Act. The AIS

Strategy Team felt this comment was addressed in that the report supports the *provisions of* that version. In addition, the AIS Strategy Team explicitly debated this subject and, with the exception of two participants, achieved consensus that the provisions of the act should be supported in the plan. Another comment, from the Council of Great Lakes Industries, advocated more evaluation of prevention and control mechanisms to avoid unintended economic consequences. This opinion is contrary to our opinion and the overwhelming sentiments of the strategy team and the public; we heard loud and clear that the time for action is now.

PRIORITIES

The strategy team has prioritized the recommendations presented in the AIS Action Plan in an effort to identify measures that can be taken in the near term to address AIS. This list of priorities emerged from a team-wide conference call and facilitated discussions during the Rochester meeting. We want to be clear about our understanding of “prioritization.” We were asked **to identify recommendations that could be achieved immediately, in the near term.** It would be a grave mistake to conclude that items not on the list are unimportant or not necessary for effective AIS policy. In fact, it is critical that AIS policy be comprehensive and viewed in the long-term. Again, if a recommendation does not appear on the near-term list then it should not be construed as unimportant

Concerning specific near-term priorities, the team members and the overwhelming response from the public agree that comprehensive legislation—specifically, legislation that contains the provisions of S. 770/H.R. 1591 and 1592, collectively known as NAISA—should be supported by the Administration and passed by Congress at the earliest convenience. We have broad consensus that legislation is badly needed to protect the Great Lakes from invasive species. Fortunately, such legislation is pending in Congress to address many of the team’s recommendations and we again convey to you that Administration support for the comprehensive legislation is a top priority in the view of the team and the public. It is important to add, however, that while the team and the public overwhelmingly support the provisions of NAISA, some representatives of federal agencies, and the U.S. Great Lakes Shipping Association, are uncomfortable endorsing *particular* legislation. We received several comments from federal agency personnel that stressed that their work on the AIS Action Plan should not be construed as advocacy or endorsement of particular legislation.

The team also discussed and agreed to other immediate priorities. Those priorities are attached to this letter (**attachment 3**).

ADDITIONAL ISSUE FOR EXECUTIVE COMMITTEE CONSIDERATION

In addition to the response to public comments, we also communicate to you an additional issue for consideration by the Executive Committee -- The need to coordinate aquatic invasive species work with Canada.

We noted in the draft AIS Action Plan that it is imperative both the United States and Canada work together to implement complementary AIS programs. This will require a redoubled effort to harmonize regulations, develop shared objectives, coordinate law enforcement, and undertake many other activities in cooperation with Canada. We agree with the comments submitted by the Macomb County Environmental Prosecutor *et al.* that “the plan should place stronger emphasis on U.S. and Canadian government cooperation” and that a new body should be formed, or an existing body/agreement be adapted, to establish common objectives. We note, for instance, that the International Joint Commission has requested at least three times that the two Federal governments address AIS on a binational level. It

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would be highly desirable for the governments to revisit the IJC's request or to act on the recommendations of the Macomb County commenters. Also, we received a collective letter from several Canadian agencies (attachment 3) which contains a Canadian review of the AIS Action Plan. This letter exemplifies the need for coordination of AIS action with Canada.

Thank you, again, for the opportunity to facilitate the production of the Aquatic Invasive Species Action Plan. We applaud the hard work of hundreds of participants in the development of this plan, particularly the leaders and members of the individual drafting teams who helped focus our efforts. This plan is the consensus of the participants and received near-unanimous endorsement by the public.

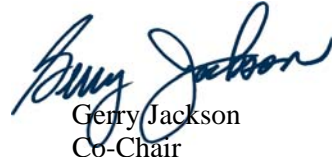
Sincerely,



Ken DeBeaussaert
Co-Chair
Michigan Office
of the Great Lakes



Chris Goddard
Co-Chair
Great Lakes Fishery
Commission



Gerry Jackson
Co-Chair
US Fish and Wildlife
Service

AQUATIC INVASIVE SPECIES

I. Problem Statement

Significant progress over the previous three decades to restore the Great Lakes has been interrupted and undermined by the present crisis of Aquatic Invasive Species (AIS). Invasive species come from outside an ecosystem, degrade habitat, kill native and naturalized species, and short-circuit food webs needed to maintain and rehabilitate biological resources. The Great Lakes region continues to face wave after wave of aquatic invasion. Sadly, even after decades of high-profile invasions like the sea lamprey and zebra mussel, the rate of new introductions has not slowed.¹ Our Great Lakes, which are the world's greatest freshwater lakes, are succumbing to an irreversible "invasional meltdown"² that may be more severe than chemical pollution, as AIS often make the Great Lakes home, they reproduce and spread, rendering eradication impossible. Existing measures to prevent the introduction of new species and to control species that are already established are woefully inadequate. The Great Lakes cannot afford even one new invader, and as invasions are irreversible, prevention is paramount.

An "invasive species" is defined as a species: 1) that is not native, and 2) whose introduction causes, or is likely to cause, economic or environmental harm or harm to human health.³ AIS have entered or may enter the lakes through vectors such as maritime commerce (e.g., ship ballast), aquaculture, canals and waterways, recreational activities, and the trade and use of live organisms. The AIS Strategy Team's plan addresses species invasion through these vectors. More than 160 non-native aquatic species are established in the Great Lakes, and during the last several decades established populations have been discovered at an average rate of one every 8 months.⁴ Not all of those species are invasive, but economic losses in the Great Lakes Basin from those that are were estimated in 2005 at \$5.0 billion per year.⁵ Moreover, 42 percent of threatened and endangered species in the U.S. are at risk, mainly because of invasive species.

Recommendations below apply only to the U.S. While a heightened U.S. response to AIS is welcomed and overdue, the U.S. should work closely with Canada to ensure commensurate action on both sides of the border, especially with regards to ballast water controls for ships transiting the St. Lawrence either in ballast or declaring no ballast on board. Bi-national cooperation is required to prevent introductions of AIS into the Great Lakes via maritime commerce, canals and waterways (including Long Lac and Ogoki diversions, St. Lawrence Seaway, and Welland Canal), trade of live organisms, and recreational activities.

II. Goals and Milestones

Goal: Prevent all new introductions of AIS into the Great Lakes.

Goal: Stop the spread of AIS within the basin, extirpate harmful AIS, or if impossible, then control to levels that ensure sustainable ecosystems and the social, economic and cultural uses they support.

Interim Milestones: Several milestones were developed to measure progress through 2010 toward reaching the goals (Appendix A). The most important interim milestones supporting the recommendations are to:

- enact comprehensive federal legislation (*specifically* legislation that would incorporate all of the terms contained in S. 770, H.R. 1591 and 1592 as introduced in the 109th Congress; collectively the *National Aquatic Invasive Species Act*—NAISA; with modifications as outlined in recommendation #3) to authorize and fund AIS programs;
- provide expanded federal support for AIS research and outreach programs, and
- develop a binational plan of action to prevent additional species invasions, and control established populations of the most damaging AIS.

III. Recommendations

The AIS Strategy Team offers the following five recommendations. A complete list of recommendations is included as appendix A. Dollar figures have been included in the recommendations, where available. The dollar amounts provided are often incomplete estimates; more realistic figures should be developed.

1) Ship and barge-mediated introductions and spread of AIS in the Great Lakes should be eliminated, through the immediate promulgation of environmentally protective standards for ballast water, and the implementation of effective ship-board treatments and management measures. Specifically:

- **immediately require, verify, and enforce (in the current shipping season under existing authorities) that ocean-going vessels in the no ballast on board condition (NOBOB) implement practices that are an improvement over current practices⁶;**
- **immediately require, verify and enforce best performing ship-board ballast water treatment and hull management methods for ocean-going vessels (with a set approval period), with continued upward ratcheting of the treatment floor as treatment performance improves. Approved treatment must be to an environmentally protective standard by 2011;**
- **immediately require monitoring, reporting, and public dissemination of all ballasting activities, prevention practices, and outcomes such that progress toward the goal is measurable and enforcement practical;**
- **review and apply best-performing ballast water management practices to non-ocean-going vessels operating exclusively within the Great Lakes (including application of ballast water treatment for new ships) to eliminate the spread of AIS already introduced into the system; and**
- **immediately and significantly expand research, testing, and evaluation of policies and technologies as alternatives to on-board treatment. Alternatives to be investigated should include (but not be limited to) cargo transfer, shore-based treatment, use of Clean Water Act discharge permits, and state/regional actions. Programs under which these investigations can be conducted include the Ballast Water Technology Demonstration Program and the Environmental Technology Verification Program. These investigations will hasten development of effective shipboard treatment systems. If ship-board treatments are shown to be inadequate, the team recommends implementation by 2011 of effective alternatives that prohibit ballast water from ocean-going ships from being discharged into the Great Lakes.**

Rationale: The failure to install meaningful and enforceable regulations for treatment of ballast water from ballasted and NOBOB ocean-going ships remains a major inhibitor for achieving the protection and restoration of the Great Lakes. Moreover, some AIS have limited means to disperse throughout the Lakes without the help of ships. Clearly, the status quo is unacceptable and does not protect the Great Lakes. Ocean-going ships are the prime vector for AIS introductions into the waters of the Great Lakes, so stopping those introductions is a top priority. Also, preventing the spread of AIS by the Great Lakes shipping industry is also a priority, so ballast water management practices for ships that operate within the Great Lakes should be reviewed and modified. Quick passage and immediate implementation of comprehensive federal legislation is required to prevent ship-mediated introductions of AIS into the Great Lakes. The government has significant authority under existing law to take immediate action, particularly in the management of NOBOB ships. Ship-board treatment actions must be fully implemented now, and evaluated well in advance of 2011. This will require immediate action by the Coast Guard to promulgate ballast water regulations. In addition, research and planning on alternatives is needed immediately so that methods may be applied by 2011, in the event best-performing ship-board treatment fails to fully protect the Great Lakes and the nation.

Cost: \$13.2 million annually for five years.

2) Federal, state, and/or local governments must enact measures that ensure the region's canals and waterways are not a vector for AIS, including full federal funding of the Chicago San-Ship Canal barrier and the sea lamprey control program. Specific recommendations are to:

- **complete construction of barrier II, make barrier I permanent, provide federal funds to operate both dispersal barriers in the Chicago Waterway system, and complete a study of options to for permanent hydrological and/or biological separation of the Great Lakes and Mississippi River systems;**
- **fully examine options and their economic benefits and costs to prevent the spread of AIS via the Lake Champlain Canal and other canal systems linking the Great Lakes with other basins;**

- **close or modify, through the use of physical barriers or control structures, canals that have fallen into disuse or disrepair—if rebuilt, prevent passage of aquatic invasive species;**
- **prohibit development of new cross-drainage basin connections;**
- **address intermittent flood-related connections;**
- **initiate measures to prevent or reduce the movement of AIS into stream segments opened up by dam/impediment removal or culvert construction, and fully consider benefits to native species and impacts from AIS when evaluating cost-benefits of proposed fish passage projects;**
- **develop and implement AIS monitoring plans to provide comprehensive monitoring and reporting of AIS through the canal vector; and**
- **fully fund the Great Lakes Fishery Commission’s sea lamprey control program.**

Rationale: A unified (federal) approach is preferred, but some canals and waterways are under state or local jurisdiction that will require state or local legislation. Canals facilitate the conveyance of bulk goods and commodities and are used for recreational activities, but they also facilitate the spread of AIS by allowing cross-basin transfer between watersheds. Canal closure can re-establish the natural geographic separation of the Great Lakes from other drainage basins. Work to complete the barrier system on the Chicago Waterway is moving forward, and provisions supporting this project exist in the pending NAISA legislation and in the Senate version of the Water Resources Development Act of 2005 (S. 728). New legislation is needed to study options for hydrological separation and to address issues in other canals, particularly in un-used waterways. Existing canals and waterways should include dispersal barriers, flood control barriers, physical barriers, and other provisions to ensure hydrologic separation of historically disconnected watersheds. Wherever possible, canals that have fallen out of use should not be improved and, in fact, should contain physical barriers to prevent the free-flow of organisms. Dam removal, while often an important element of habitat rehabilitation, should be done carefully, with full coordination of federal, state, and local agencies, so as not to solve one problem by creating another, an AIS pathway. The sea lamprey control program, successfully carried out by the Great Lakes Fishery Commission, should be fully funded so that this species, which entered the system through canals, remains under suppression.

Cost: \$45 million annually for five years.

3) Federal and state governments must take immediate steps to prevent the introduction and spread of AIS through the trade and potential release of live organisms. Specifically:

- **develop a list of species of concern for the Great Lakes basin and an immediate moratorium by the States on the trade of species on that list, until the species are screened and approved for trade⁷;**
- **implement provisions of the pending NAISA legislation, as introduced, that establish a federal screening process for organisms proposed for trade;**
- **modify the pending NAISA legislation mandating that the screening process should classify species proposed for trade into three lists—prohibited, permitted, and conditionally prohibited/permitted;**
- **modify NAISA to clearly state that the screening process established must place the burden of proof of non-injuriousness on the importer;**
- **allocate sufficient resources to heighten the number of species under the Lacey Act as "injurious," to prevent the interstate transportation of harmful species; the Fish and Wildlife Service FWS should list black, bighead, and silver carps as injurious under the Lacey Act;**
- **significantly increase resources for the enforcement of laws governing the trade of live organisms; and**
- **develop and implement risk models for organisms in aquaculture.**

Rationale: The trade of live organisms is vibrant. Hundreds of millions of fish and hundreds of thousands of invertebrates, plants, and other organisms are traded live each year. However, serious problems and many loopholes in the trade regime exist. In many cases, trade is unregulated, making importation, interstate commerce, and trade among the pathways that pose the greatest risk for introduction of invasive species into the Great Lakes ecosystem. This recommendation is designed to close the loopholes in the trade regime. It calls for an immediate listing of species and a state moratorium on trade of those species. It supports the provisions of NAISA that establish a screening process and it proposes that the screening process be based on a three-list approach. The recommendation also improves the implementation of key federal laws that restrict the interstate transportation of injurious species and calls for increased law enforcement to ensure the laws are implemented properly. Underlying the recommendation is the requirement that the burden of proof demonstrating that an organism is not injurious be placed on person(s) who

proposes to import it. When the screening process is developed pursuant to NAISA, it will be important to place the burden of proof on the importer. Placing the burden on the government to demonstrate injuriousness (which occurs usually after it is too late to address the problem, if at all) does little to contain the spread of AIS through trade, and does not protect the Great Lakes.

Cost: \$17 million annually for five years.

4) Establish a Great Lakes Aquatic Invasive Species Integrated Management Program to implement rapid response, control, and management programs and assess the effectiveness of those programs. This program, which will require authorization, must:

- **allocate funds for development and implementation of State and Interstate Aquatic Nuisance Species Management Plans through the Aquatic Nuisance Species Task Force, with a particular emphasis on the immediate use of techniques to control or slow the spread of AIS;**
- **develop voluntary agreements and codes of best practices for industrial trade groups;**
- **encourage investigation of economic requirements and incentives (e.g., bonds or insurance) to prevent new introductions;**
- **establish a revolving fund for rapid response actions;**
- **establish an interagency, Great Lakes Federal Rapid Response Team, that will conduct activities on federal lands, and in other locations with State, Tribal, and local cooperation; and**
- **allocate funds to implement a system of enhanced monitoring and ecological surveys in the Great Lakes;**
- **support additional research to develop and implement new control methods for uncontrolled species of concern;**
- **establish a coordinated data management system, through the Smithsonian Institution, the Great Lakes Environmental Research Laboratory, or other suitable entity, to develop an accessible, integrated, and centralized database that allows for the reporting and tracking of AIS infestations; and**
- **ensure overall coordination and accountability through the Invasive Species Council, including developing regular and comprehensive reports summarizing the status of AIS activities (including those of the Aquatic Nuisance Species Task Force and the Great Lakes Panel on ANS in implementing the National Invasive Species Management Plan), formulating a complete AIS federal budget request, overseeing progress in addressing AIS, evaluating the collective response to AIS, and communicating AIS needs and problems to Congress and the public. The National Invasive Species Management Plan should include specific focus on AIS in the Great Lakes.**

Rationale: The Government Accountability Office (then the General Accounting Office) observed that more than 20 federal agencies in ten departments are involved in AIS management and that States also play a significant role,⁸ and much better coordination of federal, state, and local actions is needed. One entity should be empowered to coordinate the AIS actions in the Great Lakes. For example, fifty years ago the governments of the U.S. and Canada mandated and funded the development of successful control techniques for sea lampreys. A similar mandate is required for other AIS. Part of improved coordination is the systematic collection and free dissemination of AIS information. There must be a central place for the public, researchers, managers, and others to report AIS infestations. This information, in turn, should be available to anyone and should be used in implementing AIS programs. To achieve better detection and management of AIS, States and the federal government must cooperate in the development of AIS management plans, including plans allowing for monitoring, rapid response, and control. Moreover, codes of best practices for industry and the use of economic incentives (for example insurance and posting of bonds prior to engaging in practices where there is a risk of unintentional release) would significantly help industry participate in AIS management. When an AIS is first detected in the Great Lakes, States and the federal government must be prepared with pre-approved plans and funds to mount a rapid response action. Implementing an integrated pest management program in the Great Lakes will result in immediate cost-effective benefits⁹.

Cost: \$44 million annually for five years.

5) Federal, state and tribal agencies, academic institutions and other organizations should receive adequate support to conduct and evaluate cost-effective AIS vector-specific outreach and education programs. These programs should focus on behavior change and responsibility of resource users. Specifically:

- support programs that educate Great Lakes boaters and anglers on how to take preventive actions against AIS;
- continue AIS-focused Hazard Analysis and Critical Control Point (HACCP) training and plan implementation for research and management agencies within and outside of the Great Lakes basin;
- support a program that educates all facets of the Great Lakes maritime commerce industry including ports, carriers, shippers, mariners, resource users and users of goods produced from cargoes transported to and from the Great Lakes by ships, about the urgency and cost-effectiveness of preventing/containing AIS, the status of prevention, and what is needed to advance prevention; and
- support a new comprehensive AIS Organisms-in-Trade educational campaign including the bait industry, modeled on the Sea Grant AIS-HACCP and Pet Industry Joint Advisory Council/Sea Grant/USFWS Habitattitude™ campaigns. Measurable objectives and timetables for these programs are included in Appendix F.

Rationale: People of all walks of life play a role in preventing the introduction and spread of AIS and, therefore, must be involved. Education and outreach are critical in an effective program to address AIS. Several entities have developed and implemented extremely successful educational campaigns (e.g., Sea Grant's HACCP program, U.S. Fish and Wildlife Service/Aquatic Nuisance Species Task Force's Stop Aquatic Hitchhikers™ campaign, and Pet Industry Joint Advisory Council/Sea Grant/U.S. Fish and Wildlife Service Habitattitude™ campaign). These programs should be expanded, emulated, and applied to all aspects of AIS, and particularly applied to reach people who pose the greatest risks of AIS introductions. The proposed educational campaign targeting maritime commerce, for instance, would involve shippers, ports, consumers, and others touched by the marine shipping industry, thus involving all people who work in and benefit from shipping. Effective educational campaigns rely on repetition and sustained messages from multiple sources.

Cost: \$19.5 million annually for five years.

NOTES

¹ International Association of Great Lakes Research. 2002. Research and management priorities for aquatic invasive species in the Great Lakes. [online] URL www.iaglr.org/scipolicy/ais/ais_iaglr02.pdf.

² Ricciardi, A. 2001. Facilitative interactions among aquatic invaders: is an "invasional meltdown" occurring in the Great Lakes? *Can. J. Fish. Aquat. Sci.* 58: 2513-2525.

³ Executive Order 13112. <http://www.invasivespecies.gov/laws/eo13112.pdf>.

⁴ Mills, E, J. Leach, J. Carlton, C. Secor. 1993. Exotic Species in the Great Lakes: A history of biotic crises and anthropogenic introductions. *J. Great Lakes Res.* 19(1): 1-54; Drake, J.M., C. Costello, and D.M. Lodge. 2005. [Letter:] When did the discovery rate for invasive species in the North American Great Lakes accelerate? *BioScience* 55:4; Holeck KT, EL Mills, HJ Maclsaac, MR Dochoda, RI Colautti, and A Ricciardi. 2004. Bridging troubled waters: biological invasions, transoceanic shipping, and the Laurentian Great Lakes. *BioScience* 54:919-929; Holeck KT, EL Mills, HJ Maclsaac, MR Dochoda, and A Ricciardi. 2005. [Letter] Response from Holeck and colleagues. *BioScience* 55:4-5.

⁵ Pimentel, D. 2005. Aquatic nuisance species in the New York State Canal and Hudson River systems and the Great Lakes basin: an economic and environmental assessment. *Environ. Manage.* 35(1): 1-11.

⁶ The Steering Committee of the Collaboration has requested the Strategy Teams put forward recommendations that can be implemented even before the process is finalized in December, 2005. The AIS Strategy Team recommends this action on NOBOBs as one for immediate implementation.

⁷ For predictions about which fish species from Eurasia would be most damaging to the Great Lakes, and thus for insights into an immediate candidate list for damaging species that should be listed in the Lacey Act listed, see: Kolar, C.S. and D.M. Lodge. 2002. Ecological predictions and risk assessments for alien species. *Science* 298:1233-1236.

⁸ Government Accountability Office (formerly General Accounting Office). 2002. Invasive Species: Clearer Focus and Greater Commitment Needed to Effectively Manage the Problem. Report GAO-03-1.

⁹ For background on the cost-effectiveness of slowing the spread of AIS, see: Leung, B., D.M. Lodge, D. Finnoff, J.F. Shogren, M. Lewis, and G. Lambert. 2002. An ounce of prevention or a pound of cure: bioeconomic risk analysis of invasive species. *Proc Royal Soc London B* 269: 2407-2413.

Appendix A. Aquatic Invasive Species Strategy Team Implementation Actions and Milestones

(Monetary figures are provided where available)

Action	Vector Team	Description	Lead	Affiliates	Funding				
					2006 (May require additional appropriations)	2007	2008	2009	2010
Legislation and Research									
<p><i>Legislative Milestone</i> The AIS Strategy team strongly supports the immediate passage and full funding of NAISA. In fact, most, though not all, of the recommendations presented would be addressed with the enactment of legislation that has already been introduced—the National Aquatic Invasive Species Act of 2005 (NAISA--S. 770, H.R. 1591, H.R. 1592). That legislation includes titles such as Prevention, Research, Outreach and Education, Early Detection, Rapid Response, Control, Management, and Coordination. Passage of this legislation would support programs to achieve expeditious and measurable progress toward halting future species invasions of the Great Lakes and controlling established populations</p>			109 th Congress						
1	Canals and Waterways, Recreational Activities; Aquaculture; Maritime Commerce; Organisms in Trade	Pass comprehensive AIS legislation	109 th Congress						
2	Organisms in Trade	By December 2005, Federal, State, Tribal and Provincial partners in the GLRC should affirm a commitment to reduce and eliminate the risk of unintentional and intentional releases of live non-native aquatic organisms that have the capability of becoming established and cause harm to humans, the economy, or the environment in the Great Lakes basin. In affirming this commitment as part of the final terms of the Great Lakes Regional Collaboration Action Plan, jurisdictions should commit to a precautionary approach in developing and implementing legislation, regulations and programs regarding future proposed importations and commerce involving non-native/non-naturalized aquatic organisms	Federal, state, tribal, provincial partners in the Great Lakes Regional Collaboration						
3	Recreational Activities	The Council of Great Lakes Governors, the Great Lakes Legislative Caucus and Great Lakes tribal leaders will work to ensure that state legislatures and tribal councils establish comprehensive AIS programs, including watercraft inspector education, and develop long term, stable funding mechanisms for them	CGLG GLLC Tribal Leaders	State Legislatures					
4	Recreational Activities	The Council of Great Lakes Governors, the Great Lakes Legislative Caucus and Great Lakes tribal leaders will support development and implementation of AIS state and tribal laws and regulations that prohibit the transport and spread of AIS and aquatic vegetation on watercraft	CGLG GLLC Tribal Leaders	State Legislatures; Stakeholders					

Action	Vector Team	Description	Lead	Affiliates	Funding				
					2006 (May require additional appropriations)	2007	2008	2009	2010
5	Organisms in Trade	Federal, State, Tribal and Provincial governments should enact laws, regulations and programs to reduce and eliminate future introductions of live invasive species via pathways involving commerce and trade	All						
Recommendation 1: Prevention of AIS Introduction and Spread through Maritime Commerce									
Milestone 1.1									
(1) Immediately require, verify, and enforce (in the current shipping season under existing authorities) that ocean-going vessels in the no ballast on board condition (NOBOB) implement practices that are an improvement over current practices									
1A	Maritime Commerce	The immediate requirement (in the 2005 shipping season under existing authorities) that ocean-going vessels in the no ballast on board condition (NOBOB) implement practices that are an improvement over current practices	USCG						
Milestone 1.2									
(2) Immediately require, verify and enforce best performing ship-board ballast water treatment and hull management methods for ocean-going vessels (with a set approval period), with continued upward ratcheting of the treatment floor as treatment performance improves. Approved treatment must be to an environmentally protective standard by 2011									
2A	Maritime Commerce	The immediate application of best performing ship-board ballast water treatment and hull management methods for ocean-going vessels (with a set approval period), with continued upward ratcheting of the treatment floor as treatment performance improves. Approved treatment must be to the environmentally protective standard by 2011. This process should be conducted pursuant to the requirements provided in S. 770 as introduced, the National Aquatic Invasive Species Act	USCG		\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000
2B	Maritime Commerce	All vessels entering the Great Lakes/St. Lawrence Seaway System will implement effective prevention requirements including ballast treatment, hull management, and other measures as may be determined necessary, enforceable and practicable, such that there are no more ship-mediated releases of AIS into the system	USCG						
Milestone 1.3									
(3) Immediately require monitoring, reporting, and public dissemination of all ballasting activities, prevention practices, and outcomes such that progress toward the goal is measurable and enforcement practical									
3A	Maritime Commerce	The immediate requirement for monitoring, reporting, and public dissemination of all ballasting activities, prevention practices, and outcomes such that progress toward the goal is measurable and enforcement practical	USCG		\$2,750,000	\$2,750,000	\$2,750,000	\$2,750,000	\$2,750,000
3B	Maritime Commerce	Consistent and continuous assessment of 1) inoculation pressure from ships, 2) populations of NAIS, and 3) rates of NAIS introduction and spread	NOAA		\$1,250,000	\$1,250,000	\$1,250,000	\$1,250,000	\$1,250,000
Milestone 1.4									
(4) Review and apply best-performing ballast water management practices to non-ocean-going vessels operating exclusively within the Great Lakes (including application of ballast water treatment for new ships) to eliminate the spread of AIS already introduced into the system									

Action	Vector Team	Description	Lead	Affiliates	Funding				
					2006 (May require additional appropriations)	2007	2008	2009	2010
4A	Maritime Commerce	Review and application of best-performing ballast water management practices to non-ocean-going vessels operating exclusively within the Great Lakes (including application of ballast water treatment for new ships) to eliminate the spread of AIS already introduced into the system	Lake Carriers Association	GLP, USCG					
Milestone 1.5 (5) Immediately and significantly expand research, testing, and evaluation of policies and technologies as alternatives to on-board treatment. Alternatives to be investigated should include (but not be limited to) cargo transfer, shore-based treatment, use of Clean Water Act discharge permits, and state/regional actions. Programs under which these investigations can be conducted include the Ballast Water Technology Demonstration Program and the Environmental Technology Verification Program. These investigations will hasten development of effective shipboard treatment systems. If ship-board treatments are shown to be inadequate, the team recommends implementation by 2011 of effective alternatives that prohibit ballast water from ocean-going ships from being discharged into the Great Lakes.									
5A	Maritime Commerce	The immediate significant expansion of the Ballast Water Technology Demonstration Program, and EPA's Environmental Technology Verification program with the dual objective of hastening development of effective shipboard treatment systems and developing alternatives to on-board treatment such as (but not limited to) cargo transfer, shore-based treatment, or use of Clean Water Act discharge permits	NOAA, EPA		\$2,500,000	\$2,500,000	\$2,500,000	\$2,500,000	\$2,500,000
Recommendation 2: Prevention of AIS Introduction and Spread Through Canals and Waterways									
Milestone 2.1 (1) Complete construction of barrier II, make barrier I permanent, provide federal funds to operate both dispersal barriers in the Chicago Waterway system, and complete a study of options to for permanent hydrological and/or biological separation of the Great Lakes and Mississippi River systems									
1A	Canals and Waterways	Provide full federal funding for existing barrier operations including the Chicago dispersal barriers and sea lamprey barriers	109th Congress	USACE, USFWS, USEPA			\$17,500,000	\$17,500,000	\$17,500,000
1B	Canals and Waterways	By September 30, 2006, implement and fully fund the recommendations from the 2003 Chicago AIS Summit including: 1) completing a reconnaissance study of hydrologic separation of Lake Michigan from the Chicago Sanitary and Ship Canal, and 2) augmenting the two electrical barriers with technological alternatives/solutions including biological separation	109th Congress	USACE, USEPA	\$1,500,000				
Milestone 2.2 (2) Fully examine options and their economic benefits and costs to prevent the spread of AIS via the Lake Champlain Canal and other canal systems linking the Great Lakes with other basins									
2A		Pursue limited hydrologic separation with overland transport of recreational vessels, and use of a graving dock or seasonal lockage restrictions for commercial vessels on the Champlain portion of the New York State Canal System							
Milestone 2.3 (3) Close or modify, through the use of physical barriers or control structures, canals that have fallen into disuse or disrepair—if rebuilt, prevent passage of aquatic invasive species									

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Action	Vector Team	Description	Lead	Affiliates	Funding				
					2006 (May require additional appropriations)	2007	2008	2009	2010
3A	Canals and Waterways	By September 30, 2010, close non-commercial canals through use of physical barriers or control structures	States, USACE	Congressional appropriation					
3B	Canals and Waterways	By September 30, 2007, conduct research to develop and test alternative barrier types and prevention approaches. Install those approaches to evaluate their effectiveness (i.e., demonstration projects). Conduct economic analyses to compare cost-effectiveness of various alternative approaches	USACE, USGS, NOAA						
3C	Canals and Waterways	By September 30, 2008, initiate a federally funded granting process for dispersal barrier effectiveness monitoring, research & development	USACE	Needs Congressional authorization and appropriation	\$3,000,000	\$3,000,000	\$3,000,000	\$3,000,000	\$3,000,000
3D	Canals and Waterways	By September 30, 2007, investigate means to convey storm and wastewater discharges via canals without spreading AIS	USEPA, USACE, canal management agencies, NOAA, USGS						
3E	Canals and Waterways	By September 30, 2007, investigate alternative means for cargo transportation between the GL and adjacent watersheds in the U.S.	GLC, NOAA	Needs Congressional Authorization and Appropriation					
3F	Canals and Waterways	By September 30, 2007, prohibit the transgression of watersheds via canal connections by monitored AIS	Great Lakes States						
Milestone 2.4									
(4) Prohibit the development of new cross-drainage basin connections									
4A	Canals and Waterways	By September 30, 2006, prohibit improvement of existing open-channel waterway connections between drainage basins	Congress, States						
4B	Canals and Waterways	By September 30, 2006, prohibit development of new open-channel connections between drainage basins	Congress, States						
Milestone 2.5									
(5) Address intermittent flood-related connections									
5A	Canals and Waterways	By September 30, 2010, implement efforts to prevent intermittent flood-related connections between the Great Lakes and other watersheds	Congress	USACE, IL and other Great Lakes States, City of Chicago					
Milestone 2.6									
(6) Initiate measures to prevent or reduce the movement of AIS into stream segments opened up by dam/impediment removal or culvert construction, and fully consider benefits to native species and impacts from AIS when evaluating cost-benefits of proposed fish passage projects									
6A		Initiate measures to prevent or reduce the movement of AIS into stream segments opened up by dam/impediment removal or culvert construction, and fully consider benefits to native species and impacts from AIS when evaluating cost-benefits of proposed fish passage projects							
Milestone 2.7									
(7) Develop and implement AIS monitoring plans to provide comprehensive monitoring and reporting of AIS through the canal vector									
7A		Develop and implement AIS monitoring plans to provide comprehensive monitoring and reporting of AIS through the canal vector							

Action	Vector Team	Description	Lead	Affiliates	Funding				
					2006 (May require additional appropriations)	2007	2008	2009	2010
Milestone 2.8									
(8) Fully fund the Great Lakes Fishery Commission's sea lamprey control program									
8A	Canals and Waterways	Fund the sea lamprey control and research program	GLFC	Congress	\$19,000,000	\$19,000,000	\$22,700,000	\$23,380,000	\$24,080,000
Recommendation 3: Prevention of AIS Introduction and Spread Through Trade of Live Organisms									
Milestone 3.1									
(1) Develop a list of species of concern for the Great Lakes basin and an immediate moratorium by the States on the trade of species on that list, until the species are screened and approved for trade									
1A	Organisms in Trade	The Great Lakes Panel on Aquatic Nuisance Species has produced Model Guidance for Great Lakes Jurisdictions on AIS (1999). This should be reviewed, updated and strengthened. Existing and proposed laws in Minnesota (Chapter 84D "Harmful Exotic Species"), Florida and Michigan may provide good models	GLP		\$50,000				
1B	Organisms in Trade	Great Lakes states should enact laws to prohibit sales and shipment of species listed on the moratorium list. This prohibition should remain in effect until a process to screen and fully evaluate risks is implemented	Great Lakes States						
1C	Canals and Waterways	By September 30, 2007, prohibit the use of potentially invasive organisms with the potential to survive in the Great Lakes in aquaculture operations subject to flooding	Great Lakes States						
1D	Organisms in Trade	An institution with legal expertise (such the Environmental Law and Policy Center, or the Environmental Law Institute) should provide a model law to assist states and encourage consistency	Congress Policy Center or Institute		\$100,000				
Milestone 3.2									
(2) Implement provisions of the pending NAISA legislation, as introduced, that establish a federal screening process for organisms proposed for trade									
2A	Organisms in Trade	The federal government should establish consistent guidelines for scientifically-based minimum information required for screening to be applied by those federal agencies with authority to regulate or restrict species movement	USFWS	Agencies with jurisdiction	\$1,000,000	\$1,000,000			
2B	Organisms in Trade	Industry should be brought into the development of the new screening process.	USFWS	Industry Sea Grant					
Milestone 3.3									
(3) Modify the pending NAISA legislation mandating that the screening process should classify species proposed for trade into three lists—prohibited, permitted, and conditionally prohibited/permitted									
3A	Organisms in Trade	The federal government should promulgate federal regulations to be applied by federal agencies with authority to regulate or restrict species movement defining permitted, permitted conditionally/prohibited provisionally pending further information or prohibited lists, and the conditions or restrictions imposed on species in each category	USFWS	USGS Agencies with jurisdiction		\$3,500,000			
3B	Organisms in Trade	The federal government, in consultation with state, tribal, and provincial governments, should ask the Great Lakes Panel on Aquatic Nuisance Species to produce a list of species that have a high likelihood of becoming invasive in the Great Lakes basin	USFWS GLP		\$250,000				

Action	Vector Team	Description	Lead	Affiliates	Funding				
					2006 (May require additional appropriations)	2007	2008	2009	2010
3C	Organisms in Trade	By 2006, Federal, State, Tribal and Provincial authorities should collaborate to collect, share and make available to the public information on invasive species in trade, create networks to improve effectiveness and implementation, and to coordinate budgetary planning	Federal agencies State agencies		\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000
3D	Organisms in Trade	USGS should lead the creation and maintenance of databases of information in cooperation with the U.S Fish and Wildlife Service (FWS), NOAA and the Smithsonian Environmental Research Center. These databases should include: a catalog of non-native, non-naturalized organisms currently or potentially in trade; a list of species proposed for importation and/or interstate commerce; a list of species which are being screened; a documentation of trends and practices in commerce, trade and cultural activities; and information on criminal activity. Where appropriate (except for criminal activity) information in the database should be made available to the public	USGS	USGWS NOAA Smithsonian States	\$3,500,000	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000
Milestone 3.4 (4) Modify NAISA to clearly state that the screening process established must place the burden of proof of non-injuriousness on the importer									
4A	Organisms in Trade	Within 18 months of the promulgation of federal regulations, importers should be prohibited from importing any live species on the lists except in compliance with the uniform federal regulations The Fish and Wildlife Service to oversee implementation of the screening process and provide screening for any species proposed for importation that is not covered by another federal agency	USFWS	Importers			\$3,500,000	\$3,500,000	\$3,500,000
Milestone 3.5 (5) Allocate sufficient resources to heighten the number of species under the Lacey Act as "injurious," to prevent the interstate transportation of harmful species; FWS should list black, bighead, and silver carps as injurious under the Lacey Act									
5A	Organisms in Trade	Congress should amend the Lacey Act or enact new legislation to include aquatic invertebrates and plants	Congress	USFWS					
5B	Organisms in Trade	Congress should provide authority and funding under the Lacey Act or enact new legislation to create an effective process to screen aquatic organisms proposed for importation. Congress should provide timelines to require agencies to make decisions on species listings in a timely manner. Congress should provide the funding and directive to APHIS to fully implement its existing authority to regulate aquatic plants and insects	Congress	USFWS APHIS	\$700,000	\$700,000	\$700,000	\$700,000	\$700,000
5C	Organisms in Trade	Congress should amend the Lacey Act or enact new federal legislation to prohibit, restrict, or allow proposed importations based on the results of the screening process	Congress	USFWS					
5D	Organisms in Trade	Congress should amend the Lacey Act to list the black, silver, bighead, and grass carp as injurious so that interstate transportation of live fish will be prohibited. (Black, silver and bighead carp should be the highest priority.)	Congress						

Action	Vector Team	Description	Lead	Affiliates	Funding				
					2006 (May require additional appropriations)	2007	2008	2009	2010
5E	Organisms in Trade	Regulations should be promulgated to implement the screening process recommended above to apply to live non-native, non-naturalized species which are already imported, proposed for sale or interstate commerce, but which have not yet become widespread or invasive	USFWS		\$3,500,000				
5F	Organisms in Trade	Regulations should be adopted and implemented to prohibit, restrict, or allow sale, possession and interstate movement of species following screening	USFWS			\$3,500,000	\$3,500,000	\$3,500,000	3,500,000
Milestone 3.6									
(6) Significantly increase resources for the enforcement of laws governing the trade of live organisms									
6A	Organisms in Trade	The Great Lakes Fishery Commission should convene workshop of the Law Enforcement Committee of the Council of Lake Committees to discuss with federal, state, provincial and tribal law enforcement officers information needs, resource needs, and training needs for effective enforcement	GLFC	Law Enforcement Committee Council of Lake Committees	\$75,000				
6B	Organisms in Trade	State and federal governments should provide state and federal agencies the authority, clear directive, tools, and funding necessary to effectively enforce ANS laws	Congress State legislatures						
6C	Organisms in Trade	Federal, state, tribal, and provincial agencies should increase enforcement personnel presence in and around areas operating in the sale of non-native aquatic organisms for commercial purposes	State, Federal, tribal, and provincial agencies						
6D	Organisms in Trade	Citizen suit provisions should be enacted as part of federal laws to improve enforcement, hold state and federal governments accountable for effective implementation and to bolster accountability	Congress						
6E	Organisms in Trade	Federal and state penalties associated with the sale of prohibited species of live organisms should be made much more strict	Congress State legislatures						
6F	Organisms in Trade	Federal, state, provincial, and tribal enforcement agencies should be provided with the authority and the training to effectively enforce AIS laws	Congress State legislatures	Law enforcement agencies	\$3,000,000	\$3,000,000	\$3,000,000	\$3,000,000	\$3,000,000
Milestone 3.7									
(7) Develop and implement risk models for organisms in aquaculture									
7A	Aquaculture	Development and implementation of formal and <i>a priori</i> risk assessment protocols with an agreed upon process to assess and address risks before releases or escapement	States, Tribes		160,000	160,000	160,000	160,000	160,000
7B	Aquaculture	Development and implementation of formal and <i>a priori</i> decision models with an agreed upon process to decide on merits, costs, and benefits before releases or elevated risks of escapement	States, Tribes		160,000	160,000	160,000	160,000	160,000
7C	Aquaculture	Focus public and commercial aquaculture on native or naturalized species and gene pools	States, Tribes						

Action	Vector Team	Description	Lead	Affiliates	Funding				
					2006 (May require additional appropriations)	2007	2008	2009	2010
7D	Aquaculture	Implement a bi-national and tribal accord aimed at reducing risks of introduced non-native invasive species from public and private aquaculture operations consisting of a bilateral agreement on approved actions or at least decision processes by which desired introductions can be approved or disallowed; the appropriate level of taxonomic complexity at which to direct policies and procedures; cost bearing (sharing) for protection and remedy, and enforcement	States, Tribes		\$25,000	\$25,000	\$25,000	\$25,000	\$25,000
7E	Aquaculture	Require the Implementation of the formal a priori risk assessment protocols contained in Brister and Kapuscinski's 2002 "Environmental Assessment Tool for Aquaculture in the Great Lakes Basin Version 1.2. with an agreed upon process to assess and address risks before development and investment of new aquacultural net pen operations in the Great Lakes	States, Tribes						
Recommendation 4: Establish a Great Lakes AIS Integrated Pest Management Program									
Milestone 4.1									
(1) Allocate funds for development and implementation of State and Interstate Aquatic Nuisance Species Management Plans through the Aquatic Nuisance Species Task Force, with a particular emphasis on the immediate use of techniques to control or slow the spread of AIS									
1A	Canals and Waterways, Recreational Activities	Authorize a single binational or Federal agency (i.e., Lead Federal Entity) to coordinate development and implementation, with appropriate State, Tribal, Federal, and Canadian partners, of an integrated pest management program for priority AIS	Administration, Congress, Lead Federal Entity	Federal, State, Tribal, and local governments, nongovernmental organizations	\$15,000,000	\$15,000,000	\$15,000,000	\$15,000,000	\$15,000,000
1B	Recreational Activities	By December 31, 2005, Congress will pass legislation that authorizes, and will appropriate by FY2007, \$8 million annually to support USFWS allocations to Great Lakes State and Interstate Aquatic Nuisance Species Management Plans (Plans) approved by the Aquatic Nuisance Species Task Force (ANSTF). The plans must include rapid response technical plans	Congress	USFWS; ANSTF; states; tribes; other cooperators	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000
1C	Canals and Waterways	By September 30, 2006, fully fund and implement the recommendations in the National Management and Control Plan for Asian carp	USFWS	Requires Congressional authorization and appropriation	Budget to be determined	Budget to be determined	Budget to be determined	Budget to be determined	Budget to be determined
1D	Maritime Commerce	Containment of AIS spread by ships (salty and laker) of any populations of AIS not eradicated through rapid response							
1E	Organisms in Trade	Regional, federal, state/provincial and local agencies should work together early in the budgetary planning stages for AIS programs. Related appropriations requests should be presented to Congress under one umbrella, when appropriate, representing needs on a regional basis	Federal Agencies States Congress						
Milestone 4.2									
(2) Develop voluntary agreements and codes of best practices for industrial trade groups									
2A		Develop voluntary agreements and codes of best practices for industrial trade groups							

Action	Vector Team	Description	Lead	Affiliates	Funding				
					2006 (May require additional appropriations)	2007	2008	2009	2010
Milestone 4.3									
(3) Encourage investigation of economic requirements and incentives (e.g., bonds or insurance) to prevent new introductions									
3A		Encourage the investigation of economic requirements and incentives (e.g., bonds or insurance) to prevent new AIS introductions							
Milestone 4.4									
(4) Establish a revolving fund for rapid response actions									
4A	Recreational Activities	By December 31, 2005, Congress will authorize, and will appropriate by FY2007, \$2 million for a contingency fund to be used in rapid response actions conducted in accordance with approved Great Lakes State and Interstate Management Plans.	Congress	USFWS; ANSTF; States; Tribes; other cooperators	\$2,000,000	Re-appropriate funds to restore fund to \$2,000,000	Re-appropriate funds to restore fund to \$2,000,000	Re-appropriate funds to restore fund to \$2,000,000	Re-appropriate funds to restore fund to \$2,000,000
Milestone 4.5									
(5) Establish an interagency, Great Lakes Federal Rapid Response Team, that will conduct activities on federal lands, and in other locations with State, Tribal, and local cooperation									
5A	Recreational Activities	Congress will authorize, and appropriate by FY2007, \$1,500,000 for the USFWS, NOAA, Sea Grant, EPA, USDA and other appropriate federal agency heads to establish the team in collaboration with the states and tribes	Congress	USFWS; NOAA (including Sea Grant); USEPA; USDA; other appropriate federal agencies	\$1,500,000	\$1,500,000	\$1,500,000	\$1,500,000	\$1,500,000
5B	Canals and Waterways, Recreational Activities	Government agencies responsible for AIS will develop an accessible, integrated and centralized program for recreational users to report and verify new infestations/invasions of AIS	USDA USFS USFWS NPS USGS SEFWA TEFWA USEPA	Budget to be determined	Budget to be determined	Budget to be determined	Budget to be determined	Budget to be determined	Budget to be determined
5C	Recreational Activities	Great Lakes Sea Grant programs will collaborate with state and tribal agencies to establish and promote volunteer AIS monitoring programs at marinas, harbors, and other locations that are at highest risk of introduction of AIS by recreational and other activities based on volume of watercraft traffic and proximity to infested waters	GLSGN NPS USFWS USFS	SEFWA; TEFWA; resort and recreation associations; conservation groups; lake associations; municipalities; businesses	90,000**	85,000**	85,000**	85,000**	80,000**
5D	Aquaculture	Response to unauthorized release or escapement with an agreed upon process to decide on responsibilities, cost-sharing, and reporting of remedial actions such that timely and effective actions may be taken before problems grow unmanageable	States, Tribes, Aquaculture facilities, Federal agencies		\$350,000	\$350,000	\$350,000	\$350,000	\$350,000
Milestone 4.6									
(6) Allocate funds to implement a system of enhanced monitoring and ecological surveys in the Great Lakes									

Action	Vector Team	Description	Lead	Affiliates	Funding				
					2006 (May require additional appropriations)	2007	2008	2009	2010
6A	Canals and Waterways, Recreational Activities	Congress will authorize and appropriate \$2,000,000 for the USFWS, NOAA, USFS, and EPA to develop and implement, in cooperation with state, tribal, local, port, and other federal entities, a system of ecological assessments at Great Lakes locations at high risk of AIS invasion	Congress	USFWS; NOAA; USFS; USEPA; States; USGS	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000
6B	Maritime Commerce	Statistically valid sampling of Great Lakes/St. Lawrence Seaway System harbors, connecting channels and ships, including a system for vouchering, identifying and reporting suspected AIS from ships, and an effective and adequately funded rapid response strategy, to prevent AIS establishment and dispersal about the basin							
Milestone 4.7 (7) Support additional research to develop and implement new control methods for uncontrolled species of concern									
7A	Recreational Activities	USEPA, USFWS, U.S. Geological Survey, USDA and NOAA (including Sea Grant) and states and tribes will develop and administer a \$10 M annual grant program to fund research, development, demonstration, and verification of environmentally sound and cost-effective approaches to control and eradicate AIS	Congress	EPA; USFWS; USGS; USDA; NOAA (including Sea Grant); states; tribes	\$10,000,000	\$10,000,000	\$10,000,000	\$10,000,000	\$10,000,000
Milestone 4.8 (8) Establish a coordinated data management system, through the Smithsonian Institution, the Great Lakes Environmental Research Laboratory, or other suitable entity, to develop an accessible, integrated, and centralized database that allows for the reporting and tracking of AIS infestations									
8A		Establish a coordinated data management system, through the Smithsonian Institution, the Great Lakes Environmental Research Laboratory, or other suitable entity, to develop an accessible, integrated, and centralized database that allows for the reporting and tracking of AIS infestations							
Milestone 4.9 (9) Ensure overall coordination and accountability through the Invasive Species Council, including developing regular and comprehensive reports summarizing the status of AIS activities (including those of the ANS Task Force and the Great Lakes Panel on ANS in implementing the National Invasive Species Management Plan), formulating a complete AIS federal budget request, overseeing progress in addressing AIS, evaluating the collective response to AIS, and communicating AIS needs and problems to Congress and the public. The National Invasive Species Management Plan should include specific focus on AIS in the Great Lakes									
9A		Improve coordination through the Invasive Species Council including developing regular and comprehensive reports summarizing the status of AIS activities (including the status of individual agencies' activities to implement the National Invasive Species Management Plan), formulating a complete AIS federal budget request, overseeing progress in addressing AIS, evaluating the collective response to AIS, and communicating AIS needs and problems to Congress and the public							
Recommendation 5: Education and Outreach									

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Action	Vector Team	Description	Lead	Affiliates	Funding				
					2006 (May require additional appropriations)	2007	2008	2009	2010
Milestone 5.1									
(1) Support programs that educate Great Lakes boaters and anglers on how to take preventive actions against AIS									
1A	Canals and Waterways	By September 30, 2007, fund and implement angler, cultural and stakeholder education programs and prohibit release of non-native organisms in rivers, canals and associated waterways	Great Lakes States, Sea Grant	Need Congressional appropriation	\$5,000,000 (Also funds Actions 2 & 3)	\$5,000,000 (Also funds Actions 2 & 3)	\$5,000,000 (Also funds Actions 2 & 3)	\$5,000,000 (Also funds Actions 2 & 3)	\$5,000,000 (Also funds Actions 2 & 3)
1B	Recreational Activities	Governments, academia, businesses, and boating and fishing associations will collaborate to develop, coordinate, and implement cost effective AIS prevention programs and campaigns based on social science strategies and integrating, as appropriate, existing products or campaigns such as <i>Stop Aquatic Hitchhikers!</i> TM	GLP GLSGN NPS SEFWA TEFWA USCG USEPA USFWS USFS	Boating and fishing manufacturers and retailers; tourism, resort and recreation associations; chamber of commerce; conservation groups; lake associations; municipalities; businesses	\$730,000** **Included in Action 4.	\$720,000**	\$720,000**	\$720,000**	\$720,000**
1C	Recreational Activities	Develop and implement watercraft inspector training/education programs in each state and design and distribute materials including windshield fliers, winch post decals, and bait bucket stickers to encourage recreational users to adopt preventive behaviors	SEFWA TEFWA	Boating and fishing manufacturers and retailers; tourism, resort and recreation associations; chamber of commerce; conservation groups; lake associations; municipalities; businesses	3,302,000**	3,200,000**	3,302,000**	3,200,000**	3,302,000**
1D	Recreational Activities	Develop public service announcements and purchase advertising in recreation-oriented media	GLSGN NPS SEFWA TEFWA USEPA USFS USFWS	Boating and fishing manufacturers and retailers; tourism, resort and recreation associations; chamber of commerce; conservation groups; lake associations; businesses	\$110,000**	\$80,000**	\$80,000**	\$80,000**	\$80,000**

Action	Vector Team	Description	Lead	Affiliates	Funding				
					2006 (May require additional appropriations)	2007	2008	2009	2010
1E	Recreational Activities	Include AIS information and list infested waters in recreation safety and regulation publications	NPS SEFWA TEFWA USCG USFS USFWS		\$19,000**	\$19,000**	\$19,000**	\$19,000**	\$19,000**
1F	Recreational Activities	Develop and distribute tip sheets for boaters and anglers.	GLP GLSGN NPS SEFWA TEFWA USCG USEPA USFWS USFS Businesses	Boating and fishing manufacturers and retailers; tourism, resort and recreation associations; chamber of commerce; conservation groups; lake associations; municipalities; businesses	\$160,000**	\$150,000**	\$150,000**	\$150,000**	\$150,000**
1G	Recreational Activities	Identify and select the five most likely user groups	GLP GLSGN NPS SEFWA TEFWA USCG USEPA USFWS	Boating and fishing manufacturers and retailers; tourism, resort and recreation associations; chamber of commerce; conservation groups; lake associations; municipalities; businesses	\$10,000**				
1H	Recreational Activities	Develop standard guidance and target other recreational users	GLP GLSGN NPS, SEFWA TEFWA USCG USEPA USFWS Businesses	Aquaculture, live seafood, nursery, and aquarium trades; boating & fishing manufacturers & retailers; tourism, resort & recreation associations; chamber of commerce; conservation groups; lake assoc.; municipalities	\$400,000**	\$400,000**	\$400,000**	\$400,000**	\$400,000**

Action	Vector Team	Description	Lead	Affiliates	Funding				
					2006 (May require additional appropriations)	2007	2008	2009	2010
II	Recreational Activities	Feature AIS prevention messages and ways to minimize AIS impacts on boats and other recreational equipment at 70% of Great Lakes basin water access sites	GLSGN SEFWA TEFWA USFWS	USEPA; USFS; USCG; USGS; NPS; boating and fishing manufacturers and retailers; tourism, resort and recreation associations; chambers of commerce; conservation groups; lake assoc.	\$185,000**	\$185,000**	\$185,000**	\$185,000**	\$185,000**
IJ	Recreational Activities	Provide information on AIS at visitor centers along key transportation corridors and at major boating and angling events	GLSGN SEFWA TEFWA USFWS	SDOT; USFS; NPS; boating and fishing manufacturers and retailers; tourism, resort and recreation assoc.; chambers of commerce; conserve. groups; lake assoc.; municipalities; businesses	\$285,000**	\$125,000**	\$285,000**	\$125,000**	\$125,000**
IK	Recreational Activities	Assess and evaluate AIS boater and angler outreach and education programs	GLSGN SEFWA TEFWA	USFWS, USFS, USCG; NPS; recreational boating and fishing associations		\$100,000**			\$100,000**
IL	Recreational Activities	Use assessment and evaluation results to better understand, target, and manage recreational activities and to use the most effective methods	GLSGN SEFWA TEFWA	GLP; NPS; USCG; USEPA; USFS; USFWS; boating and fishing manufacturers and retailers; tourism, resort and recreation associations; chamber of commerce; conservation groups; lake associations; municipalities; businesses			\$100,000**		\$100,000**

Action	Vector Team	Description	Lead	Affiliates	Funding				
					2006 (May require additional appropriations)	2007	2008	2009	2010
1M	Recreational Activities	Develop marketing strategies to enhance distribution of new and existing AIS educational materials to schools and learning centers and provide training for teachers	GLSGN SEFWA	NPS; TEFWA; USFWS; USFS; boating and fishing manufacturers and retailers; tourism, resort and recreation associations; chamber of commerce; conservation groups; lake associations; municipalities; businesses	\$46,000**				
1N	Recreational Activities	Thirty governments and organizations will collaborate to develop and produce and disseminate key AIS identification materials and conduct effective educational programs	GLSGN SEFWA TEFWA USFWS	GLP; NPS; USCG; USEPA; USFS; USGS	\$1,650,000**		\$1,650,000**		\$1,650,000**
Milestone 5.2									
(2) Continue AIS-focused Hazard Analysis and Critical Control Point (HACCP) training and plan implementation including research and management agencies within and outside of the Great Lakes basin									
2A	Canals and Waterways	By September 30, 2007, fund, design, and implement an "AIS consequences" education program for canal management agencies	Great Lakes Sea Grant Network, Canal Management Agencies						
2B	Recreational Activities	Develop a model partnership between business, governments and academia to design and implement demonstration projects to build community-based capacity	GLSGN NPS SEFWA TEFWA USCG USEPA USFWS USFS Businesses	Boating and fishing manufacturers and retailers; tourism, resort and recreation associations; chamber of commerce; conservation groups; lake associations	\$300,000**	\$300,000**	\$300,000**	\$300,000**	\$300,000**
2C	Recreational Activities	Communicate outreach and education successes with policy makers, resource managers, targeted audiences, and news media to other communities to encourage similar partnership programs	Everyone	Everyone			\$20,000**		\$20,000**

Action	Vector Team	Description	Lead	Affiliates	Funding				
					2006 (May require additional appropriations)	2007	2008	2009	2010
2D	Aquaculture	Continue AIS-Hazard Analysis and Critical Control Point training within and outside of the Great Lakes region	Great Lakes Sea Grant Network and North Central Regional Aquaculture Center						
Milestone 5.3 (3) Support a program that educates all facets of the Great Lakes maritime commerce industry including ports, carriers, shippers, mariners, resource users and users of goods produced from cargoes transported to and from the Great Lakes by ships, about the urgency and cost-effectiveness of preventing/containing AIS, the status of prevention, and what is needed to advance prevention									
3A	Canals and Waterways	By September 30, 2007, develop outreach plans for the shipping industries that use canals and waterways	Great Lakes Sea Grant Network, Shipping Industry						
3B	Maritime Commerce	All facets of the industry supporting maritime commerce in the Great Lakes, including ports, carriers, shippers, mariners, resource users and users of goods produced from cargoes transported to and from the Great Lakes by ships are aware of the risk and costs of importations of AIS by ships and the urgency and cost-effectiveness of preventing/containing them, the status of prevention, and what is needed to advance it							
Milestone 5.4 (4) Support a new comprehensive AIS Organisms-in-Trade educational campaign including the bait industry, modeled on the Sea Grant AIS-HACCP and Pet Industry Joint Advisory Council/Sea Grant/USFWS Habitattitude™ campaigns. Measurable objectives and timetables for these programs are included in Appendix F									
4A	Organisms in Trade	Funding should be provided to enable a new AIS Organisms in Trade educational campaign modeled on the Sea Grant AIS-HACCP and Sea Grant/USFWS Habitattitude campaigns	Congress	Sea Grant USFWS Industry					
4B	Organisms in Trade	Within 6 months of funding, the Great Lakes Panel on ANS should approve the highest priority draft educational materials and programs, based on listed species of highest concern, for development and use in the Organisms in Trade campaign. Funding sources should allocate funds based on this prioritization	Great Lakes Panel on Aquatic Nuisance Species	Organisms in Trade Educational Campaign Sea Grant Industry					
4C	Organisms in Trade	Within 12 months of Congressional funding, new educational materials and programs should be produced and made widely available	Organisms in Trade Educational Campaign	Sea Grant Industry					
4D	Organisms in Trade	Federal agencies should engage industry in development of codes of best practice, using the AIS-HACCP training program as a model	Organisms in Trade Educational Campaign USFWS NOAA APHIS	Sea Grant Industry					

*AIS Action Plan
October 14, 2005*

Action	Vector Team	Description	Lead	Affiliates	Funding				
					2006 (May require additional appropriations)	2007	2008	2009	2010
4E	Organisms in Trade	Federal agencies should engage industry in the design and delivery of educational materials for consumers and industry members using the Habitattitude™ model	Organisms in Trade Educational Campaign USFWS NOAA APHIS	Sea Grant Industry					
4F	Organisms in Trade	Awareness materials must be made available in appropriate languages that inform readers of the dangers and consequences of releasing live aquatic organisms into the wild. Target live food sales and commerce (awareness activities should target all pathways not just live food)	Organisms in Trade Educational Campaign						
Milestone 5.5 (5) Provide allocations for approved State and Interstate Aquatic Nuisance Species Management Plans									
5A	Recreational Activities	Pass legislation to authorize and appropriate \$32,442,000* over five years to support cost effective AIS outreach and education programs conducted by federal, state, tribal, agencies, academic programs and organizations. *Includes all O&E items	Congress	DOI (USFWS, NPS); NOAA; USDA; USFS; USEPA	\$7,287,000* *Includes all **in 2006	\$5,364,000* *Includes all ** in 2007	\$7,296,000* *Includes all ** in 2008	\$5,264,000* *Includes all ** in 2009	\$7,231,000* *Includes all **in 2010
Total					\$107,944,000	\$102,123,000	\$126,187,000	\$122,803,000	\$127,347,000

GLP – Great Lakes Panel on ANS
SEFWA – State Environmental and Fish and Wildlife Agencies
USDA – U.S. Department of Agriculture

GLSGN – Great Lakes Sea Grant Network
TEFWA – Tribal Environmental and Fish and Wildlife Agencies
USFS – U.S. Forest Service

NPS – National Park Service
USACE – U.S. Army Corps of Engineers
USCG – U.S. Coast Guard
USFWS – U.S. Fish and Wildlife Service

SDOT – State Departments of Transportation
USEPA – U.S. Environmental Protection Agency
USGS – U.S. Geological Survey

NEAR TERM PRIORITY ACTIONS: AQUATIC INVASIVE SPECIES STRATEGY TEAM

October 14, 2005

PRIORITY NEAR TERM ACTION	LEAD (PARTNER) ENTITIES	COMPLETION DATE	FY 06 \$ REQUEST (MILLIONS) May Require Additional Appropriations	FY 07 \$ REQUEST (MILLIONS)	FY 08 \$ REQUEST (MILLIONS)
Legislation					
Support by the administration for enacting provisions contained in the National Aquatic Invasive Species Act (ex. Senate Bill 770 / H.R. 1591 and 1592), with modifications recommended in the Action Plan, and immediate passage by Congress	Administration (Congress)	12/31/05			
Canals and Waterways					
Complete construction of, and activate, barrier II in the Chicago Sanitary and Ship Canal	Corps of Engineers	12/31/05	Funds available	0	0
Make permanent base funding for the U.S. Army Corps of Engineers for construction, operation, and maintenance of Barrier I and II	Corps of Engineers	12/31/05	1	6	1
Support by the administration and Congressional appropriations for a reconnaissance study that will examine options for permanent hydrological and/or biological separation of the Great Lakes and Mississippi River systems	Administration (Congress, Corps of Engineers)	12/31/06	0	0.8	0.8
Maritime Commerce					
Immediately promulgate a rule to require, verify, and enforce that ocean-going vessels in the no-ballast-on-board condition (NOBOB) implement mandatory best management practices	Coast Guard	Immediate	0.25	0.25	0.25
If there is no existing authority, immediately seek and obtain authority and promulgate rules as stated above	Coast Guard	Immediate	0	0	0
Appropriate necessary funds for U.S. Coast Guard to verify and enforce mandatory best management practices	Congress	Immediate	0.2	0.2	0.2
Modify Title I, Section 101 of NAISA to require development of an environmentally protective standard and immediately after implement best available treatment technology; Require full implementation and compliance with the environmentally protective standard.	Congress (Coast Guard)	12/31/06 (standard); 12/31/11 (compliance)	6	6	6
Organisms in Trade					
The Great Lakes Panel on ANS will develop a list of species of concern for the Great Lakes basin	Great Lakes Panel on ANS (Fish and Wildlife Service, NOAA)	6/30/06	0.25	0	0
Each state will implement a moratorium on intra-state trade based upon the list of species of concern developed by the Great Lakes ANS Panel	Great Lakes states	12/31/06	State funding	State funding	State funding
The federal government will promulgate federal regulations to regulate or restrict species movement defining permitted, permitted conditionally/prohibited provisionally, and prohibited (which is a recommended modification of NAISA) pending further information or prohibited lists, and the conditions or restrictions imposed on species in each category to regulate interstate trade	Fish and Wildlife Service	12/31/06	4	3.5	3.5

PRIORITY NEAR TERM ACTION	LEAD (PARTNER) ENTITIES	COMPLETION DATE	FY 06	FY 07	FY 08	
			\$ REQUEST (MILLIONS) May Require Additional Appropriations	\$ REQUEST (MILLIONS)	\$ REQUEST (MILLIONS)	
Integrated Pest Management (each of the actions listed below recommends administration support and congressional appropriations)						
Support by the administration and congressional appropriations for the Great Lakes Fishery Commission's (GLFC) integrated sea lamprey management program that involves lampricides, barriers, traps, sterile-male-release, and pheromone research and development. (Numbers reflect U.S. portion of the program.)						
	Sea lamprey control program (lampricides, barriers, traps, sterile-male-release-technique, and pheromone research and development)	Administration, Congress (GLFC, Department of State)	12/31/05	17.4	18.9	22.7
	Sea lamprey barriers under WRDA sec. 1135	Administration, Congress (Corps of Engineers)	12/31/05	1.5	1.5	1.5
Authorize a single binational or Federal agency (i.e., Lead Federal Entity) to coordinate development and implementation, with appropriate State, Tribal, Federal, and Canadian partners, of an integrated pest management program for priority AIS.		Lead federal entity	12/31/05	0	0	0
Enhance early detection monitoring for AIS		Lead federal entity in partnerships with all State, Tribal, and Federal research and management agencies	12/31/06	2	2	2
Establish a revolving fund that will be used by States and Tribes that implement rapid response plans covered by approved (by the Aquatic Nuisance Species Task Force [ANSTF]) State and Interstate Aquatic Nuisance Species Management Plans		Lead federal entity ANSTF, FWS, States, Tribes	12/31/06	5	5	5
Establish a Great Lakes Federal Rapid Response Team, develop rapid response plans, develop environmental compliance documents, implement plans as needed		Lead fed in partnerships with all State, Tribal, and Federal research and management agencies	12/31/05	1.5	1.5	1.5
Establish a competitive grants program supporting research leading to new, effective, and ecologically compatible technologies and techniques to control populations of priority AIS (e.g., zebra mussel, round goby, quagga mussel, ruffe, Eurasian watermilfoil)		Lead federal entity	12/31/06	2	2	2
Enhance funding for State and Interstate Aquatic Nuisance Species Management Plans		FWS	12/31/06	8	8	8
Lead Federal entity will coordinate development and implementation of control programs for priority AIS other than sea lamprey		Lead federal entity	12/31/06	10	10	10
Continue and expand Great Lakes AIS education for recreational users, and develop and implement education programs targeted at maritime commerce, organisms-in-trade, and recreational boaters/ anglers.		NOAA-Sea Grant, States, Tribes	12/31/06	7.3	7.3	7.3
TOTAL				66.4	72.95	71.75